

1. 9:30 A.M. Agenda

Documents:

[2021-06-03 Council Agenda.pdf](#)

2. Meeting Materials

Documents:

[Frans Draft Of Recruitment Brochure.pdf](#)
[GUENTHER Pro Tem City Manager _Planner Contract.pdf](#)
[2021-06 PWS Commission Request For Action Stop Sign.pdf](#)
[2021-177 RES Placement Stop Sign.pdf](#)
[Union Contract On Vacations.pdf](#)
[Initial Draft Of A Potential Water Emergency Agreement.pdf](#)
[2021-178 RES Drinking Water Protection Plan.pdf](#)
[Yachats_Draft-DWPP_05-12-2021_City Council.pdf](#)
[Link To Materials On City Website On Drinking Water Protection Plan.pdf](#)
[Yachats Water Master Plan- DRAFT MAY 2021.Pdf](#)
[Agreement For Payment Of Land - Fire Station Property.pdf](#)

2.I. Additional Fire Department History Documents

Documents:

[YRFPD Land Board Minutes.PDF](#)
[YRFPD Land Letters.PDF](#)



**CITY OF YACHATS
CITY COUNCIL WORK SESSION & COUNCIL MEETING
Yachats OR
Thursday, June 3, 2021 at 9:30 am – 12:30 pm
To Be Held Via Zoom**

AGENDA

Join Zoom Meeting

<https://us02web.zoom.us/j/88376972670?pwd=YllheENFRDJESzI1VStHb3k5S0xnZz09>

Meeting ID: 883 7697 2670

Passcode: 569731

One tap mobile

+12532158782,,88376972670#,,, *569731# US (Tacoma)

+13462487799,,88376972670#,,, *569731# US (Houston)

Dial by your location

+1 253 215 8782 US (Tacoma)

+1 346 248 7799 US (Houston)

+1 669 900 6833 US (San Jose)

+1 301 715 8592 US (Washington DC)

+1 312 626 6799 US (Chicago)

+1 929 205 6099 US (New York)

Meeting ID: 883 7697 2670

Passcode: 569731

Find your local number: <https://us02web.zoom.us/j/88376972670?pwd=YllheENFRDJESzI1VStHb3k5S0xnZz09>

Work Session

- I. Outgoing Interim City Manager Lee Elliott's advice to Council
- II. City Manager Recruitment

Regular Council Meeting

The Yachats City Council meetings are open to the public and interested citizens are invited to attend. These are open meetings under Oregon law, but a work session is not a community forum; audience participation is at the discretion of the Council. Meetings are audio-recorded. Public meeting minutes are available for review at City Hall. The meeting place is accessible to persons with disabilities. For accommodations, please call (541) 547-3565, or Oregon Relay 1-800-735-2900 TDD) two days in advance. City of Yachats does not discriminate on the basis of race, color, religion, creed, gender, national origin, age, disability, marital or veteran status, sexual orientation, or any other legally protected status.

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 Revised 06/02/2021

- I. Announcements, Correspondence, Proclamation
- II. Public Comment: **Topics not listed on the agenda**
5-minute limitation per person

- III. New Business
 - a. Approval of Contract with City manager Pro Tem/Planner Katherine Guenther
 - b. Recommendation from PWS concerning Second street traffic
 - c. Consideration of Vacation Leave Carryover for staff
 - d. Water Emergency Mutual Agreement Draft

- IV. Old Business
 - a. Drinking Water protection plan (Guest Suzanne de Szoeki)
 - b. Water Master Plan (Guest Chris Brugato)
 - c. Agreement with Yachats Rural Fire Protection District regarding sale of land

- V. Other Business (**time allowing with adjournment by 12:30 PM**)
 - a. From Mayor
 - b. From Council
 - c. From Staff

The Yachats City Council meetings are open to the public and interested citizens are invited to attend. These are open meetings under Oregon law, but a work session is not a community forum; audience participation is at the discretion of the Council. Meetings are audio-recorded. Public meeting minutes are available for review at City Hall. The meeting place is accessible to persons with disabilities. For accommodations, please call (541) 547-3565, or Oregon Relay 1-800-735-2900 TDD) two days in advance. City of Yachats does not discriminate on the basis of race, color, religion, creed, gender, national origin, age, disability, marital or veteran status, sexual orientation, or any other legally protected status.

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City of Yachats **CITY MANAGER**

CITY OF YACHATS Gem of the Oregon Coast

Located on the scenic central Oregon Coast along Highway 101, Yachats borders lush forested mountains to the east and rhythmic Pacific surf to the west. Its stunning natural scenery and outdoor recreational opportunities make Yachats a popular tourist destination. Residents enjoy the simplicity of small-town life with major urban cities nearby, including Portland just three hours to the northeast and Eugene just two hours to the southeast.

Yachats, with a strong sense of community, wants to maintain its unique character and enhance what makes it a special Pacific Northwest coastal town. If you are looking for an exciting opportunity to help a small community thrive, preserve its charm, and protect its natural beauty, this is the right position for you.

GOVERNMENT AND ORGANIZATION

City of Yachats operates under a Council-Manager form of government. The City Council is nonpartisan, and comprised of four elected Council members, each serving four-year terms, and an elected Mayor, who serves a two-year term. Yachats operates with an annual budget of XXXXX. The Council appoints a City Manager to oversee operations and to enact Council policies in an effective, efficient and equitable manner.

The City Manager supervises 7.5 FTE's. These positions include office staff, public works staff, and a part-time city planner. The City contracts with a city attorney and a municipal judge. The City Manager also contracts for code-enforcement, IT technical support, custodial work, mowing and the Visitors' Center, and manages all contractor evaluations.

A structured network of commissions and committees work in collaboration with the City Council to provide a full range of services. Volunteers serve on and oversee all these commissions and committees, including: the Yachats Public Library, the Little Log Church & Museum, Parks & Trails, Invasive Plant Control, Public Works & Streets, Planning, Parks & Commons, Budget, Finance, and Emergency Preparedness. Neither police nor fire services are a city function; they are provided by Yachats Rural Fire District, Lincoln County Sheriff's Office, and Oregon State Police. Clearly, there are many more volunteers than employed staff, and volunteer coordination and support is a major responsibility.

THE POSITION CITY MANAGER

With a population of roughly 750, Yachats works to maintain a strong feeling of community that can be hard to find in larger settings. Local residents are highly active and engaged in all village issues, offering sometimes passionate comment and involvement. The preferred candidate will be an excellent communicator, approachable enough to listen openly to conflicting opinions, and skilled enough to bring people together for shared common goals, contributing to the community's success.

The City Manager of a small town must be a "jack-of-all-trades," flexible enough to multi-task, and willing to do "hands-on" work often delegated to others in larger offices. The chosen candidate will need to demonstrate the ability to manage many essential areas at once: finance, accounting & budget; grants & contracts; infrastructure maintenance; water and sewer delivery services; code enforcement; streets, traffic and parking issues; visitor amenities; local business and worker issues; stakeholder involvement; negotiation with county and state officials; organization and communication amongst commissions & committees, city office staff, and the citizens.

The City Manager will be expected to maintain clear roles and boundaries as she or he works with the City Council in its policymaking role, while simultaneously building the necessary ongoing trust, transparency and sense of teamwork. This leader will provide realistic assessments of the staff capacity to fulfill Council expectations and strive to balance several priorities and initiatives. In order to achieve these goals, the City Manager must be able to assign staff to a coherent and functional organizational structure, while allowing for their individual challenge, creativity and growth. It may go without saying, that in this complex process, demonstrable skill in conflict resolution will be required.

DESIRED QUALIFICATIONS

The successful candidate should have at least a Bachelor's degree in public or business administration, public policy, political science, organizational psychology, finance, or a related field. Master's degree is preferred, but years of relevant experience may be substituted for some of the education requirement.

The ideal candidate will have demonstrated success in municipal leadership roles in comparably sized communities or organizations. Preferred candidates will have observable success in collective bargaining; human resource management and personnel supervision; intergovernmental relations; familiarity and comfort with the volunteer Council-Manager form of government. It will add to the candidate's value to have a working knowledge of Oregon law related to finances, purchasing & vendors, water and sewer rate structures, land use, debt tools and funding development, records management & maintenance, open meetings and ethics.

COMPENSATION AND BENEFITS

1. Salary Range DOQ
2. Oregon PERS (retirement system)
3. Family, Medical, Dental & Vision insurance benefits
4. Long-term disability insurance
5. Paid holidays, vacation and sick leave

“Soft Benefits” include assistance from a welcome committee of community volunteers in making the transition and getting settled. Community gatherings will be organized within the first few weeks, to assist in getting acquainted with the citizens. Private and small group tours of the area will be arranged.

CITY COUNCIL GOALS

1. Improve timeliness, relevance, quality, and effectiveness of city service delivery
2. Prioritize and demonstrate environmental responsibility in all actions and decisions
3. Strengthen relationships with community
4. Provide a safe environment
5. Demonstrate financial responsibility
6. Address lack of affordable housing

YACHATS CITY VISION STATEMENT

Our village is a place where natural resources are valued and protected; where diversity is celebrated and where a vibrant economy and sense of community pride create and recreate a living spirit. Yachats cares not just for its citizens’ basic needs but also supports them in their efforts to excel mentally, physically, artistically, and spiritually. It is a community with an enduring sense of itself.

Adopted April 2, 2009

**CITY OF YACHATS
EMPLOYMENT AGREEMENT FOR
PRO TEM CITY MANAGER / PLANNER SERVICES**

This Agreement is entered into this 24th day of May, 2021 by and between the City of Yachats, Oregon, hereinafter referred to as "CITY" and Katherine Guenther, (referred to herein as the "CITY MANAGER PRO TEM / PLANNER") so that the parties may secure temporary professional city manager services.

RECITALS

It is the desire of the CITY to temporarily secure and retain the professional services and skills of the CITY MANAGER PRO TEM / PLANNER and to provide inducement for CITY MANAGER PRO TEM / PLANNER to remain in such temporary employment, and

CITY MANAGER PRO TEM / PLANNER has the necessary skills and experience to assist the CITY; and

It is the desire of the CITY and CITY MANAGER PRO TEM / PLANNER to enter into a contractual agreement wherein the CITY MANAGER PRO TEM / PLANNER provides city manager services on a temporary basis and duties may include assisting the CITY in its search for a permanent City Manager.

THEREFORE, in consideration of the mutual covenants herein contained and for consideration herein specified, the CITY and CITY MANAGER PRO TEM / PLANNER mutually agree as follows:

SECTION I. – DUTIES

- A. Incoming Pro Tem City Manager Duties While current Interim City Manager Lee Elliott holds the office of Pro Tem City Manager and is willing and able to fulfill the duties of the office, but not extending beyond June 3, 2021, the CITY MANAGER PRO TEM / PLANNER will serve as Incoming Pro Tem City Manager and will work cooperatively with Lee Elliott to facilitate a smooth transition.
- B. Pro Tem City Manager Duties As soon as is needed, and no later than June 4, 2021, the CITY MANAGER PRO TEM / PLANNER will serve as the Pro Tem City Manager for the CITY pursuant to Section 33(h) of the City Charter. CITY and CITY MANAGER PRO TEM / PLANNER agree that the CITY MANAGER PRO TEM / PLANNER shall perform the functions and duties of the city manager as given in Section 33 of the City Charter. Pursuant to City Charter Section 33(h), CITY MANAGER PRO TEM / PLANNER will only be able to appoint or remove employees with City Council approval.
- C. The City Council expects the CITY MANAGER PRO TEM / PLANNER to adhere to the highest professional standards. Her actions will always comply with those standards. She agrees to follow the Code of Ethics and Guidelines of the International City/County Management Association and the ethics rules, regulations, and laws of the State of Oregon.
- D. The City Council annually establishes the City's goals and objectives. Decisions and actions generated as a result of the goal setting sessions supplement the annual budgetary process and serve as a guide in the formulation of the budget. The CITY MANAGER PRO TEM / PLANNER will be responsible for pursuing the goals and objectives of the City Council and for providing reports to the City Council regarding the progress toward achieving the Council's goals and objectives.
- E. Pro Tem City Manager / Planner Duties CITY and CITY MANAGER PRO TEM / PLANNER agree that the CITY MANAGER PRO TEM / PLANNER shall perform the functions and duties of city planner as well as the functions and duties described in item A.

SECTION II – TERM; AT WILL STATUS

- A. Term. The term of this Agreement will commence on May 24, 2021 and will continue until terminated as provided herein.
- B. At Will Employee. CITY MANAGER PRO TEM / PLANNER understands and agrees that she is an at-will employee and may be terminated at any time with or without cause, subject only to the terms of this Agreement. CITY MANAGER PRO TEM / PLANNER acknowledges that she is an FLSA-exempt, full-time, temporary employee.
- C. Planner Position: Following termination, CITY MANAGER PRO TEM / PLANNER will resume her position and duties as part-time Planner.

SECTION III. – TERMINATION AND RESIGNATION

- A. Notwithstanding anything herein to the contrary, the CITY may terminate this Agreement and the PRO TEM CITY MANAGER / PLANNER's employment as PRO TEM CITY MANAGER / PLANNER at any time by providing two weeks written notice of its intent to terminate. If the City terminates, it shall have no obligation to pay any severance monies or payments.
- B. The CITY MANAGER PRO TEM / PLANNER agrees not to give written notice of her resignation during the first thirty (30) days of her service as CITY MANAGER PRO TEM / PLANNER. Following this initial thirty-day period, the CITY MANAGER PRO TEM / PLANNER may voluntarily resign her position as CITY MANAGER/PRO-TEM and terminate this Agreement by giving written notice at least thirty (30) days prior to the resignation's effective date.
- C. Termination for Cause. In the event of a for-cause termination, this Agreement shall not be deemed to waive statutory or constitutional rights or remedies otherwise available to the CITY MANAGER PRO TEM / PLANNER. The CITY MANAGER PRO TEM / PLANNER'S employment with the CITY as PRO TEM CITY MANAGER / PLANNER may be terminated immediately in the sole discretion of a majority of the City Council members upon the occurrence of any of the following events:
 - i. The CITY MANAGER PRO TEM / PLANNER fails, refuses, or is unable to comply with the written policies, standards, and regulations of the CITY that are in existence at the time, or fails, refuses, or is unable to comply with any then-current state or federal laws;
 - ii. Dishonesty in any form;
 - iii. The City Council, after a thorough investigation, has reasonable cause to believe the CITY MANAGER PRO TEM / PLANNER has committed fraud, misappropriated CITY funds, goods, or services, or other acts of misconduct that cause injury to the CITY or affect the CITY MANAGER PRO TEM / PLANNER'S ability to perform her job; or
 - iv. The CITY MANAGER PRO TEM / PLANNER fails to perform her duties as CITY MANAGER PRO TEM / PLANNER faithfully and fully in accordance with the highest professional standards.

SECTION IV. – SALARY AND BENEFITS; RULES AND SCHEDULES

- A. Salary. The CITY agrees to pay the CITY MANAGER PRO-TEM/PLANNER a monthly salary of \$7,000 for each month of work provided under this Agreement, subject to all state and federal withholdings and payable in the same installments and manner as other employees are paid. Salary will be pro-rated for any partial month of employment.
- B. Benefits. Will be provided per the City's Personnel Policy for all full-time employee's. The full-time benefits will revert back to part-time benefits once the CITY MANAGER PRO TEM/PLANNER reverts back to her part-time Planner position.
- C. Workers' Compensation. CITY MANAGER PRO TEM / PLANNER will be treated as an employee for purposes of CITY'S workers' compensation coverage.
- D. PERS. CITY MANAGER PRO-TEM / PLANNER is eligible for PERS per the City's Personnel Policies.
- E. Vacation, Sick, Holiday. The CITY MANAGER PRO TEM / PLANNER will earn per the rates established in the City's Personnel Policies.
- F. General Expense. The City recognizes that certain expenses will be incurred by the CITY MANAGER PRO TEM / PLANNER on behalf of the CITY and agrees to reimburse or pay these expenses promptly if the expenses are (i) incurred in the performance of CITY MANAGER PRO TEM / PLANNER'S duties (ii) evidenced by receipts or other documentation, and (iii) approved by the City Council.
- G. Personnel Rules. The parties agree that CITY MANAGER PRO TEM / PLANNER will be bound by the CITY's personnel rules and procedures except as follows: 1) If the CITY's personnel manual, rules, or procedures conflict with the express terms of this Agreement, this Agreement shall control; and 2) CITY MANAGER PRO TEM / PLANNER shall not be subject to any CITY progressive discipline process or disciplinary due process provided in the CITY's personnel manual, rules, or procedures.
- H. Work Schedule. The parties acknowledge that the CITY MANAGER PRO TEM / PLANNER must often work in excess of 40 hours per week and during evening or early morning hours. Overtime pay will not be paid because she is exempt from the FLSA. The parties anticipate that the CITY MANAGER PRO TEM / PLANNER'S work schedule will be a flexible schedule and that she may set her own office hours as long as her work duties are being accomplished and as long as she is present in the office for an average of 40 hours per week.
- I. Consultant Assistance. Recognizing that the CITY MANAGER PRO TEM / PLANNER is agreeing to provide planning services as well as performing the functions and duties of the City manager, the CITY MANAGER PRO TEM / PLANNER has available \$2,200 each month for the payment of consultants / advisors to assist with projects or to provide advice / guidance relevant to her duties. A careful record of these expenses will be maintained. If additional funds are needed, a request should be placed by the CITY MANAGER PRO TEM / PLANNER to the mayor for City Council consideration.

SECTION V. – PROFESSIONAL LIABILITY/INDEMNIFICATION

In accordance with and subject to the tort claim limitations in the Oregon Tort Claims Act and the Oregon State Constitution, the CITY agrees to defend, hold harmless and indemnify CITY MANAGER PRO TEM / PLANNER from and against any and all demands, claims, suits, actions and legal proceedings brought against CITY MANAGER PRO TEM / PLANNER in her official capacity as an agent and employee of the CITY and arising out of any alleged act or omissions in her performance of CITY MANAGER PRO TEM / PLANNER'S duties, as long as such acts or omissions occurred while she was acting within CITY MANAGER PRO TEM / PLANNER'S proper scope of authority.

SECTION VI. – GENERAL PROVISIONS

- A. Entire Agreement; Severability. The text herein will constitute the entire Agreement between the parties and supersedes any and all prior discussions or Agreements between the parties, if any, which are not fully expressed herein. No oral understandings are binding upon the parties. No single person has the authority to amend this Agreement. This Agreement may only be amended by mutual, signed written consent of the parties. If any provision, or any portion thereof, contained in this Agreement is held to be unconstitutional, invalid or unenforceable, the remainder of this Agreement or a portion thereof will be deemed severable and will not be affected, and will remain in full force and effect.
- B. Representation. At all times, the CITY has been represented by attorneys at the firm of Local Government Law Group PC. CITY MANAGER PRO TEM/PLANNER acknowledges that she has had, at all times, the right and the opportunity to consult with independent counsel of her choosing in regard to this Agreement.

IN WITNESS WHEREOF, the City of Yachats, Oregon, has caused this Agreement to be signed and executed on its behalf by its Mayor and Katherine Guenther has signed and executed the Agreement effective the date noted above.

Leslie Vaaler, Mayor

Katherine Guenther



CITY OF YACHATS
COMMISSION / COMMITTEE MEETING REPORT
REQUEST FOR ACTION

COMMISSION: Public Works & Street Commission

MEETING DATE: May 11, 2021

ACTION:

Create a 3 way stop at W. 2nd & Pontiac and paint a crosswalk across W. 2nd. Manual of Uniform Traffic Control Devices (MUTCD) Oregon revised , will be followed.

RECOMMENDATION(s):

As a beginning to address the additional traffic and speeding on W. 2nd the above recommendation is made. Impact of change will be reviewed by Commission in the future to determine what further action may be required. We will continue to look at options available. Intent is first to slow down traffic and create a safer street for pedestrians and animals. Further considerations at a later date will be coming looking at how to reduce traffic on W. 2n, including looking at 3rd & Hwy 101 intersection.

DOCUMENT CHANGES, Any document changes should be indicated through redlining and sent to Kimmie Jackson at kimmie@yachatsmail.org

You will be submitting a document change: YES **NO**

If YES, Document Title:



CITY OF YACHATS RESOLUTION 2021-177
A RESOLUTION APPROVING PLACEMENT OF A 3-WAY STOP AT PONITAC AND
W. 2ND STREET.

WHEREAS, the Public Works & Streets Commission discussed Public Works Department creating a three-way at Pontiac and W 2nd Street and painting a crosswalk across W. 2nd Street;

WHEREAS, on May 11, 2021, a Motion was brought forth to ask the Yachats City Council to create a three-way at Pontiac and W 2nd Street and paint a crosswalk across W. 2nd Street, following the revised Manual of Uniform Traffic Control Devices;
and

NOW THEREFORE, the City of Yachats City Council approved Public Works Department creating a three-way at Pontiac and W 2nd Street and painting a crosswalk across W. 2nd Street, following the revised Manual of Uniform Traffic Control Devices;

EFFECTIVE DATE: This Resolution shall take effect immediately upon its adoption.

This resolution memorializes the action of the City Council on June 3, 2021.

Dated: June 3, 2021

Leslie Vaaler, Mayor

Lee Elliott, City Manager Pro Tem

ARTICLE 18 – VACATION

18.1 Eligibility

Employees shall be eligible for paid vacation after six (6) months of continuous service with the City. Vacation benefits shall be computed from the date of hire.

18.2 Accrual

Permanent employees shall accrue vacation leave based on the following:

<u>Completed Years of Service</u>	<u>Accrued</u>
<u>1st – 3rd year of employment</u>	<u>6.67 hrs monthly / 80 hours per year/ 10 days</u>
<u>4th – 7th year of employment</u>	<u>10.00 hrs monthly / 120 hours per year/ 15 days</u>
<u>8th – 12th year of employment</u>	<u>13.34 hrs monthly / 160 hours per year/ 20 days</u>
<u>13th year and after</u>	<u>16.67 hrs monthly / 200 hours per year/ 25 days</u>

Employees will accrue vacation hours on a monthly basis.

18.3 Rate of Pay

The rate of vacation pay shall be the employee's regular straight time rate of pay.

18.4 Scheduling

Vacations will be granted at the time requested by the employee, subject to supervisory approval and reasonable operational requirements. If the City is compelled by operational requirements to limit vacations, the employee with the greatest seniority shall be given preference of choice for vacation dates. This seniority right shall be exercised only once per fiscal year.

18.5 Vacation Compensation at Separation

Any regular employee who resigns, is laid off, discharged, or retires from the service of the City for any reason prior to taking his/her vacation shall be compensated by check for all earned but unused vacation she/he accumulated at the time of separation.

In case of death, compensation for accrued vacation leave shall be paid in the same manner that salary due the decedent is paid.

18.6 Vacation Accrual

Vacation leave can accrue from year to year to a maximum of 200 hours. On July 1 of each year, any unscheduled vacation leave accrued above the 200 hours shall be forfeited. No employee shall lose vacation as a result of the City not approving vacation.

ARTICLE 19 – HEALTH, WELFARE AND RETIREMENT

19.1 Medical, Dental and Vision Insurance

The City shall provide medical, dental and vision insurance benefits for all employees equal to the coverage, from the City's designated provider, presently in effect.

The City shall continue the current contribution toward premiums for medical, dental and vision insurance coverage. City will not be required to pay these full amounts if the actual rates are below these amounts. Any increase in premiums over the previous year's premium will be split 50/50 by the City and the employees and the employee's share will automatically be deducted from their paycheck. The City agrees that the employee contribution will not increase more than 50% from the current amount in 2017 for the life of this agreement.

WATER EMERGENCY MUTUAL AID AGREEMENT

The Cities of Yachats and Waldport, Municipal Corporations of the State of Oregon (hereafter "City") and Southwest Lincoln County Water People's Utility District (hereafter "Water District") agree that a mutual aid agreement needs to exist between them for the purpose of water emergencies. Therefore, the reasons and conditions are listed below for this mutual aid agreement.

Section 1.

- A. Definition -For the purposes of this agreement, a "water emergency" means a condition, as determined solely by the City Manager of either City or the Water District's Manager or a designate appointed by either Manager that additional water is needed to protect the health and welfare of its consumers, over and above the available water supply to either City or the Water District.
- B. Use of Available of Water -Available water means that amount of water produced by a City or the Water District which may be offered for aid without jeopardizing the municipal water supply of the entity offering aid as may be determined in the sole discretion of the Manager of a City or the Water District. The signatories hereto agree and understand that the available water in each City or the Water District will be carefully managed before declaring a water emergency pursuant to this Agreement.
- C. Permission to Use Water -Once a Manager has determined that a water emergency exists in his/her jurisdiction and that additional water is needed, the Manager shall notify the Manager of the entity from which additional water is sought. The Manager may, if water is available, agree to supply "available water" to the City or Water District in which the water emergency exists. Only the Manager of a City or the Water District from which additional water is requested shall have authority to take the steps necessary to provide water for any water emergency. The Manager of the City or Water District providing the additional water shall have the sole discretion to determine their ability to provide additional water.

Section 2.

- A. Notices -The Manager of each City and Water District shall provide contact lists for the other to use to give notice that a water emergency exists, and that additional water is being requested. The request shall be in writing and be signed by the Manager. A Manager shall not take any step, such as opening a valve or turning on a pump, unless the Manager has received permission in writing from the entity that will be providing the additional water.

- B. Charges for Water -The supplying entity is entitled to charge for water supplied for any water emergency. The charge shall be per unit (per 100 cu. ft. or per 1000 gallons) of water supplied during the emergency as measured by a meter installed for this purpose. The value per unit will be determined by the governing bodies of each City and the Water District each June, to be effective July 1. The City or Water District providing the water shall reasonably determine the rate at which water will be supplied to the requesting City or Water District.

Section 3

- A. Indemnification and Hold Harmless - It is agreed among the parties that the City or Water District receiving water shall indemnify and hold harmless the City or Water District which agrees to supply emergency water to the City or Water District pursuant to this agreement. This includes any damages, costs or other charges which may result from the acts or omissions, negligence, intentional or otherwise incurred under this agreement, including reasonable attorney's fees incurred in any suit, action, or arbitration, including those incurred upon appeal. The indemnification and hold harmless provisions contained in this section are subject to and limited by the relevant provisions of the Oregon Tort Claims Act, ORS Chapter 30.
- B. Termination - Either City or the Water District may terminate this agreement by giving written notice of such termination to the other party. Termination by one party shall not terminate the agreement as to the other parties unless another party elects in writing to do so.

The parties below have hereunto entered into this agreement on the date so indicated below.

City of Yachats

Date

City of Waldport

Date

Southwest Lincoln County Water People's Utility District

Date



CITY OF YACHATS RESOLUTION 2021-178
A RESOLUTION ENDORSING THE DRINKING WATER PROTECTION PLAN

WHEREAS, the Public Works & Streets Commission discussed the Drinking Water Protection Plan prepared by GSI Water Solutions, presented by Suzanne de Szoeki; and

WHEREAS, on May 11, 2021, a Motion was brought forth to ask the Yachats City Council to endorse the Drinking Water Protection Plan; and

NOW THEREFORE, the City of Yachats City Council endorses the Drinking water Protection Plan as presented.

EFFECTIVE DATE: This Resolution shall take effect immediately upon its adoption.

This resolution memorializes the action of the City Council on June 3, 2021.

Dated: June 3, 2021

Leslie Vaaler, Mayor

Lee Elliott, City Manager Pro Tem

DRAFT

City of Yachats

Drinking Water Protection Plan



May 2021

Prepared by:



1600 SW Western Boulevard, Suite 240, Corvallis, OR 97333

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Appendices

Appendix A	City of Yachats 2016 Source Water Assessment and 2020 Update
Appendix B	Risk Prioritization Matrix

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Abbreviations and Acronyms

BLM	U.S. Bureau of Land Management
cfs	cubic feet per second
City	City of Yachats
DEQ	Oregon Department of Environmental Quality
DWPP	Drinking Water Protection Plan
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
ODF	Oregon Department of Forestry
ODA	Oregon Department of Agriculture
ODOT	Oregon Department of Transportation
OEM	Oregon Emergency Management
OHA	Oregon Health Authority
OWRD	Oregon Water Resources Department
POD	point of diversion
SWCD	Soil and Water Conservation District
USDA	U.S. Department of Agriculture
USFS	U.S. Forestry Service
WMCP	Water Management and Conservation Plan
WSMP	Water System Master Plan

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SECTION 1: Introduction

1.1 Background and Goals

Protecting the water quality of drinking water sources is important to safeguard public health and to reduce the need for complex and expensive treatment systems. The 1996 amendments to the federal Safe Drinking Water Act introduced new requirements and provided resources for communities seeking to protect their drinking water sources, including both groundwater and surface water. In Oregon, the development of local Drinking Water Protection Plans (DWPPs) is voluntary, and the State approval process for these plans is administered by the Oregon Department of Environmental Quality (DEQ) for surface water and the Oregon Health Authority (OHA) for groundwater sources. This DWPP provides the City of Yachats (City) with approaches for addressing risks to its drinking water source areas while meeting DEQ and OHA's requirements for State approval.

The major goals of this DWPP are to protect the City's current drinking water sources by identifying and assessing risks in the source water areas, developing effective strategies to address those risks, and providing a well-defined implementation plan to ensure that necessary drinking water protection activities are carried out. The DWPP also includes a contingency plan outlining actions to be taken in the event that a current water source becomes unavailable and considers risks and strategies for protecting potential future water sources. Overall, the DWPP represents a significant step forward in the City's long-term planning efforts for providing a clean, safe, and reliable public water supply.

1.2 City of Yachats Drinking Water Source Areas

Yachats is the southernmost city in Lincoln County, located along Highway 101 on the scenic Oregon coast. The City is popular as a vacation destination, featuring a lively arts and culture scene, charming resorts and restaurants, and picturesque beaches and hiking trails. Particularly in the summer, tourism and seasonal residents can substantially increase the water service population, which reached approximately 2,191 in 2020 during the peak tourism season. For comparison, the 2020 estimate of the population of permanent residents was 780. The Yachats River and estuary bisect the City, with the main business district located on the north side of the river. The surrounding watersheds are primarily forested (including portions of the Siuslaw National Forest, Bureau of Land Management land [BLM], and private industrial timberlands) and include some private agricultural lands.

1.2.1 Water Rights

The City of Yachats holds water rights for the use of water from four sources, two of which are currently in use to provide municipal drinking water supplies. Exhibit 1-1 presents the City's water rights and Exhibit 1-2 shows a map delineating the drinking water source areas.

The City's primary water source is Reedy Creek, a tributary of the Yachats River. Certificate 22933 authorizes the use of up to 2.0 cubic feet per second (cfs), equivalent to 897.7 gallons per minute (gpm), from Reedy Creek. Water from Salmon Creek, another tributary of the Yachats River, is used to supplement the supply from Reedy Creek. Permit S-29018 authorizes the use of up to 2.0 cfs (897.7 gpm) from Salmon Creek, with use limited to any deficiency in the available supply under the water right from Reedy Creek. Protecting the watersheds of Reedy Creek and Salmon Creek is vital to preserving high water quality.

The City also holds water rights for the use of water from North Cape Creek, typically referred to as Cape Creek, and the Yachats River, which are currently held in reserve as potential future water sources. Certificate 14104 authorizes the use of up to 0.49 cfs (219.9 gpm) from (North) Cape Creek. Permit

S-53471 authorizes the use of up to 2.0 cfs (897.7 gpm) from the Yachats River, subject to several restrictions as described in Exhibit 1-1.

Exhibit 1-1. Municipal Water Rights Held by the City of Yachats

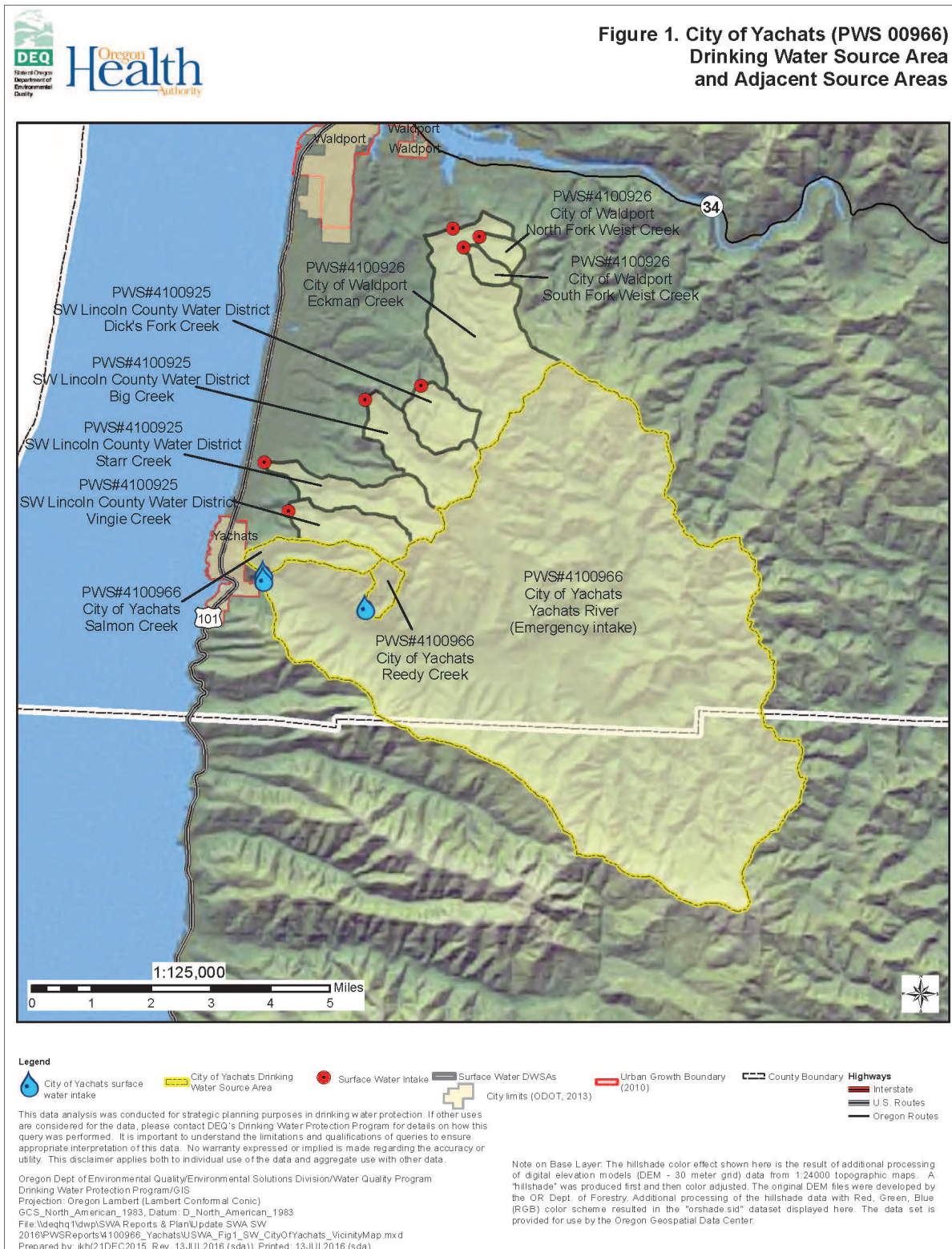
Source	Application	Permit	Permit Amendment	Certificate	Priority Date	Authorized Rate (cfs)	Comments
Reedy Creek	S-20951	S-17333	--	22933	7/9/1945	2.0	City's primary water source.
Salmon Creek	S-38383	S-29018	--	--	8/22/1963 for 1.0 cfs; 6/26/1963 for 1.0 cfs	2.0	City's secondary water source; Supplemental to Certificate 22933 (Reedy Creek water right)
(North) Cape Creek	S-15440	S-11586	--	14104	7/31/1934	0.49	Currently held in reserve as a water source.
Yachats River	S-69856	S-53471	T-7967	--	3/20/1989	2.0 ¹	Permit Amendment T-7967 changed the point of diversion. 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 Use 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 1998 (Stipulated Agreement). The Stipulated Agreement made it so 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). 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." Other stipulations about use of this water right are described in the text of Permit S-53471 and the Stipulated Agreement.

Note: If the water right has not been certificated, the City has not shown that it has used the full authorized rate.

Exhibit 1-2. Map of Drinking Water Source Watersheds



1.3 Drinking Water Protection Plan Development

1.3.1 Source Water Assessment

To fulfill new requirements of the amended Safe Drinking Water Act, DEQ prepared a source water assessment (SWA) report for the City of Yachats Public Water System in 2001, and provided an updated SWA in 2016. In addition to the map of the drinking water source watersheds reprinted above, the SWA includes maps showing soil erosion potential, areas prone to landslides, local land uses and ownership, and potential anthropogenic sources of pollution. Creating a DWPP for the water system has provided an opportunity to build on and enhance the SWA's inventory of potential contaminant sources using local knowledge and public input, as described further in Section 2 of this document.

1.3.2 Plan Development Process

1.3.2.1 Timeline

Development of the DWPP began in the spring of 2020 with the formation of a team of local stakeholders and experts, facilitated by the City's selected contractor, GSI Water Solutions, Inc. Public engagement in the planning process was critical in order to gain on-the-ground knowledge of potential contamination risks and to ensure that strategies to protect the drinking water source areas were customized to meet local needs and conditions. As the DWPP Team worked on developing the plan, public meetings were held virtually using an online meeting web application in September 2020 and April 2021 to provide a public forum for questions and feedback on risks and proposed strategies. Following revisions to incorporate public comment, the City plans to submit the final draft of the DWPP to City Council for approval in May 2021 and then to DEQ for approval in June 2021.

1.3.2.2 DWPP Team

The DWPP Team consisted of a group of stakeholders and a technical advisory group to guide the process of developing this Drinking Water Protection Plan. The Team had over 20 members representing local residents and organizations, government agencies (local, state, and federal), and conservation groups. Collectively, they provided invaluable local knowledge and technical expertise. Exhibit 1-3 shows the Team members and their affiliations.

Exhibit 1-3. Drinking Water Protection Plan Team Members

Name	Affiliation
John Purcell	View the Future
Joanne Kittel	View the Future
Craig Berdie	Yachats Water Committee
Jim Adler	Yachats Water Quality Monitoring Group
Rick McClung	City of Yachats, Public Works Department
Heather Hoen	City of Yachats, Community Services Coordinator
Onno Husing	Lincoln County Planning
Joe Moll	McKenzie River Trust
Mike Broili	MidCoast Watershed Council
Jen Hayduk	Lincoln Soil and Water Conservation District
Kacey Largent	US Forest Service
Douglass Fitting	Bureau of Land Management
Tony Spitzack	Bureau of Land Management
Maria Gibson	Oregon State University Hydrogeologist
Ariana Carlson	Yachats resident and business owner
Marc Courtenay	Yachats resident
Drew Tracy	Yachats resident
Sam Hillmann	RARE Associate with the City of Yachats
Technical Advisory Group	
Jacquie Fern	Oregon Department of Environmental Quality
Nikki Hendricks	Oregon Water Resources Department
Leo Williamson	Oregon Department of Forestry
Cheryl Hummon	Oregon Department of Agriculture
John Spangler	Oregon Department of Fish and Wildlife
Stan Van de Wetering	Confederated Tribes of the Siletz Indians
Amy Bleekman	Drinking Water Services/Oregon Health Authority

1.3.2.3 Public outreach and engagement

Throughout the planning process, the Team remained committed to the inclusion of local voices through opportunities for public outreach and engagement. A public meeting was held virtually in September 2020 to discuss the risks to the drinking water source areas identified by the SWA and the DWPP Team, to evaluate how those risks were prioritized, and to seek public input on additional potential risks to the water supply. A second public meeting will be held in April 2021 to gather public feedback on the draft DWPP, including proposed strategies for protecting water quality in the source areas, the implementation plans for these strategies, and the contingency plan for the use of alternative water sources. The City advertised the public meetings through articles in the City newsletter, the City's website and local news websites, messages in water bills, and flyers posted around the community. The *Newport Times News* newspaper also ran articles about the public meetings. In addition to attending the meetings, the public was able to view a recording of

the meeting online for a week after the meetings and to provide comments during the meetings and via phone and email.

1.4 Organization of the Drinking Water Protection Plan

The plan is organized into the following sections:

- Section 2: Risk Assessment
- Section 3: Strategies to Address Risks
- Section 4: Implementation Plan
- Section 5: Contingency Plan
- Section 6: Future Water Sources

SECTION 2: Risk Assessment

2.1 Introduction to Risk Assessment

In 2016, DEQ completed an updated SWA for the City of Yachats Public Water System. This assessment delineated the City's current and potential future drinking water source areas and provided baseline data on known potential contaminant sources. DEQ provided an updated section of the SWA called Inventory of Potential Sources of Pollution in April 2020. Appendix A contains the 2016 SWA plus the section updated in 2020. The Inventory of Potential Sources of Pollution updated in 2020 identified erosion risks within the City's current drinking water source area (Salmon Creek and Reedy Creek watersheds). Erosion risks, along with other potential sources of pollution, were also identified in the future drinking water source area (Yachats River watershed, described as the emergency intake area). Sensitive areas within the City's drinking water source area include areas with high soil erosion potential and areas within 1,000 feet of the source water streams. The SWA shows that 100 percent of the stream miles within the Salmon Creek and Reedy Creek watersheds are located in areas of highly erodible soils. Potential contaminant sources, if located near these streams, would pose a greater threat to the water supply.

The Yachats DWPP Team used the SWA as a starting point to evaluate identified facilities and land uses that could be potential sources of contamination, focusing primarily on the current drinking water source areas. The Team then provided input on additional risks identified through their expertise and local knowledge. Once potential risks were identified, the Team assessed the risk levels using a DEQ-provided guidance document as a starting point. The document contained information on water quality impacts and general risk levels for each potential contaminant source. This was further refined with Team input on factors specific to local watersheds that could affect the risk level. During the risk prioritization process, the Team ranked the risks in each category and subcategory as high, medium, or low based on their knowledge of local conditions.

Next, the City held a virtual public meeting in September 2020 to present the risks identified and prioritized. Further potential risks were added based on public comments, and subcategories of risks were refined. Stakeholders also expressed interest in refining the risk prioritization by separating the probability and consequences of each risk. To do this, each potential risk category was given two ratings, each on a scale of 1-5, describing the likelihood of occurrence and the consequence or severity of impact if it does occur (See Appendix B).

This process considered risks to both current and future water sources. Based on combined DWPP Team expertise and public feedback, the final risk assessment for current water sources is presented below. Information about potential risks to the future source area is provided in Section 6. The risks to current water sources fall into three general categories with associated subcategories:

- **Natural Disasters**
 - Drought/low flows
 - Climate change
 - Wildfire
 - Earthquakes
 - Severe Weather Events
 - Tsunamis
 - Insect outbreak

- **Forestry Management**
 - Timber harvest
 - Forestry pesticides
 - Access roads
- **Municipal, Commercial, and Residential (Urban/Rural) Property Management**
 - Development
 - Property management
 - Aging municipal infrastructure
 - Landscape care
 - Sabotage/vandalism of municipal infrastructure

2.2 Risks to Current Drinking Water Sources

The risks identified below are presented in order from highest to lowest risks to the current drinking water sources, the watersheds of Salmon Creek and Reedy Creek. Each risk is presented with its ranked risk level (high, medium, low) followed by its probability (1-5) and consequence (1-5), with 1 being the lowest risk and 5 being the highest risk.

2.2.1 Natural Disasters

Natural disasters encompass a wide range of potential events that could impact drinking water source areas. Although these events generally cannot be prevented, evaluating their potential consequences in order to be prepared and identifying steps to increase the resilience of the drinking water system are critical.

2.2.1.1 Drought and low flows (high: 5, 5)

Low streamflows in the summer may limit the water system's ability to meet demand. Low flows also contribute to elevated stream temperatures, low dissolved oxygen, growth of algae and bacteria, and concentration of pollution. These conditions could impair water quality in drinking water sources. Extended droughts could intensify these effects and prolong impacts throughout the year.

2.2.1.2 Climate change (high: 5, 5)

In the Pacific Northwest, climate change is projected to increase climate variability and extremes, leading to patterns such as reduced summer rainfall and intensified winter storms. This could exacerbate issues associated with droughts and low flows described above in the summer, as well as increasing winter runoff and flooding, leading to increased erosion and turbidity in drinking water sources. Climate change may also increase the risks of wildfire and insect outbreaks.

2.2.1.3 Wildfire (high: 4, 5)

Although significant wildfires have not been common in the City's drinking water source areas and adjacent forest lands, fires in the forested watersheds of the drinking water sources could remove vegetation and damage soils. This could increase runoff and erosion while decreasing soil water infiltration and retention. This risk is amplified by potential understaffing of firefighting efforts, fuel loading in the Salmon Creek watershed, and timber harvest practices, such as leaving slash piles on-site to burn in the fall. Firefighting chemicals also have the potential to contaminate drinking water quality.

2.2.1.4 Earthquakes (high: 4, 5)

Earthquakes have the potential to cause significant damage depending on their magnitude, location, and timing. Coastal elevation drop could drain water more quickly from water sources. An earthquake could damage infrastructure for water intakes, treatment, and distribution.

2.2.1.5 Severe weather events (high: 5, 4)

Heavy precipitation and rapid runoff of snowmelt could cause erosion of the landscape, leading to sedimentation and increased stream turbidity. This risk may be higher in combination with other risks, such as timber harvest and burned areas. Although no landslide deposits have been mapped within the Salmon and Reedy Creek watersheds, 100% of the stream miles within these watersheds are located in areas of high soil erosion potential.

Ice storms, snow storms, and high winds can cause trees to fall and damage water infrastructure. Depending on the location of trees knocked down, this could also diminish riparian (i.e., streamside) vegetation, which is associated with increases in streambank erosion and drinking water source turbidity.

2.2.1.6 Tsunamis (high: 2, 5)

The Oregon coast is at risk from both local and distant tsunamis. A local tsunami, caused by a nearshore earthquake, could reach the coast within minutes and cause extensive damage to property, public lands, and water infrastructure. This risk may be combined with direct earthquake damage as described above. A distant tsunami produced by an undersea earthquake farther away could take several hours to travel across the Pacific Ocean, but could still be capable of causing substantial damage to infrastructure when it reaches the coast. Water could be pushed upstream along the Yachats River and its tributaries, potentially introducing seawater, mud, debris, and other contaminants to the drinking water source if it reaches the intake areas.

2.2.1.7 Insect outbreak (medium: 2, 4)

Insect outbreaks are not currently common in the area, but climate change could impact the likelihood and severity of outbreaks of insects, such as bark beetles. An outbreak affecting a large area of forested land in the watershed could lead to widespread loss of trees, increasing the risk of erosion and runoff, as well as making the landscape more susceptible to wildfires.

2.2.2 Forestry Management

The forested watersheds comprising Yachats' current drinking water source areas are predominantly owned by USFS and are part of the Siuslaw National Forest. However, a significant portion of the Salmon Creek watershed, directly upstream from the drinking water intake, is private industrial timberland. Oregon's Forest Practices Act sets standards for forestry operations, access roads, reforestation, and water protection, among other issues. Nonetheless, forestry practices may still have the potential for drinking water quality impacts due to lack of compliance or gaps in regulations.

2.2.2.1 Timber harvest (high: 4, 4)

Timber harvest practices, particularly clearcutting, may increase erosion in the watershed. This results in higher stream turbidity from sedimentation. At the same time, increased rapid runoff of precipitation reduces groundwater infiltration, contributing to lower streamflows during parts of the year. Irregular tree densities occurring under natural reforestation conditions, such as in the Salmon Creek watershed, can exacerbate those issues. Timber harvest can reduce or remove riparian vegetation, leading to the issues discussed above. Oregon's Forest Practices Act does not require riparian buffers for non-fish-bearing streams, so water

quality in headwater tributaries could become degraded by forestry activities unless the streams are otherwise protected. Timber harvest near riparian areas may also reduce beaver habitat. Beaver habitat includes floodplains supporting the beavers' food sources, such as willows and young alders. Beavers create dams and ponds that store water and slowly release it through the year, supporting greater streamflows into the summer season. Further studies of beaver habitat in the Yachats area, including the basin size and the number and size of beaver ponds, could help clarify potential local impacts and the degree of increase in summer flows.

2.2.2.2 Forestry pesticides (high: 4, 4)

Over-application or improper handling of pesticides (i.e., insecticides, fungicides, and herbicides) used in forestry management, or aerial spraying, could contaminate drinking water sources. Timing of applications can potentially contribute to water quality impacts, such as applying pesticides before precipitation events or during periods during the year when breakdown by soil microorganisms is slower, by increasing the likelihood of the pesticides making it into drinking water sources. Environmental conditions can also contribute to water quality impacts, such as steep slopes, little to no vegetation, and windy or stormy weather conditions.

2.2.2.3 Access roads (high: 4, 4)

Road construction, maintenance, and usage for forestry operations removes vegetation and disturbs the soil, potentially leading to the same erosion and stream turbidity issues discussed above. This risk is increased if the road density exceeds two miles of road per square mile of watershed, and where there are inappropriately maintained roads and undersized culverts. In addition, vehicle usage along roads in the watershed presents the possibility of leaks or spills of petroleum products or other hazardous materials, such as pesticides, depending on what is being transported. Fuel leakage from abandoned forestry machinery in the Salmon Creek watershed could pose potential contamination issues.

2.2.3 Municipal, Commercial, and Residential (Urban and Rural) Property Management

Good property management practices can maintain healthy ecosystems, protect streams, and prevent the unintentional release of hazardous substances. Both urban and rural parts of the watershed can benefit from attention to wise property management. For example, the City has an ordinance prohibiting pesticide use on their properties.

2.2.3.1 Development (high: 4, 4)

New construction may be associated with vegetation removal and soil disturbance, increasing erosion and stream turbidity. New development also increases the proportion of impervious surfaces in the watershed, increasing runoff. Development increases the potential for runoff to carry contaminants from domestic animals or pesticides (i.e., insecticides, fungicides, and herbicides) and fertilizers used in landscaping. Currently, few homes could be developed in the drinking water source areas. Land in the Salmon Creek area was recently reclassified as Residential Tract, and annexation or rezoning could pose more of a threat, although annexation could also allow the City to protect critical drinking water areas. The Urban Growth Boundary for Yachats currently follows city limits.

2.2.3.2 Property management (high: 4, 4)

Land management activities on residential, commercial, or municipal properties could include removal of riparian vegetation and reduction of beaver habitat. As mentioned previously, this could increase the risk of streambank erosion, turbidity, high stream temperatures, low dissolved oxygen, algae growth, and high

bacteria counts. Beaver habitat includes broad floodplains with willow and alder, and the beaver themselves create dams and ponds that store water and slowly release it to bolster streamflows during the summer. The degree of increased summer flows depends on basin size and the number of beaver ponds, as described above. In addition to these impacts, land management can result in the use of release of fertilizers, pesticides, or other hazardous chemicals. Although few landowners are presently located in the current source water areas, additional land could be developed in the future.

2.2.3.3 Aging municipal infrastructure (high: 4, 4)

Some of Yachats' municipal water supply infrastructure has been serving the community for many years and is approaching the end of its anticipated lifespan. Failures in water system infrastructure could reduce the water supply or limit the ability to filter out contaminants.

2.2.3.4 Landscape care (medium: 3, 4)

Over-application or improper handling of pesticides (i.e., insecticides, fungicides, and herbicides) and fertilizers in landscape care around residences, businesses, and municipal facilities could lead to unintentional releases into drinking water sources. In addition, excessive irrigation of landscaping could transport these contaminants to surface water even if applied in recommended amounts. Although few landowners are presently located in the current source water areas, additional land could be developed in the future.

2.2.3.5 Saltwater intrusion (low: 1, 2)

A combination of sea level rise and storm surge could potentially push seawater upstream toward the Salmon Creek water supply intake.

2.2.3.6 Sabotage/vandalism of municipal infrastructure (low: 1, 1)

Water system infrastructure could be damaged by deliberate acts of sabotage or vandalism.

2.3 Identifying and Addressing New Risks

DEQ evaluates approved Drinking Water Protection Plans on an approximately 5-year cycle for recertification. At this time, the City will review the risks presented in the DWPP and consider any new information available about emerging risks to the source area. In the interim, the City will consider new information on risks as part of its annual evaluation of the DWPP and adjust implementation of strategies accordingly. Any updates to the Source Water Assessment provided by DEQ or OHA will be incorporated into DWPP implementation as needed. If the City determines the need to begin usage of a new water source, Section 6 of this DWPP provides an assessment of potential risks to water quality, as well as suggested strategies to protect the new drinking water source.

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SECTION 3: Strategies to Address Risks

3.1 Introduction to Strategies

The Team identified strategies for each of the risks to the City's current drinking water sources described in Section 2. To identify strategies, the Team reviewed DEQ's Source Water Assessment document and drinking water protection plans developed by other water providers and utilized Team member expertise and local knowledge. The Team typically identified multiple strategies for each risk and the strategies often fit under similar themes. For example, a strategy for many of the risks was public education about the particular risk. The Team decided to group strategies under major themes, or programs, to provide a manageable structure for implementing the strategies. The eight major programs are:

- Communications and Advocacy
- Public Education
- Critical Area Protection
- Municipal Policies and Infrastructure Management
- Plan and Program Development and Enhancement
- Monitoring
- Contamination Prevention Programs
- Watershed Restoration Support

Exhibit 3-1 presents each of the programs that an identified strategy fits under for each risk. The remainder of Section 3 describes the strategies under each program.

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Exhibit 3-1. Strategies Addressed by Program

Category	Risk Addressed	Risk Level:	Public Education and Technical Assistance	Communications and Advocacy	Critical Area Protection Programs (acquisitions, easements)	City Policies: Regulations, Infrastructure	Contamination Prevention Programs	Monitoring	Watershed Restoration Support	Plan/Program Development and Enhancement
Natural Disasters	Drought/low flows	High (5,5)	•	•		•		•	•	•
	Climate change	High (5,5)	•	•	•	•		•	•	•
	Wildfire	High (4,5)	•	•					•	•
	Earthquakes	High (4,5)	•	•				•	•	•
	Severe Weather Events	High (5,4)	•	•	•				•	
	Tsunamis	High (2,5)	•			•				
Forestry Management	Insect outbreak	Medium (2,4)						•		
	Timber harvest	High (4,4)	•	•	•			•		
	Forestry pesticides	High (4,4)	•	•			•	•		
	Access roads	High (4,4)		•					•	•
	Development	High (4,4)	•	•	•	•				
	Property management	High (4,4)	•			•			•	
Municipal, Commercial, and Residential (Urban and Rural) Property Management	Aging municipal infrastructure	High (4,4)								•
	Landscape care	Medium (3,4)	•				•			
	Saltwater intrusion	Low (1,2)				•				
	Sabotage or vandalism of municipal infrastructure	Low (1,1)				•				

Note

1: Numbers in parentheses refer to the probability and consequence of each risk, with 1 being the lowest risk and 5 being the highest risk.

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3.2 Communications and Advocacy

These strategies focus on increasing understanding about the City's drinking water protection concerns among government entities, regional water providers, stakeholders, and landowners or land managers; learning about activities or events that may affect the City's drinking water sources; and participating in government processes that may have an outcome that impacts the City's drinking water sources.

3.2.1 General Communication and Advocacy Strategies

3.2.1.1 Communications protocols

The City will establish protocols and schedules for communicating with governmental entities, regional water providers, Oregon legislators, and other stakeholders about a variety of concerns related to drinking water protection. These topics include, but may not be limited to, the following:

- **Natural disasters:** drought, climate change, severe weather events, tsunamis, wildfire
- **Forestry management:** timber harvest and pesticides
- **Municipal, commercial, and residential property management:** development

By establishing communication protocols, the City will be able to establish and strengthen relationships with entities whose activities could impact drinking water source areas and whose cooperation could help address risks. Collaborative water supply planning with neighboring and regional water providers could lead to strategies to mitigate risks. Communications with landowners and land managers in the drinking water source areas could foster relationships and partnerships. Regular communication is particularly important given that the source areas are outside city limits, constraining the City's options for direct action.

3.2.1.2 Participation in government processes

A robust communication protocol will ensure that the City is aware of and able to participate in any relevant processes that could impact drinking water supplies. This may include broad climate change planning efforts as well as more focused activities, such as reviewing and commenting on state and federal agency annual operations plans for timber harvesting during public comment periods. The City would also ensure its drinking water interests are represented in public processes related to addressing the effects of severe weather events, forestry pesticide applications, and land use changes and development.

3.2.1.3 Master outreach document

The City will compile a master document of information on topics related to drinking water source protection for use in outreach. Information from the relevant sections of the document can then be used to create consistent messaging in communications. Types of information to incorporate may include:

- **Natural disasters:** Potential impacts on water resources due to drought, climate change, wildfires, tsunamis, and severe weather events
- **Forestry management:** managing nonpoint source pollution from forestry activities, importance of stream buffers, and potential impacts of pesticide applications on drinking water sources
- **Municipal, commercial, and residential property management:** impacts of development on drinking water sources and sensitive areas, benefits of riparian vegetation and beaver habitat, and impacts of the misuse of pesticides and fertilizers on water quality

Additional topics may be developed as needed.

3.2.2 Communications Strategies to Address Specific Risks

In addition to the general strategies described above, the Team identified additional strategies to address risks related to wildfire, severe weather events, and forestry issues.

3.2.2.1 Natural disasters: wildfire

Fire preparedness planning

The City will communicate with forest landowners and managers to inform them of the location of drinking water intakes and the drinking water source area boundaries, to promote measures that reduce fire risk and intensity, and to promote measures that improve post-fire resiliency.

On State-owned or regulated forest lands, the City will learn about Oregon Department of Forestry's (ODF's) work related to fires and work with ODF to address potential impacts to drinking water from fires and firefighting efforts (e.g., potential chemical use and pumping water from creeks).

Post-fire activities

After any wildfire in the drinking water source area, the City will work with landowners and managers to assess potential water quality impacts from the fire and firefighting efforts. The City will also work with landowners, managers, and relevant agencies to implement erosion control measures as needed to reduce the risk of excessive runoff in the source area. The City will contact OHA and DEQ's Laboratory to request water quality monitoring at the drinking water intake, and if water quality is impaired, the City will contact OHA to inquire about a post-fire emergency drinking water source protection grant to help reduce water quality impacts.

3.2.2.2 Natural disasters: severe weather events

In the event of severe storms that result in downed trees or loss of riparian vegetation, the City will work with landowners and managers to assess potential water quality impacts from soil erosion and runoff. The City will communicate with affected entities about the importance of implementing erosion control measures and restoration efforts as needed.

3.2.2.3 Forestry management: timber harvest

The City will notify forest landowners and managers of their location in the City's drinking water source area, provide outreach information about preventing water quality impacts from timber harvest activities, and express interest in partnering on drinking water source protection projects if opportunities exist.

3.2.2.4 Forestry management: pesticides

In conjunction with its communication around timber harvest impacts on water sources discussed in 3.2.2.3, the City will also address forest management concerns related to the use of pesticides on private and public land. When the City learns of plans for pesticide applications within the drinking water source areas, it will request consultation with the forest landowner and/or appropriate regulatory agency to discuss a preferred Integrated Pest Management approach and the use of additional buffers, where feasible, to protect water bodies. The City will develop a process to notify nearby residents of aerial spraying and other pesticide applications planned within the source areas.

3.2.2.5 Forestry management: access roads

Since spills of potential contaminants are more likely along roads, the City will become familiar with the Oregon Emergency Response System within the State Office of Emergency Management, the agency that coordinates and manages State resources in response to spills. The City will verify that the State emergency response programs have the City's correct contact information. In addition, the City will share contact information with entities who manage roadways in the drinking water source areas (e.g., Oregon Department of Transportation, Lincoln County, or private landowner). In order to facilitate more rapid spill responses, the City will notify the property owner and local first responders of the location of the drinking water source area and need for protection in the event of a spill of petroleum products or other hazardous materials.

3.3 Public Education and Technical Assistance

These strategies focus on promoting conservation of the City's water resources to ensure wise use and to address drought and climate change; preparing for the impacts of natural disasters, such as wildfire, earthquakes, and tsunamis on water sources; safe management of chemicals, including those used in forestry, development, and landscape care; and promoting land management practices that are protective of the City's drinking water sources.

3.3.1 Water Conservation

As part of a larger water conservation program described in more detail later in this plan, the City will provide public education related to the impacts of droughts and low flows, as well as projected impacts of climate change on water resources. The objective of this education is to encourage conservation of water to avoid waste and to protect against future shortages, as well as to advance preparedness for changing conditions.

3.3.2 Natural Disaster Preparedness

Education in this area will focus on assisting the public to prepare for wildfires, earthquakes, and tsunamis, particularly in the context of potential impacts to drinking water sources. This includes providing information on receiving disaster alerts, how to find out if there is a boil water order, updates on the City's fire, earthquake, and tsunami preparedness planning, and similar measures. Messaging will be coordinated with the City's Emergency Preparedness Committee.

3.3.3 Safe Management of Potential Contaminants

Safe handling, application, and disposal of chemicals is essential to protecting drinking water sources.

3.3.3.1 Forestry management: pesticides

Education of the landowners and managers of private forestry lands will focus on ensuring that pesticides are handled and applied in a manner that does not present risks to drinking water. The City will notify forest landowners and managers of their location in the City's drinking water source area and will provide information about preventing pollution.

3.3.3.2 Property management: development

Education and technical assistance will be provided around safe management of potential contaminants during potential municipal, commercial, or residential development. This may be combined with other education programs conducted by the City.

3.3.3.3 Property management: landscape care

The City will provide public education about safe management of chemicals typically used in landscape care that could pose a risk to drinking water sources. Educational materials will help property managers understand the connection between landscape care and water quality. The City will also share more technical information on water quality and pesticide use with interested parties, including referrals to DEQ resources and technical assistance. The City will also support efforts to offer OSU Extension and Lincoln Lincoln Soil and Water Conservation District (SWCD) “Living on the Land” workshops or similar trainings.

3.3.4 Land Management Education

The City will provide public education on the connection between residential and commercial land management activities and water quality. This may include education about riparian area management and protection, beaver habitat, floodplain protection, and invasive plant species control. These activities benefit water quality and fish and wildlife habitat in the source watersheds. The City will also assist interested parties in accessing technical and financial assistance resources and connecting with relevant entities, such as the MidCoast Watersheds Council, The Beaver Coalition, and SWCD.

3.4 Critical Area Protection Programs

Critical area protection programs are designed to safeguard the City’s drinking water supply by preventing activities that could pose a risk to water quality. These strategies focus on land acquisition or conservation easements by the City or a land trust from a willing seller to protect drinking water source areas. Areas of greatest concern include:

- **Natural disasters:** areas projected to be critical under future climate change conditions; areas potentially subject to substantial erosion or landslides due to heavy precipitation and other severe weather events
- **Forestry management:** areas where timber harvest would not be compatible with the City’s drinking water protection goals
- **Municipal, commercial, and residential property management:** areas that might otherwise undergo development

Land acquisition and conservation easements would provide the City with more influence over activities outside city limits that could affect the drinking water supply. One potential conservation easement location has already been identified below Salmon Creek, east of the water treatment plant.

3.5 Municipal Policies and Infrastructure Management

These strategies focus on promoting water conservation to manage the City’s water supply sustainably and protecting municipal water infrastructure.

3.5.1 Water Conservation Policies

Water conservation measures decrease demand on water resources, protecting limited supplies and reducing the need to seek alternative supply sources.

3.5.1.1 Natural disasters: drought/low flows and climate change

Reducing demand helps ensure a sufficient water supply during low flows during the summer months, as well as during prolonged droughts. The City will analyze water rates and water rate structures for its customers in order to adjust rates as needed to address anticipated costs of water conservation and

management efforts, as well as to encourage water conservation. These efforts will be part of the broader water conservation program outlined under Section 3.6.1.

3.5.1.2 Property management: development

Inside city limits, the DWPP Team recommends that the City pass development ordinances that maximize the water efficiency of new homes and businesses and their associated landscaping. Ordinances should require indoor water fixtures that are more water-efficient than current plumbing standards and require water-wise landscaping and water-efficient irrigation technologies. The Team also recommends that the City adopt an ordinance tying the issuance of building permits to water supply sufficiency to ensure that water sources are not overtaxed. Additional zoning ordinance updates that restrict development or change siting and permitting requirements may be considered.

3.5.2 Municipal Infrastructure Management

Infrastructure management activities are designed to protect, maintain, and improve municipal water infrastructure to ensure its long-term ability to meet the needs of all users.

3.5.2.1 Property management: aging municipal infrastructure

Rapid leak detection and repair are essential to maintaining the water system's capacity to meet demand now and in the future under a changing climate. The City will identify leaks through proactive leak detection surveys and will take steps to address problems promptly. Through the Water System Master Plan development process, the City will identify the percentage of water loss in the system and will then address potential sources of water loss, such as system leakage, accounting issues, and unmetered authorized uses. As part of the planning process, the City will also develop and implement a Capital Improvement Plan to upgrade aging infrastructure that may be vulnerable to leaks and to optimize water system efficiency. The City will identify and pursue funding opportunities for identified capital improvement projects. Annual water audits will keep information on water loss up-to-date so that new issues can be addressed as they occur. In addition, the City's water treatment plant is currently in the tsunami zone. When a new water treatment plant is needed at some point in the future, the Team recommends locating the new water treatment plant outside of the tsunami zone if possible.

3.5.2.2 Property management: saltwater intrusion

The current water supply intake on Salmon Creek is not considered to be at risk for saltwater intrusion. The City will document the risks to this and other potential surface water intakes in order to maintain institutional knowledge for future water managers.

3.5.2.3 Property management: sabotage and vandalism

To prevent intentional damage to water system infrastructure from sabotage or vandalism, the City will adopt policies ensuring that security systems are in place around key water infrastructure. The City will also share information and security-preparedness measures with nearby water systems.

3.6 Plan and Program Development and Enhancement

These strategies focus on promoting water conservation and sustainable management, municipal supply planning, water quality protection, and disaster preparedness.

3.6.1 Water Conservation Program

The City's water conservation program will be designed to ease stress on water supplies and reduce excessive demand and water waste. The program will benefit water supplies under conditions of drought, low flows, and climate change. Major components of the program will include:

- Public education about the need for conservation and ways to save water for water customers and students
 - Public education could include: newsletter articles, billing messages, curriculum for students (K-12, community college), brochures, workshops, and a booth at events
- Tiered water rates to encourage awareness of water use and discourage waste
- Technical and financial assistance for water conservation
- Incentive programs to encourage water fixture efficiency upgrades and purchases
- Landscape and water fixture ordinances described above
- Customer leak detection and notification

The water conservation program will be aligned with the City's Water Management and Conservation Plan objectives and implementation actions.

3.6.2 Supply Planning

In conjunction with the Water System Master Plan and other planning processes, the City will evaluate and plan for a sustainable water supply that can continue to meet demands from future growth, droughts, and climate change. The City will consider alternative water sources, connections to other water systems, and storage options. Infrastructure needs identified during supply planning will be included in the City's Capital Improvement Plan.

3.6.3 Water Quality Protection Programs

In addition to variability in quantity, water supply can be constrained by water quality concerns, and the City will take steps to protect water quality and prevent the need for additional treatment measures.

3.6.3.1 Natural disasters: drought/low flows and climate change

Low streamflows tend to concentrate pollution and exacerbate turbidity, as well as potentially presenting logistical problems at the water supply intake. When low flows pose a risk to the drinking water supply and/or watershed health in the source areas, the City will seek to promote and coordinate temporary instream leases of water rights in order to boost flows and protect water quality and aquatic habitat.

3.6.3.2 Forestry management: access roads

The City will encourage the development of and request to review spill response plans developed by entities responsible for management of the forested drinking water source watersheds, including access roads used for forestry activities. These plans should include provisions for protecting water quality in the event of leaks or spills of petroleum products, pesticides, and other potential contaminants being transported along access roads.

3.6.4 Disaster Preparedness Programs

The City will integrate protection of drinking water source areas into existing emergency planning and preparedness programs for disasters, such as wildfire, earthquake, and tsunami response. This will include

coordination with the Emergency Preparedness Committee to promote awareness of the potential effects of disasters on drinking water supplies. In conjunction with the Water System Master Plan process, the City will determine any upgrades to infrastructure needed for earthquake resiliency. The City will then address any upgrades needed through the Capital Improvement Plan process, including identifying and pursuing funding opportunities as they become available.

3.7 Monitoring

These strategies focus on monitoring water quality to detect and address degradation, and monitoring for potential insect outbreaks.

3.7.1 Water Quality Monitoring

As discussed above, water quality is as important to water supply as quantity. The City's water treatment plant is designed for the typically high quality raw water that is usually available in the source creeks. Degraded water quality would create challenges to the treatment process and potentially increase costs.

3.7.1.1 Natural disasters: climate change

Long-term water quality monitoring will ensure that water quality is not degraded over time by erosion, runoff, or pollution. Maintaining long-term records of streamflows will help the City identify trends that could potentially impact its water supply and prepare for its future water needs.

3.7.1.2 Natural disasters: severe weather events

Water quality monitoring will be conducted after extreme storms in areas prone to excessive erosion and sedimentation.

3.7.1.3 Forestry management: timber harvest

As needed, monitoring downstream of identified problem areas after timber harvest will be conducted to ensure that water quality is not being degraded by erosion and runoff. If water quality problems are detected, the City will communicate with the landowners or managers regarding steps that can be taken to protect the City's drinking water sources.

3.7.2 Insect Outbreak Monitoring

The City will stay aware of and participate in monitoring programs for regional insect outbreaks that could lead to widespread tree mortality in the drinking water source areas. In the event of an outbreak, the City will conduct public education on detecting pests and will institute or participate in a reporting system to monitor the spread of insect pests to new areas.

3.8 Contamination Prevention Programs

These strategies focus on prevention of contamination of drinking water sources by chemicals used in forestry activities and landscape management, and safe disposal of hazardous wastes.

3.8.1 General Contamination Prevention

Safe handling of chemicals is fundamental to protecting source water areas as well as the health of individuals using these chemicals.

3.8.1.1 Forestry management: pesticides

If private industrial forest land is scheduled for harvest or chemical application within a drinking water source area, the City will work with the landowner or manager to set up direct communication, share maps of the affected area, and provide notification of any chemical applications. Building a good relationship with landowners and the Oregon Department of Forestry Stewardship Forester will be beneficial in developing site-specific plans that address the use of chemicals in the drinking water source areas. This could include voluntary actions that may be more stringent than Forest Practices Act requirements, such as avoiding mixing, handling, or storage of pesticides and fertilizers in areas that could affect the water supply. The City could also encourage elimination or minimization of pesticide application in sensitive areas and other locations that could contaminate drinking water sources.

3.8.1.2 Property management: landscape care

Similar to forestry management, the City can request elimination or minimization of pesticide application in locations, such as beside waterways, which could contaminate drinking water sources.

3.8.2 Hazardous Waste Collection

In order to ensure safe disposal of potentially hazardous chemicals, the City will sponsor hazardous waste collection events. These may include collection of unused pesticides from private forestlands, as well as collection days for pesticides, and fertilizers used in landscaping for residential and commercial areas. Collection events will be combined with public education about the need for proper disposal of potential contaminants. The City will communicate with Lincoln County, Lane County, and DEQ about a hazardous waste collection event. Lincoln County holds annual household hazardous waste collection events and Lane County accepts waste from outside its political boundaries.

3.9 Watershed Restoration Support

These strategies focus on restoring watersheds following natural disasters; forested watershed restoration; and general restoration efforts on municipal, commercial, and residential lands.

3.9.1 Watershed Restoration Addressing Natural Disasters

In addition to ongoing efforts to protect and restore natural areas, specific activities may be needed to address natural disasters in relation to drinking water source protection:

- **Drought and low flows:** restoring floodplains and beaver habitat to aid streamflows
- **Climate change:** maintaining healthy riparian buffers, beaver habitat, and drinking water source areas
- **Wildfire:** post-fire restoration to stabilize soils, accelerate revegetation, and reduce erosion risk
- **Severe weather events:** restoration of riparian zones, floodplains, uplands, and beaver habitat to reduce stream turbidity; post-windstorm restoration to stabilize soils, accelerate revegetation, and reduce erosion risk

Riparian areas, floodplains, and beaver habitat are particularly critical to protecting water quality and streamflows in the source watersheds.

3.9.2 Restoration on Forestlands

The City supports voluntary participation in watershed restoration efforts on private and public forestlands in its drinking water source areas. This includes maintaining healthy riparian buffers to protect streams from

erosion and sedimentation, as well as assessing decommissioned forest access roads to identify locations where soil improvement and revegetation could be focused to improve water quality.

3.9.3 Restoration on Municipal, Commercial, and Residential Properties

Healthy watersheds produce clean water for communities, businesses, and the environment. As feasible, the City will support and collaborate with local entities engaging in watershed restoration and environmental enhancement activities that benefit watershed health, water supply, and water quality. This includes support for voluntary participation in the ecological restoration of drinking water source areas and beaver habitat.

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SECTION 4: Implementation Plan

The City's implementation plan describes the activities that the City intends to implement as part of its strategies to address risks to its drinking water supply source areas. The implementation plan focuses on activities over the next five fiscal years (with an emphasis on the first two fiscal years), but many of the activities likely involve longer-term implementation. The implementation plan also provides descriptions of funding sources and opportunities. The City intends to revisit its implementation plan annually as part of its review of the DWPP to assess any needed updates as a result of progress made through implementation of activities, lessons learned, and potential changes in risks.

4.1 Fiscal Year 2021-2022

4.1.1 Communications and Advocacy

During the first fiscal year of DWPP implementation, the focus will be on initiating development of communications materials, protocols, and schedules, as well as beginning communications and advocacy around reducing the use of pesticides in the drinking water source areas.

4.1.1.1 Develop communications materials about risks

The City will develop communications protocols and schedules as described in Section 3.2.1 to address serious potential risks to the drinking water supply. This includes development of communications materials to explain concerns to a variety of audiences. The City will begin implementing its communications and advocacy strategy to the extent feasible during this fiscal year.

For government entities, such as Lincoln County, ODF, U.S. Forest Service (USFS), and BLM, the City will focus its communication efforts on land use and development, forestry, and climate change concerns, as applicable to the entity and its jurisdiction. Land use and development concerns include the effects of heavy precipitation and other severe weather events in areas of new development and areas with sensitive soils and high landslide potential, and the need for riparian buffers. Forestry management concerns include timber harvest on public and private lands, and the usage of pesticides in forestry operations.

The City will communicate with regional water providers about natural disasters, forestry management, and property management concerns.

The City will communicate with other stakeholders (e.g., MidCoast Watersheds Council, regional nonprofits, Oregon legislators, League of Oregon Cities, commercial timber companies, and landowners) about forestry management concerns on public and private land, as well as climate change concerns.

Components of the communications protocols to be developed will likely include identifying the staff that will be communicating, identifying the concerns to be discussed during each communication, identifying the questions that should regularly be asked during communications, and creating and updating materials explaining the concerns and how various management practices could affect the City's drinking water sources. To facilitate ongoing communications, the City will develop schedules that will likely include the following:

- Meetings with government entities, regional water providers, and other stakeholders at least annually
- Reviewing protocols at least annually and updating them as needed based on new information and partnerships
- Reviewing materials explaining concerns at least annually, and updating them as needed

- Schedules for dissemination of communications materials

4.1.1.2 Request elimination or minimization of pesticide application

This activity will focus on communication and advocacy to reduce the potential for contamination of drinking water sources. The City will first identify locations where water quality impacts could occur from planned or potential pesticide application. The City will then conduct outreach to landowners to describe water quality concerns and to make the request to eliminate or minimize the use of these chemicals. Communications materials will describe alternatives to the use of chemicals to control pests and weeds. The City will also conduct outreach to landscaping companies serving customers in Yachats and its drinking water source areas to promote landscape management practices that exclude and/or minimize pesticide application. Finally, the City will conduct outreach to realtors to encourage them to promote elimination or minimization of pesticide application when interacting with clients and landscaping contractors.

4.1.2 Public Education

Public education efforts will primarily focus on residents of the City and its drinking water source areas, including adults and youth (through the school system). Educational materials to be developed (or adapted from shared resources) and disseminated during this fiscal year may include handouts and website content. Topics to be addressed include:

- The value of water for people in the City and region and for fish and wildlife (i.e., water is a community asset),
- The City's drinking water supply source area
- Specific risks to the drinking water supply
 - Natural disasters, such as earthquakes, tsunamis, and wildfires
 - Forestry concerns, such as timber harvest and pesticide use
 - Development and property management concerns
 - Landscape care

Outreach materials will describe the City's strategies to address the risks and will focus on what the public can do to assist these efforts, as well as provide information about additional resources.

4.1.3 Critical Area Protection

During this fiscal year, the City will identify land acquisition and conservation easement opportunities in the drinking water source areas, begin outreach to landowners, and develop plans to pursue funding for viable opportunities.

4.1.4 Municipal Policies and Infrastructure Management

To address aging infrastructure concerns, the City will begin addressing infrastructure issues identified in the Water System Master Plan and associated capital improvement plans. Pursuing long-term funding for infrastructure projects and rate studies will be critical to this effort. The Public Works Department will be encouraged to communicate regularly with City Council about infrastructure needs and the status of projects in the 5-year and 20-year capital improvement plans.

4.1.5 Plan and Program Development

The revised Water System Master Plan and Water Management and Conservation Plan will provide a foundation for the City's drinking water protection efforts and long-term water supply strategy.

4.1.5.1 Complete Water System Master Plan

The City is currently in the process of completing an updated Water System Master Plan (WSMP). This effort will allow the City to develop capital improvement plans for addressing infrastructure issues and identify strategies for meeting future water demand.

4.1.5.2 Complete Water Management and Conservation Plan

An updated Water Management and Conservation Plan (WMCP) is being developed concurrently with the WSMP. This plan will assist the City in identifying water conservation measures (required by the State of Oregon, as well as additional actions) to implement within the next five years and will help the City define a strategy for meeting future water demand.

4.1.5.3 Develop long-term water supply strategy

Based on information from the WSMP and WMCP, the City will be equipped to choose a long-term water supply strategy and begin implementation of any steps deemed necessary to secure the water supply. The DWPP Team recommends the formation of a citizens committee with City staff participation to provide City Council with long-term water supply recommendations, utilizing information from the WSMP and WMCP, and to encourage City Council to pursue responsible growth plans and policies, including the recognition of water supply concerns in preparing for future growth.

4.1.5.4 Implement a water conservation program

During this fiscal year, the City will begin implementing a water conservation program that incorporates the WMCP requirements for water conservation. Program components may include:

- Public education on water conservation practices
 - Website content
 - Newsletter articles
 - Billing messages
 - Outreach to schools, such as development of curriculum
 - Outreach to landscaping companies to promote water-efficient landscaping
 - Outreach to realtors encouraging them to promote water conservation when interacting with clients and contractors
 - Development of brochures and flyers
 - Presentations or hosting a booth at community events (these may be in person or online as circumstances change)
- Ordinances related to water conservation
 - Require that indoor water fixtures meet or exceed State standards, focusing on rentals and older homes and businesses
 - Require water-efficient landscaping. Efficiency standards could address turf ratios, plant selection, and irrigation system design and technologies. The ordinance could require certification of landscape professionals.
- Offer free water-efficient fixtures to residents, such as faucet aerators and showerheads
- Install water-efficient fixtures in municipal buildings and implement water-efficient landscaping practices on City properties, potentially with educational signage
- Develop a tiered water rate tied to water curtailment phases and potentially to water source

4.1.6 Watershed Restoration

As opportunities arise, the City will contribute resources to watershed restoration projects that will help protect its drinking water sources. The City will maintain a list identifying projects that would contribute to drinking water source area protection and will maintain communications with partner organizations regarding these projects. The City will also assist with pursuing funding for these projects and provide in-kind or monetary support for project implementation to the extent possible.

4.2 Fiscal Year 2022-2023

4.2.1 Communications and Advocacy

Regular communications will continue around protecting the drinking water source areas, and additional stakeholders may be engaged this year as feasible. The City will also advocate for any changes deemed beneficial.

4.2.1.1 Continue communications to address serious risks

During this fiscal year, the City will continue implementing its communication protocols and schedules to address threats to the drinking water supply. Protocols, schedules, and materials will be reviewed and updated to reflect any changing concerns and lessons learned from communications over the past year.

4.2.1.2 Advocate for support for drinking water supply protection

The DWPP Team has recommended that the City communicate with Oregon legislators about risks to its drinking water supply and potential strategies to address those risks, and has recommended that the City Council conduct the communications as part of its activities. In addition, the DWPP Team has recommended that the City Council communications include advocating for more funding for land acquisition and conservation easements in the drinking water source area to protect drinking water supplies.

4.2.2 Public Education

The City will continue developing and disseminating public education materials about water supply risks and what can be done to protect drinking water source areas.

4.2.3 Critical Area Protection

Throughout the fiscal year, the City will continue identifying land acquisition and conservation easement opportunities in the drinking water source areas, conducting outreach to landowners, and pursuing funding for viable opportunities.

4.2.4 Municipal Policies and Infrastructure Management

The City will continue implementing capital improvement plan activities identified in the WSMP. The focus this fiscal year will broaden to include potential changes to water-related City policies.

4.2.4.1 Continue addressing infrastructure issues

Using the WSMP and capital improvement plans, the City will continue taking action to protect and upgrade critical municipal water infrastructure.

4.2.4.2 Assess and adjust water-related City policies

During this fiscal year, the City will assess and consider adjusting policies related to development zoning in order to take water supply and water quality issues into account. The City will also assess and potentially adjust its water rates to promote conservation.

4.2.5 Plan and Program Development

Plans developed in the previous fiscal year will continue to be implemented and expanded as feasible.

4.2.5.1 Continue long-term water supply strategy implementation

Specific activities during this fiscal year will depend on the water supply strategy chosen with input from the WSMP, WMCP, residents, City staff, and City Council.

4.2.5.2 Continue implementing a water conservation program

The water conservation program will continue to incorporate WMCP requirements for water conservation. Additional components of the program may be implemented in this and subsequent fiscal years to build on earlier efforts. These may include:

- Expanded public education activities (See 4.1.5.4 for a list of potential activities)
- Rebate programs for water-efficient fixtures
 - Indoor fixtures, such as toilets and clothes washers
 - Outdoor fixtures, such as rain sensors, soil moisture sensors, sprinkler nozzles, drip irrigation equipment, and weather-based irrigation controllers
- Outreach to short-term rentals
 - Outreach materials for renters
 - “Blue certification” of rentals for water efficiency, which owners of rentals can use for marketing
 - Financial incentives for water conservation in rental properties
 - Technical assistance to property owners on water-efficient upgrades

As part of the water conservation program, the City may also study the feasibility of non-potable water uses, including capture of runoff during the rainy season, greywater, and industrial wastewater.

4.2.6 Monitoring

The City’s monitoring efforts will focus on the water quality of drinking water sources and insect outbreaks that could negatively impact trees in the drinking water source areas.

4.2.6.1 Implement water quality monitoring

Water quality monitoring will enable the City to detect and address potential issues in a timely manner. The City will determine which water quality parameters to monitor, select appropriate monitoring locations, develop protocols and schedules for monitoring, and identify responsible parties to conduct the monitoring. The City will pursue funding to develop a water quality monitoring plan and to implement monitoring. The results of water quality monitoring will be used by the Public Works Department to ensure that any risks to the drinking water supply can be addressed rapidly.

4.2.6.2 Implement insect outbreak monitoring

The City will communicate with regional experts about the status of any insect outbreaks that could affect the drinking water source area through widespread tree mortality. All communications should be documented along with the status of any emerging or ongoing outbreaks. Based on best practices and recommendations from regional experts, the City will develop response actions as needed.

4.2.7 Contamination Prevention Programs

During this fiscal year, the City will develop and implement a collection program for potential water contaminants, such as pesticides. The City will communicate with Lincoln County, Lane County, and DEQ regarding the program and development of protocols for collecting and properly disposing of pesticides. Outreach materials will be developed to promote the program and facilitate safe handling on collection days.

4.2.8 Watershed Restoration

Restoration activities will focus on promoting healthy watersheds in the drinking water source areas.

4.2.8.1 Continue contributing to watershed restoration projects

The City will continue contributing resources to watershed restoration projects as opportunities arise.

4.2.8.2 Pursue restoration of decommissioned access roads

During this fiscal year, the City will partner with stakeholders (e.g., USFS, ODF, and private landowners) to identify decommissioned access roads that may pose a risk to drinking water sources through erosion potential and transport of contaminated sediments. Where watershed restoration projects are deemed appropriate to protect the water resource, the City will seek funding and develop partnerships to implement identified projects.

4.3 Implementation Plan Summaries: Fiscal Years 2021–2022 and 2022–2023

Exhibits 4-1 and 4-2 summarize the implementation plans for Fiscal year 2021-2022 and Fiscal Year 2022-2023, respectively. The exhibits list the implementation plan activities plus identify the following associated with the activity: the strategy (see Section 3 for additional details), risks addressed (see Section 2 for additional details), responsible parties, potential partner organizations, and potential funding sources (see Section 4.5 for additional details).

4.4 Fiscal Years 2023–2026

Activities outlined under Fiscal Year 2022–2023 will be continued through at least Fiscal Year 2025–2026.

4.5 Implementation Plan Timeline

Exhibit 4-3 presents the timing of when implementation plan activities will be implemented and the duration of those activities.

Exhibit 4-4. Implementation Plan Summary: Fiscal Year 2021-2022

Activity	Strategy Category	Risk addressed	Responsible Party	Partnerships to Pursue	Funding Sources and Opportunities
- Complete Water System Master Plan (WSMP) - Capital improvement plan for infrastructure - Strategy for meeting future water demand	Plan/Program Development and Enhancement	- Aging infrastructure - Drought/low flows - Climate change - Development	City Manager, Public Works Director		Secured
- Complete Water Management and Conservation Plan (WMCP) - Water conservation measures - Strategy for meeting future water demand	Plan/Program Development and Enhancement	- Aging infrastructure - Drought/low flows - Climate change - Development	City Manager, Public Works Director		Secured
- Long-term water supply strategy - Form a citizens committee with city staff participation to: - provide City Council with long-term water supply recommendations, utilizing information from the WSMP and WMCP - encourage City Council to pursue responsible growth plans/policies	Plan/Program Development and Enhancement	- Aging infrastructure - Drought/low flows - Climate change - Development	City Manager, Public Works Director		Annual budget
- Begin addressing infrastructure issues identified in the WSMP - Pursue long-term funding for infrastructure projects and rate studies - Regularly communicate with City Council about infrastructure needs and capital improvement plans	Plan/Program Development and Enhancement	- Aging infrastructure - Drought/low flows - Climate change - Development	City Manager, Public Works Director		Annual budget Infrastructure loans
- Develop communications protocols and schedules to address serious risks, including developing materials to explain concerns, and begin communications to the extent possible - For government entities: land use/development concerns and heavy precipitation, forestry management, climate change - For regional water providers: natural disasters, forestry management, and property management - For other stakeholders (e.g., MidCoast Watersheds Council, regional nonprofits, Oregon legislators, Oregon League of Cities, and landowners): forestry management, climate change	Communications and Advocacy	- Drought/low flows - Climate change - Wildfire - Earthquakes - Severe weather events - Tsunamis - Timber harvest - Forestry pesticides - Access roads - Development	City Manager, Public Works Director	Lincoln County, ODF, USFS, BLM, DEQ, MidCoast Watersheds Council, commercial timber companies, regional nonprofits, landowners	Annual budget DEQ
- Develop public education materials and begin disseminating them to the extent possible. Materials will include: - The value of water - City's drinking water supply source area - Risks to the water supply (natural disasters, development and property management, forestry management) - Strategies to address risks and what the public can do	Public Education	- Drought/low flows - Climate change - Wildfire - Earthquakes - Severe weather events - Tsunamis - Timber harvest - Forestry pesticides - Development - Property management - Landscape Care	City Manager, Public Works Director	City of Yachats Emergency Preparedness Committee, Lincoln County, ODF, USFS, BLM, DEQ, commercial timber companies, FEMA, ODOT, EPA, Oregon Emergency Management (OEM), State Fire Marshal's Office, DEQ, OHA, MidCoast Watersheds Council, The Beaver Coalition, Lincoln SWCD	Annual budget In-kind from volunteer time Earthquakes: FEMA, OEM Wildfire: FEMA, USFS, BLM, OEM All: DEQ, OHA

Activity	Strategy Category	Risk addressed	Responsible Party	Partnerships to Pursue	Funding Sources and Opportunities
- Begin implementing a water conservation program - Water conservation program components may include: - Public education for water customers and students - Ordinances on indoor and outdoor water efficiency - Offer free water-efficient fixtures - Examples: Faucet aerators and showerheads - Install water-efficient fixtures in municipal buildings and implement water-efficient landscaping practices - Develop a tiered water rate tied to water curtailment phases and potentially to water source - Conduct outreach to landscaping companies to promote water-efficient landscaping (e.g., plants with low water needs and water-efficient irrigation systems and practices) - Conduct outreach to realtors to encourage them to promote water conservation when interacting with clients and contractors	Plan/Program Development and Enhancement	- Drought/low flows - Climate change	Public Works Director	Regional water providers, EPA, OWRD,	Annual budget DEQ OWRD
Identify land acquisition and conservation easement opportunities in the City's drinking water source areas, begin outreach to landowners, and pursue funding for viable opportunities	Critical Areas Protection Programs	- Drought/low flows Climate change - Severe weather events - Timber harvest - Development	City Manager	MidCoast Watersheds Council	Annual budget DEQ OWRD Oregon Watershed Enhancement Board
Request elimination or minimization of pesticide application in certain locations	Communications and Advocacy	Forestry pesticides	City Manager	DEQ, OHA	Annual budget
Contribute resources to watershed restoration projects as opportunities arise	Watershed Restoration Support	- Drought/low flows - Climate change - Wildfires - Severe weather events - Access roads - Property management	City Manager	MidCoast Watersheds Council, USFS, BLM, ODF	Annual budget Oregon Watershed Enhancement Board DEQ OHA

Notes

BLM U.S. Bureau of Land Management
 DEQ Oregon Department of Environmental Quality
 EPA U.S. Environmental Protection Agency
 FEWA Federal Emergency Management Agency
 ODF Oregon Department of Forestry
 ODOT Oregon Department of Transportation

OEM Oregon Emergency Management
 OHA Oregon Health Authority
 SWCD Soil and Water Conservation District
 USFS U.S. Forestry Service
 WMCP Water Management and Conservation Plan
 WSWP Water System Master Plan

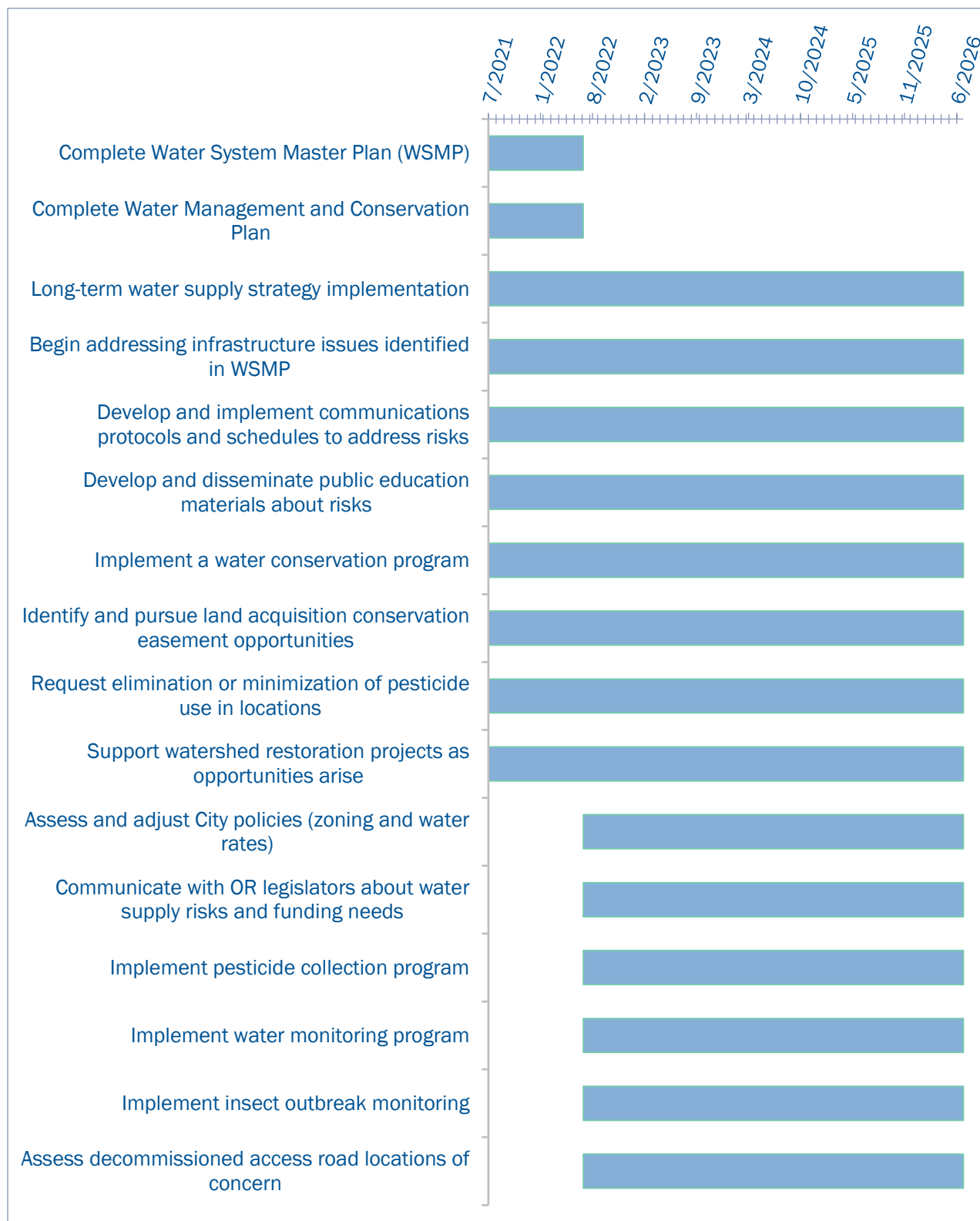
Exhibit 4-2. Implementation Plan Summary: Fiscal Year 2022-2023

Activity	Strategy Category	Risk addressed	Responsible Party	Partnerships to Pursue	Funding Sources and Opportunities
Continue long-term water supply strategy implementation	Plan/Program Development and Enhancement	- Aging infrastructure - Drought/low flows - Climate change - Development	City Manager, Public Works Director		Annual budget
Continue addressing infrastructure issues	Plan/Program Development and Enhancement	- Aging infrastructure - Drought/low flows - Climate change - Development	City Manager, Public Works Director		Annual budget Infrastructure loans
Continue communications to address serious risks	Communications and Advocacy	- Drought/low flows - Climate change - Wildfire - Earthquakes - Severe weather events - Tsunamis - Timber harvest - Forestry pesticides - Access roads - Development	City Manager, Public Works Director	Lincoln County, ODF, USFS, BLM, DEQ, MidCoast Watersheds Council, commercial timber companies, landowners	Annual budget
Continue developing and disseminating public education materials about water supply risks	Public Education	- Drought/low flows - Climate change - Wildfire - Earthquakes - Severe weather events - Tsunamis - Timber harvest - Forestry pesticides - Access roads - Development	City Manager, Public Works Director	Lincoln County, ODF, USFS, BLM, DEQ, commercial timber companies, FEMA, ODOT, EPA, Oregon Emergency Management (OEM), State Fire Marshal's Office, DEQ, OHA	Annual budget In-kind from volunteer time Earthquakes: FEMA, OEM Wildfire: FEMA, USFS, BLM, OEM All: DEQ, OHA
- Continue implementing a water conservation program that incorporates WMCP requirements for water conservation - Additional water conservation program components may include: - Public education - Rebate program for water-efficient indoor and outdoor fixtures - Short-term rental outreach program	Plan/Program Development and Enhancement	- Drought/low flows - Climate change	Public Works Director	Regional water providers, EPA, OWRD,	Annual budget DEQ OWRD

Activity	Strategy Category	Risk addressed	Responsible Party	Partnerships to Pursue	Funding Sources and Opportunities
Study non-potable water uses, including capture of runoff during the rainy season, greywater, and industrial wastewater					
Continue identifying land acquisition and conservation easement opportunities in the City's drinking water source areas, conducting outreach to landowners, and pursuing funding for viable opportunities	Critical Areas Protection Programs	- Drought/low flows - Climate change - Severe weather events - Timber harvest - Development	City Manager	MidCoast Watersheds Council	Annual budget DEQ OWRD Oregon Watershed Enhancement Board
Continue contributing resources to watershed restoration projects as opportunities arise	Watershed Restoration Support	- Drought/low flows - Climate change - Wildfires - Severe weather events - Access roads - Property management	City Manager	MidCoast Watersheds Council, USFS, BLM, ODF	Annual budget Oregon Watershed Enhancement Board DEQ OHA
Assess and adjust City policies related to development zoning and water rates	City policies: regulation and infrastructure	- Drought/low flows - Climate change - Development	City Manager		Annual budget
Communicate with Oregon legislators about risks to the City's drinking water supply and potential strategies to address those risks, as well as funding needs to protect the drinking water supply	Communications and advocacy	- Forestry pesticides - Timber harvest - Development	City Manager	MidCoast Watersheds Council, ODF, USFS, BLM, local volunteers	Annual budget In-kind: volunteer time
Implement pesticide collection program	Contamination Prevention Program	Forestry pesticides	City Manager	DEQ, OHA	Annual budget DEQ
Implement water monitoring program	Monitoring	- Climate change - Severe weather events - Timber harvest - Forestry pesticides - Access roads	Public Works Director	DEQ, OHA	Annual budget
Implement insect outbreak monitoring	Monitoring	Insect outbreak	City Manager	ODA, Lincoln SWCD, OSU Extension, ODF, USFS, BLM	Annual budget
Identify and assess decommissioned access road locations near drinking water sources	Watershed Restoration Support	Access roads	Public Works Director	MidCoast Watersheds Council, USFS, BLM, ODF	Annual budget Oregon Watershed Enhancement Board

Notes

BLM	U.S. Bureau of Land Management	EPA	U.S. Environmental Protection Agency	ODF	Oregon Department of Forestry	OEM	Oregon Emergency Management	SWCD	Soil and Water Conservation District
DEQ	Oregon Department of Environmental Quality	FEMA	Federal Emergency Management Agency	ODOT	Oregon Department of Transportation	OHA	Oregon Health Authority	USFS	U.S. Forestry Service

Exhibit 4-3. Implementation Plan Timeline

4.6 Funding Sources and Opportunities

The following is a list of funding available for supporting drinking water protection plan implementation. The City's 2016 Source Water Assessment also includes a thorough list of potential funding sources (see Appendix A), as does DEQ's webpage on Funding for Public Water Systems: www.oregon.gov/deq/wq/programs/Pages/DWP-Funding.aspx.

- Drinking Water Source Protection Fund, Oregon Health Authority
 - Provides grants up to \$30,000; grants can be received in two consecutive years, then there must be at least one year before another grant is awarded
 - Provides loans up to \$100,000 per project
 - Funding must be used within two years
 - Emergency grants are available to address threats to drinking water supplies outside of the standard Letter of Interest submission timeline
 - Letters of Interest due from January through March
 - Example projects: land acquisition, incentive-based protection measures, community outreach, riparian restoration, waste collection, and watershed planning
 - <https://www.oregon.gov/oha/PH/HEALTHYENVIRONMENTS/DRINKINGWATER/SRF/Pages/spf.aspx>
- Drinking Water Provider Partnership Grants, Numerous partners (Oregon Department of Environmental Quality, USFS, US EPA, BLM, USDA, The Freshwater Trust, GEOS Institute, Wild Earth Guardians, Washington State Department of Health)
 - Provides grants up to \$50,000
 - Project must be in a drinking water source area with a Federal nexus (e.g., USFS and BLM)
 - Funding must be used within 1 year
 - Proposals due in early January
 - Supports projects that restore and protect watersheds that provide drinking water while also benefiting aquatic and riparian ecosystems, including the native fish that inhabit them
 - Example projects: develop native riparian reserves, road redesign, riparian planting, weed control, floodplain reconnection
 - <https://workingwatersgeos.org/drinking-water-providers-partnership>
- Clean Water State Revolving Fund, Oregon DEQ and US EPA
 - Provides below-market rate loans planning, design, and construction projects that protect public health, restore natural areas, and promote economic development.
 - Applications reviewed three times a year
 - Example projects: establishing monitoring programs and outreach programs, watershed restoration, loans for septic system upgrades/replacements, land purchase, and nonpoint source control activities
 - <https://www.oregon.gov/deq/wq/cwsrf/pages/default.aspx>
- Oregon 319 Nonpoint Source Implementation Grants, Oregon Department of Environmental Quality
 - Provides grants up to \$30,000 and requires a 40% non-Federal match (i.e., 40% of the total project cost must be covered by non-federal funds and/or in-kind services)
 - Only projects with a DEQ Watershed-Based Plan are eligible (shown in Section B of the application information)
 - Application period closes in April or May
 - Supported activities include technical assistance, financial assistance, education, training, technology transfer, demonstration projects, and monitoring
 - Projects that involve collaborative stakeholder partnerships are encouraged

- Projects that protect or replace failing infrastructure on USFS or BLM roads or lands are not eligible
- <https://www.oregon.gov/deq/wq/programs/pages/nonpoint-319-grants.aspx>
- Oregon Watershed Enhancement Board
 - Monitoring grants: eligible monitoring projects include status and trend, project effectiveness, landscape effectiveness, and Rapid Bio-Assessment; apply in the fall
 - Restoration: Priorities include altered watershed function affecting water quality, water flow, and fish production capacity; apply in the spring or fall
 - Stakeholder Engagement: Eligible projects increase awareness and understanding watersheds to support implementation of specific restoration, monitoring, and conservation activities; apply in spring or fall
 - Technical Assistance: apply in spring or fall
 - Land Acquisition Grants: Eligible projects involve purchase of interests in land from willing sellers for maintenance and restoration of watersheds and fish and wildlife habitat; apply in the fall
 - Water Acquisition Grants: Eligible projects involve purchase of an interest in water from a willing seller to increase in streamflow for habitat and species conservation benefits and to improve water quality; apply in fall
 - Small Grants: Provides up to \$15,000 for less complex, on-the-ground restoration projects
 - <https://www.oregon.gov/oeb/grants/Pages/grant-programs.aspx>
- Feasibility Study Grants and Water Project Grants and Loans, Oregon Water Resources Department
 - Water Project Grants and Loans
 - Applications are due in April
 - Supports projects that address instream and out-of-stream water supply needs now and into the future
 - Example projects include: irrigation efficiency projects
 - Feasibility Study Grants
 - Reimburse up to 50% of the costs of studies to evaluate the feasibility of developing water conservation, reuse, and storage projects
 - Applications are due in fall
 - <https://www.oregon.gov/owrd/programs/FundingOpportunities/Pages/default.aspx>
- Various Financial Assistance Programs, USDA Natural Resources Conservation Service
 - Environmental Quality Incentives Program (EQIP): Financial and technical assistance to agricultural and forestry producers to address natural resources concerns and provide environmental benefits, such as water quality improvements, reduce soil erosion and sedimentation, and improved wildlife habitat
 - Conservation Stewardship Program: Encourages farmers, ranchers, and woodland owners to take the conservation a step further by implementing additional conservation activities and enhancements
 - National Water Quality Initiative (NWQI): Provides funding for a detailed watershed assessment and an outreach strategy to address agricultural-related impacts, and following completion, funding to implement projects becomes available through EQIP
 - <https://www.nrcs.usda.gov/wps/portal/nrcs/main/or/programs/>
 - Watershed and Flood Prevention Operations Program: Provides financial and technical assistance for erosion and sediment control, watershed protection, flood prevention, water quality improvements, water management, fish and wildlife habitat enhancement, hydropower sources, and rural, municipal, and industrial water supply; the project must have agricultural benefits
 - <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/landscape/wfpo/>

- Five Star and Urban Waters Restoration Grant Program, US EPA and National Fish and Wildlife Foundation
 - Provides grants to improve water quality, watershed conditions, and fish and wildlife habitat
 - Projects must incorporate: wetland, riparian, instream, and/or coastal habitat restoration; and education and training activities through community outreach, participation, and/or integration with K-12 environmental curriculum; five or more partners; measurable ecological, educational, and community benefits; and a plan for sustaining the benefits
 - Awards range from \$20,000-\$50,000, and grants span 12 to 18 months with a start date in late summer/early fall; apply in January
 - <https://www.epa.gov/wetlands/5-star-wetland-and-urban-waters-restoration-grants>
- Environmental Education Grants Program, US EPA
 - Supports projects that promote environmental awareness and stewardship and help provide people with skills to protect the environment
 - Applicants must represent at least one of the following types of organizations: local education agency, state education or environmental agency, college or university, non-profit organization, tribal education agency, noncommercial educational broadcasting entity
 - Grant competition closes in January
 - <https://www.epa.gov/education/grants>
- Various Grants, Oregon Office of Emergency Management
 - Emergency Management Performance Grant: makes grants from the Federal government available to state, local, and tribal governments to assist in preparing for all hazards
 - Hazard Mitigation Assistance Grant: Provides funds from the Federal government to assist in hazard mitigation planning, projects, and other activities to reduce vulnerability to hazards
 - Homeland Security Grant Program: Provides funds from the Federal government for planning, organizing, equipment purchasing, training, and exercises for emergencies
 - <https://www.oregon.gov/oem/emresources/Grants/Pages/default.aspx>
- Wildfire Resources, State of Oregon
 - <https://wildfire.oregon.gov/>
- Fire prevention and training funding, multiple agencies (FEMA, USFS, BLM)

SECTION 5: Contingency Plan

A public water system that wants to have a state certified drinking water protection program must have a contingency plan. A contingency plan is a plan for responding to the potential loss or reduction of a drinking water source. Oregon Administrative Rule [OAR 333-061-0057\(5\)](#) specifies that a contingency plan must include the following elements:

1. Inventory/prioritize all threats to the drinking water supply
2. Prioritize water usage
3. Anticipate responses to potential incidents
4. Identify key personnel and develop a notification roster
5. Identify short-term and long-term replacement potable water supplies
6. Identify short-term and long-term conservation measures
7. Provide for plan testing, review, and update
8. Provide for new and ongoing training of appropriate individuals
9. Provide for education of the public
10. Identify logistical and financial resources

Those elements are addressed below.

This contingency plan has been developed in coordination with the City of Yachats Emergency Operations Plan (April 2019) and Lincoln County's Natural Hazards Mitigation Plan (updated 2017). The City of Yachats Emergency Operations Plan is posted on the City's website.

5.1 Threats to the Drinking Water Supply

As described in Section 2, the City identified numerous threats, or risks, in its drinking water source areas. Of those identified, the following could cause the potential loss or reduction of a drinking water source:

- Drought/Low Flows
- Wildfire
- Earthquakes
- Tsunamis
- Severe Weather (heavy precipitation/floods, ice storms, snowstorms, and wind)
- Aging Municipal Infrastructure (major water system component failure)
- Contamination (forestry pesticides), and
- Sabotage or vandalism of municipal infrastructure

5.2 Prioritization of Water Usage

If an emergency results in an insufficient water supply to meet all needs, the City may need to prioritize water use. This prioritization of water usage will be as follows:

1. Yachats Rural Fire Protection District
2. Residential, including senior assisted living facilities
3. Commercial
4. Parks
5. Irrigation (by Residential and Commercial water customers)

5.3 Responses to Potential Incidents

The City has an Emergency Operations Plan, which is an all-hazard plan that describes how the City will organize and respond to emergencies and disasters in the community. It is based on, and is compatible with, federal, State of Oregon, and other applicable laws, regulations, plans, and policies, including Presidential Policy Directive 8, the National Response Framework, Oregon Office of Emergency Management plans, and the Lincoln County Natural Hazards Mitigation Plan.

It contains an Immediate Action Checklist, a Basic Plan, and Incident Annexes outlining actions tailored to specific types of emergencies or disasters.

The Immediate Action Checklist focuses on determining the need to activate emergency operations and activating them if needed, notifying the appropriate City personnel and organizations that can assist with emergency response (local, regional, and State), and declaring a state of emergency as needed.

Exhibit 5-1 presents the threats to municipal water supply identified in 5.1 and the Incident Annex that responds to the threat. Each Incident Annex describes actions to be implemented in response to the incident. Examples of actions include analyzing scope and extent of the incident, communicating with agencies and the public, organizing efforts, documenting information and actions, activating mutual aid agreements, and initiating water curtailment procedures. For the full list of actions, see the Incident Annexes in the Emergency Operations Plan.

Exhibit 5-1. Municipal Water Supply Threats and Corresponding Incident Annex

Threats	Incident Annex(es)
Drought/Low Flows	Drought
Wildfire	Major Fire
Earthquakes	Earthquake
Tsunami	Tsunami
Severe Weather (heavy precipitation/floods, wind)	Severe Weather
Aging Municipal Infrastructure (major water system component failure)	Utility Failure
Contamination (forestry pesticides)	Hazardous Materials
Sabotage or Vandalism of Municipal Infrastructure	Terrorism

The City operates a Level 3 water treatment plant that requires a certified operator. As required by OHA, the City has a water treatment plant operations and maintenance manual, which is located at the water treatment plant. This manual is intended for use by individuals with some training in operating water treatment plants. The manual describes protocols for such activities as operations and maintenance of the facility and backwashing filters.

Drinking water sampling information for the City of Yachats is available through OHA's Drinking Water Data Online database by searching for the City of Yachats or using the following link:

<https://yourwater.oregon.gov/inventory.php?pwsno=00966>

Individuals trained in sampling protocols that intend to conduct water sampling in an emergency can use that database as a source for sampling requirements and schedules.

5.4 Key Personnel and Notification Roster

5.4.1 Key Personnel

The key personnel identified in this Contingency Plan as having a role in addressing emergencies is based on the City's Emergency Operations Plan (Immediate Response Checklist, Section 3.2 Emergency Management Organization, and Functional Annexes 1 through 3: Emergency Services, Human Services, and Infrastructure Services, respectively, in Section 4 Roles and Responsibilities).

The City Manager may, depending on the size or type of incident, delegate the authority to lead response and recovery actions to other City staff. Additionally, some authority to act in the event of an emergency may already be delegated by ordinance or by practice. As a result, the organizational structure for the City's emergency management program can vary depending upon the location, size, and impact of the incident.

The Emergency Management Organization (EMO) for the City is divided into two general groups, organized by function—the Executive Group and Emergency Response Agencies.

5.4.1.1 Executive group

Mayor and City Council

The ultimate responsibility for policy, budget, and political direction for the City government is borne by the City Council. During emergencies, this responsibility includes encouraging citizen involvement and citizen assistance, issuing policy statements as needed to support actions and activities of recovery and response efforts, and providing the political contact needed for visiting State and federal officials. Additionally, the Council will provide elected liaison with the community and other jurisdictions. In the event that declaration of emergency is needed, the Mayor, or designee, will initiate and terminate the state of emergency through a declaration ratified by the Council.

City Manager

The City Manager, or designee, is responsible for continuity of government, overall direction of City emergency operations, and dissemination of public information.

Emergency Preparedness Committee

The Emergency Preparedness Committee supports the City Manager in the day-to-day authority and responsibility for overseeing emergency management programs and activities. The Emergency Preparedness Committee works with the Executive Group to ensure that there are unified objectives with regard to the City's emergency plans and activities, including coordinating all aspects of the City's capabilities. The Emergency Preparedness Committee coordinates all components of the local emergency management program, including assessing the availability and readiness of local resources most likely required during an incident, and identifying and correcting any shortfalls.

Senior Staff

Senior staff collaborate with the Executive Group during development of local emergency plans and provide key response resources. City staff develop, plan, and train to learn internal policies and procedures for meeting response and recovery needs safely. They also make themselves available to participate in interagency training and exercises to develop and maintain the necessary capabilities, as well as clearly reinforce preparedness expectations.

5.4.1.2 Emergency response agencies

- **Lincoln County Sheriff's Office** (Emergency 9-1-1)
 - The City of Yachats does not have a police department, so it would look to Lincoln County Sheriff's Office in the event of an emergency.
- **Yachats Rural Fire Protection District (541-547-3266)**
- **Lincoln County Emergency Management** (541-265-4199)
- **Oregon Emergency Response System** (800-452-0311)
 - The Oregon Emergency Response System is an "all-hazards" system that coordinates and manages state resources in response to natural and technological emergencies, including wildfire, floods, earthquakes, and Search and Rescue missions.
- **Other Organizations**
 - Organizations such as the Oregon Department of Transportation (ODOT), the Oregon State Police (OSP), Oregon Health Authority (OHA), local ambulance service, and local hospitals may assist with emergency responses.

5.4.1.3 Tasked Agencies

Functional Annexes (FA) 1 through 3 described agencies tasked with responding to different types of threats to the community. Section 4 in each Functional Annex describes roles and responsibilities and Section 5 describes the concept of operations, which sometimes includes initial notification procedures.

FA 1. Emergency Services

This annex addresses emergencies, such as wildfires, hazardous materials response, and community safety and security. Tasked agencies (from page FA 1-3) are listed in Exhibit 5-2.

Exhibit 5-2. Emergency Services Task Agencies

Primary Agencies	Lincoln County Sheriff's Office Yachats Rural Fire Protection District South Lincoln Ambulance
Supporting Agencies	City Public Works Department County Emergency Management County Health and Human Services Department Samaritan Pacific Community Hospital Oregon State Police Pacific West Ambulance

FA 2. Human Services

This annex addresses emergencies that required evacuation of people and sheltering or care. Tasked agencies (from page FA 2-1) are listed in Exhibit 5-3.

Exhibit 5-3. Human Services Task Agencies

Primary Agencies	City Administration
Supporting Agencies	Yachats Rural Fire District Lincoln County Sheriff's Office Lincoln County School District Housing Authority of Lincoln County County Emergency Management County Health and Human Services Department County Animal Control Local Community- and Faith-Based Organizations (e.g., Red Cross, Salvation Army) Humane Society Oregon Coast Community College

FA 3. Infrastructure Services

This annex addresses emergencies that affect public works and other infrastructure. Tasked agencies (from page FA 3-1) are listed in Exhibit 5-4.

Exhibit 5-4. Infrastructure Services Tasked Agencies

Primary Agencies	City Public Works Department
Supporting Agencies	Yachats Rural Fire Protection District Lincoln County Sheriff's Office County Public Works Department Oregon Department of Transportation Local Utilities: <i>Water and Sewer: City of Yachats</i> <i>Electricity: Central Lincoln PUD</i> <i>Gas and Propane: NW Natural and Amerigas</i> <i>Telephone/Internet/TV: Century Link, Charter Communications, CoastCom, Inc., Pioneer Telephone Cooperative, Dahl Sanitation Service</i>

Section 3 Situation and Assumptions (FA 3-2) states that: response operations for the City Public Works Department will include assisting law enforcement and fire services in traffic control and rescue operations, and clearing and maintaining critical lifeline routes; and in a natural hazards event such as flood, windstorm, or earthquake response, the Public Works Department will generally be assigned or assume the lead agency role.

Section 4 Roles and Responsibilities (FA 3-2) describes the responsibilities of the City Public Works Department, Yachats Rural Fire Protection District, Lincoln County Sheriff's Office, and utilities.

Section 5 Concept of Operations under 5.2 Response (FA 3-7) includes the following notification procedures.

Upon arrival on scene, responding staff should evaluate the situation and notify any required divisions, departments, or agencies. These may include, but are not limited to the following:

- **City Public Works Department** for
 - Drinking water-related impacts
 - Wastewater-related impacts

- City-owned and operated infrastructure
- Debris removal assistance
- **Yachats Rural Fire Protection District** for hazardous waste containment or fire and rescue operations.
- **Lincoln County Sheriff's Office** for law enforcement, or traffic control assistance.
- **County Department of Public Works** for all County-owned and operated infrastructure.
- **Oregon Department of Transportation** for all State-owned and operated infrastructure.
- **Central Lincoln People's Utility District** for all electrical concerns or assistance.
- **NW Natural Gas** for all gas-related concerns or impacts.
- **CenturyLink or Pioneer Telephone Cooperative** for telecommunications impacts.
- **Dahl Disposal Services** for garbage, waste and debris impacts

The City's Public Works Department currently consists of a water treatment plant operator and wastewater treatment plant operator that share responsibilities of managing public works activities and three support staff with responsibilities that include water distribution system maintenance and repairs, meter reading, and assistance operating both treatment plants. These five staff members work as a team, helping each other out with various public works tasks. In the event of an emergency, Public Works Department staff can be contacted at 541-547-3565 or through their personal contact information, located at City Hall in the staff contact list. The water treatment plant operator and supporting staff will address drinking water system issues as needed.

5.5 Short-term and Long-term Replacement Potable Water Supplies

5.5.1 Short-term Actions

The City's Water Curtailment Plan will guide actions that the City takes to address the reduction or loss of water supply. The Water Curtailment Plan is a required component in the City's Water Management Conservation Plan and is codified in Yachats Municipal Code 8.22, which is posted on the City's website. The Water Curtailment Plan outlines four phases of water curtailment based on severity of the water supply issue. For each phase of water curtailment, it identifies the conditions or events triggering the phase of curtailment and the measures that the City will implement in response.

Phases 1 through 3 outline water use restrictions and prohibitions that aim to conserve water, thereby reducing water demand. These restrictions and prohibitions increase in severity as the phase number increases.

Phase 4 of water curtailment (Yachats Municipal Code Section 8.22.060), the most severe phase called Critical Water Supply Status, describes how the City will proceed in the event of loss of its water supply, stating:

- 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.
- 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.

If the City has a short-term loss of water supply lasting a few hours to a few days, the City will depend on its reservoirs. If the City has a short-term loss of water supply lasting more than a few days to several weeks, the City would likely pursue one of the letter water supply options listed under the second bullet above.

5.5.2 Long-term Actions

Depending on the water supply emergency, the City may need to construct new infrastructure to supply drinking water once again. Short-term potable water supply replacement actions would need to continue until long-term actions restore the City's drinking water supply. The City will also use its Water System Master Plan to guide infrastructure development and the pursuit of long-term water supply options.

5.6 Short-term and Long-term Conservation Measures

The City's Water Curtailment Plan (Yachats Municipal Code Section 8.22) describes water conservation measures required under the different phases (i.e., stages) of water curtailment, which are as follows.

Phase 1: Water Alert Status

The following non-essential uses are restricted or prohibited under Phase 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.

Phase 2: Water Warning Status

In addition to the restrictions and prohibitions for Phase 1 above, for Phase 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 Phase 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. (See Yachats Municipal Code for full details about this action.)

Phase 3: Water Emergency Status

In addition to the restrictions and prohibitions for Phases 1 and 2, above, for Phase 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 Phase 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 under Section 8.22.070(C)(1) (Phase 3—First offense).

For Phase 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 age can 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, pursuant to subsection B of this section in a conspicuous location on the property receiving City water service within two (2) days of receiving notice of a Phase 3. For transient water users, the notice shall be posted in each rental unit. (See Yachats Municipal Code for full details about this action.)

Phase 4: Critical Water Status

Under Phase 4, restrictions and prohibitions for Phases 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.

5.7 Plan Testing, Review, and Update

In an effort to stay coordinated and up-to-date with the City's Emergency Operations Plan, this Contingency Plan will be reviewed and updated annually or when changes to emergency operations occur, such as following evaluation of lessons learned from exercises or events. All updates to the Contingency Plan will be tracked and recorded in a table that mirrors the update tracking table the Emergency Operations Plan (lists the date, change number, department, and summary of change).

5.8 Personnel Training

Personnel training is described in Section 6.2 Training in the City of Yachats Emergency Operations Plan. This section describes protocols to assist with training and preparing essential response staff and supporting personnel and/or volunteers to incorporate Incident Command System (ICS)/National Incident Management System (NIMS) concepts in all facets of an emergency (See Sections 1.1 and 1.5.1 of the EOP).

The City's Emergency Preparedness Committee, which is designated the Emergency Management Organization for the City, coordinates training for City personnel and volunteers and encourages them to participate in training sessions hosted by other agencies, organizations, and jurisdictions throughout the region. Current training and operational requirements set forth under NIMS have been adopted and implemented by the City. The Emergency Preparedness Committee maintains records and lists of training received by City personnel and/or volunteers.

The City's training includes conducting exercises throughout the year to test and evaluate the Emergency Operations Plan (See Section 6.3 Exercises of the EOP). The City coordinates with agencies to conduct exercises, which can consist of a variety of tabletop exercises, drills, functional exercises, and full-scale exercises. The Emergency Preparedness Committee will work with other City or County departments and agencies to implement corrective actions or mitigation measures for emergency protocols based on lessons learned during exercises. In addition, the Emergency Preparedness Committee will document and track lessons learned from exercises, as well as after an actual disaster, and will address any equipment, training, and planning shortfalls identified (See Section 6.4 Event Critique and After Action Reporting of the EOP).

The City is also working on making local disaster preparedness training available to its residents through the Federal Emergency Management Administration (FEMA) Community Emergency Response Team (CERT) Program. This program educates volunteers about preparedness for threats in their local area and teaches them basic disaster response skills, including fire safety, light search and rescue, team organization, and disaster medical operations.

5.9 Public Education

The City conducts public education about threats, emergency preparedness, and emergency response. The City maintains a community preparedness program that makes information available to the public at City Hall and on its website at www.yachatsoregon.org/153/Emergency-Preparedness. Information provided on the website includes the Emergency Operations Plan, a tsunami evacuation map, assistance with signing up to receive emergency notifications, what to include in an emergency preparedness kit (food, water, and other supplies) and an emergency "Go Bag," what to do about pets and livestock in an emergency, resources for emergency planning and response, and a training opportunity through the Community Emergency Response Team (CERT) program, as described above under Training.

Additional public education will be conducted as part of the Drinking Water Protection Plan's implementation plan, as described in Section 4.

Yachats Municipal Code Section 8.22 Water Shortage Emergency Regulations outlines water conservation actions under each phase of water curtailment, which the City will communicate to water customers. Possible means of communication include the City website, posted signs, phone/text messages, mailings, or other media messages.

5.10 Logistical and Financial Resources

Funding and maintaining a Contingency Plan is a City priority, just as funding and maintaining its Emergency Operations Plan is a priority. In accordance with the Emergency Operations Plan (Section 6.6), the City Manager will work with City Council and community stakeholders to:

- Identify funding sources for emergency management programs, personnel and/or volunteers, and equipment.
- Ensure that the Council is informed of progress toward building emergency response and recovery capabilities and is aware of gaps to be addressed.
- Leverage partnerships with local, regional, and State partners to maximize use of scarce resources.

In addition, the City maintains a list of contractors and suppliers for specific needs (e.g., backup generator rental company and heavy equipment rental company) in the Emergency Operations Plan and at the water treatment plant.

Resource requests and emergency/disaster declarations must be submitted by the City Manager to the County Manager through County Emergency Management via the County Emergency Operations Center, and the County Emergency Management then processes assistance requests to the State (See Section 1.9.1 in the EOP). State and Federal assistance may be available to the City (See Sections 1.7.4 and 1.7.5 in the EOP). The State evaluates resource requests for assistance based on the goals and priorities established by OEM Director. If State assistance is insufficient to meet the requirements of an emergency response (as determined by the Governor), Federal assistance may be requested. FEMA provides resources, coordination, planning, training, and funding to support State and local jurisdictions when requested by the Governor. State and Federal resources can be pursued for longer-term needs, such as infrastructure projects.

In the case of fire emergencies, that Yachats Rural Fire Chief or County Fire Defense Board Chief can contact the State Fire Marshall to mobilize and fund fire resources (EOP Section 1.9.1.1).

If the City finds it necessary to redirect its funds to respond to an emergency incident, the City Council has the authority to adjust department budgets and funding priorities (EOP Section 1.9.2).

Potential funding sources are identified in Section 4 of this Drinking Water Protection Plan, which the City will investigate.

SECTION 6: Future Water Sources

This Drinking Water Protection Plan has focused on the City's current water sources, Reedy Creek and Salmon Creek. Nonetheless, it is important to consider future drinking water needs and potential future water sources. The use of new water sources would expand the drinking water source area, necessitating additional protective measures. As described in Section 1.2.1, the City holds water rights authorizing the use of water from (North) Cape Creek and the Yachats River. The Yachats River watershed is the designated Emergency Intake area shown in the Source Water Assessment (SWA) prepared by DEQ in 2016. Given that the City holds these water rights, the City is considering them future water sources.

The Yachats River source water area is significantly larger than the current drinking water source area, encompassing 41.46 square miles compared to the current source area of 1.21 square miles. Similar to the Reedy and Salmon Creek watersheds, approximately three-fourths of the Yachats River watershed is part of the Siuslaw National Forest. While most of the upland headwater areas of the watershed are held in federal ownership, the lands closest to the river and its tributaries are mostly privately owned. Land uses include private industrial forest, rural residential development, and agriculture.

The (North) Cape Creek source water area is a small watershed located just north of Cape Perpetua. The land use in this watershed is forestry.

The remainder of Section 6 focuses on the Yachats River source water area and its risks and strategies. The risks and strategies identified for the Reedy Creek and Salmon Creek source water areas also apply to (North) Cape Creek, except for those risks associated with Municipal, Commercial, and Residential (Urban and Rural) Property Management, so those portions of this plan address (North) Cape Creek risks and strategies. An implementation plan has not been developed for the City's potential future water sources given that the focus of this DWPP is on current water source areas and the City's future water sources have not been determined.

6.1 Risk Assessment for the Yachats River Watershed

The Yachats River watershed is adjacent to the current drinking water source watersheds characterized earlier and shares susceptibility to some of the same risks. In addition to risks described in Section 2 of this DWPP, risks specific to this watershed were identified in the SWA and by the DWPP Team.

6.1.1 Risks Identified in the Source Water Assessment

The SWA shows that 18 percent of the stream miles in the Yachats River watershed are located in areas with high soil erosion potential. Landslide deposits are also present in several locations around the watershed. These conditions increase the sensitivity of the source water area to ground disturbing activities which are likely to cause erosion and sedimentation. Water quality limitations were described for the Yachats River and several of its tributaries, although the tributaries currently supplying drinking water are not listed as water quality limited. The SWA's inventory of potential pollution sources includes a site owned by the City of Yachats where hazardous chemicals are stored; Otter Crest Quarry, a crushed stone quarry, which is now closed; and eight bridges crossing the North Fork and South Fork of the Yachats River.

Risk levels are presented after each item below showing the overall risk level, and its probability of occurrence and severity of impact rated from 1 (lowest) to 5 (highest).

6.1.1.1 Property management: municipal hazardous chemical storage (low: 1, 2)

The City stores up to four 50 gallon barrels of polymer for coagulation and up to four 50 gallons barrels of 12 percent bleach at the water treatment plant for water treatment purposes. If an accidental spill of these chemicals occurred, it would only have the potential to affect water quality at the downstream POD on the Yachats River near the estuary if built. The City is unlikely to use the downstream POD as a result of salt water intrusion issues, which are discussed in 6.1.2.3.

6.1.1.2 Property management: quarry (low: 1, 1)

The City has limited information about the closed Otter Crest Quarry. A quarry could potentially contribute sediment to the Yachats River, increasing turbidity or impairing water quality in some manner.

6.1.1.3 Property management: bridges (high: 4, 4)

Eight bridges were identified crossing the North Fork and South Fork of the Yachats River. Stream crossings can present risks to water quality depending on their design and location. Undersized culverts can back up during heavy precipitation, causing localized flooding and erosion. Contaminants, such as petroleum products, on the roadway can also wash into the stream, and any chemicals being transported that are accidentally spilled on roads over water bodies can lead to contamination of the drinking water source downstream.

6.1.2 Risks Identified by the DWPP Team

The risks described in Section 2 related to Natural Disasters and Forestry apply equally to the Yachats River source water area. In addition, the DWPP Team identified risks that fall within the Development category and a new Agriculture category. The same risks described in Section 2.2.3.1 for residential, commercial, and municipal development; property management activities described in Section 2.2.3.2; and landscape care described in Section 2.2.3.4 also apply within the Yachats River watershed. The additional development-related risks identified for the Yachats River source water area related to septic systems, wells, and the potential for saltwater intrusion at the original downstream municipal intake site (POD 2). In contrast to the current drinking water source area, portions of the Yachats River watershed are currently used for agriculture, and the potential also exists for expanded agricultural use in the future. The Agriculture risk category identified by the DWPP Team includes risks related to crops, animal grazing, and the use of agricultural pesticides. Risk levels are presented after each item below showing the overall risk level, and its probability of occurrence and severity of impact rated from 1 (lowest) to 5 (highest).

6.1.2.1 Property management: septic systems (medium: 3, 3)

New development in the watershed would most likely be rural residences located outside of the City's urban growth boundary. New and existing developments primarily rely on septic systems for sanitation. If septic systems are improperly designed, installed, or maintained, the systems could potentially fail and allow contaminants to leach into drinking water sources. The cumulative effects of multiple septic systems in the area could impact drinking water quality through potential discharge to shallow sediments adjacent to the Yachats River.

6.1.2.2 Property management: wells (medium: 3, 3)

Domestic wells within the watershed that are improperly installed or maintained, along with wells that have been abandoned, may provide a direct route to contamination of groundwater. In areas where groundwater and surface water are hydraulically connected, this could lead to contamination of the City's drinking water sources.

6.1.2.3 Property management: saltwater intrusion (low: 1, 2)

Permit S-53471 authorizes two points of diversion (POD) on the Yachats River. POD 1 is located upstream of the confluence of Reedy Creek with the Yachats River, and POD 2 is located downstream near the Yachats River estuary. POD 2, if built, could be subject to saltwater intrusion under conditions of climate change or during storm surges. The current water treatment system is not designed to treat excess salinity.

6.1.2.4 Agriculture: crops (medium: 3, 4)

DWPP Team members are not aware of any crops within the watershed, but did identify current cultivation of indoor crops, including cannabis and succulents. The potential future use of land in the watershed for crops could further increase the risks to drinking water associated with agriculture. The risk level is impacted by specific farming practices, including whether and how crops are irrigated. Irrigated crops are likely to have more impacts due to the potential for contamination in runoff, while non-irrigated or drip-irrigated crops are likely to have lower impacts. Excessive irrigation of any type can increase runoff and transport agricultural chemicals or sediments to surface water. In addition, excessive withdrawals for irrigation would reduce streamflows, particularly in the upper basin. This could also concentrate pollution in the remaining lower flows.

Removing riparian vegetation for agriculture increases the potential for erosion of streambanks, and the lack of stream shading can increase stream temperatures while lowering dissolved oxygen. These conditions increase the potential for algae and bacteria growth. Removal of riparian vegetation may also reduce beaver habitat, ultimately reducing summer streamflows by preventing the construction of beaver dams and ponds that slowly release water throughout the year.

The over-application or improper handling of pesticides and fertilizers used in agriculture could lead to contamination of drinking water sources, even if the crops are not irrigated. In addition, the application of biosolids on fields could impact drinking water quality.

6.1.2.5 Agriculture: animal grazing (medium: 3, 4)

Currently, there is little intensive grazing in the Yachats River watershed, although the potential remains for an increase in land used for grazing. Concentrated livestock may increase erosion and sedimentation of streams by reducing riparian vegetation, which exacerbates the effects described above. Additionally, improper storage and management of animal wastes could lead to contamination of water sources.

6.1.2.6 Agriculture: pesticides (medium: 3, 4)

As mentioned above, the over-application or improper storage and handling of agricultural pesticides could contaminate drinking water sources.

6.2 Strategies for Protecting Future Water Sources

The DWPP Team identified an array of strategies to protect water quality should the Yachats River become a new drinking water source. Strategies to protect the source area are outlined here to serve as guidelines for potential future actions. Many of the strategies described in Section 3 also apply to addressing the same risks present in the Yachats River watershed. In addition, new and enhanced strategy programs are described below to address specific risks.

6.2.1 Communications and Advocacy

6.2.1.1 Communications protocols

In addition to communicating with governmental entities and other stakeholders as described for current water sources in Section 3.2.1.1, the City will establish new or build on existing communication protocols and schedules to increase awareness and cooperation around drinking water protection. To ensure that development and property management do not pose a threat to the City's drinking water source area, the City will communicate with governmental entities, such as Lincoln County, about septic system concerns and will participate in any relevant governmental processes related to septic systems. The City will also communicate with the Oregon Department of Agriculture (ODA) to track compliance of agricultural operations with ODA's Mid Coast Agricultural Water Quality Management Area Rules. This will provide the City with timely information on potential risks to drinking water from agricultural activities such as cultivation of crops, animal grazing, and the use of pesticides.

6.2.1.2 Master outreach document

At such time as the Yachats River becomes a drinking water source, the City will add additional topics to the master outreach document described in Section 3.2.1.3 related to the installation, use, and maintenance of septic systems.

6.2.1.3 Otter Crest Quarry inquiry

The City will contact the Oregon Department of Geology and Mineral Industries to discuss the stability of the site at the time of closure, landowner requirements to maintain the site, and any concerns about erosion/instability over time that cause downstream impacts in the future. In addition, the City will inquire whether that is a permanent closure, or whether the land could be rezoned or reused for other purposes in the future.

6.2.2 Public Education and Technical Assistance

6.2.2.1 Safe management of potential contaminants

Outreach to agricultural producers will focus on ensuring that pesticides are handled, applied, and stored in a manner that does not present risks to the drinking water source. The City will also share DEQ's technical information resources on water quality and pesticide use with interested landowners and managers.

6.2.2.2 Land management education: property management

The City will hold or support domestic well and septic system educational workshops for property owners and managers in the Yachats River watershed. Such workshops may be conducted in partnership with Oregon State University (OSU) Extension Service, Lincoln SWCD, MidCoast Watersheds Council, or similar entities. The City will share materials on source water protection through proper well and septic system maintenance with area realtors. An ongoing septic system education program will provide information about appropriate operation, maintenance, and upgrades for septic systems. This program may be developed by the City or it may be a modification of an existing program such as DEQ's Septic Smart Program. The City will refer those in need of financial assistance to programs such as the Oregon On-site loan program to assist with septic system repair and replacement. To prevent wells from becoming a route for contamination, the City will provide information on well maintenance, testing, and source water protection, such as resources available from OHA, DEQ, and OWRD. The City will also notify well owners within the drinking water protection area of closure and abandonment requirements for unused wells and construction requirements and standards for active wells.

6.2.2.3 Land management education: agriculture

Agricultural producer education will focus on farm and ranch management practices that protect surface water quality, including practices required under ODA's Mid Coast Agricultural Water Quality Area Rules, and encouraging those that are voluntary under ODA's Mid Coast Agricultural Water Quality Management Area Plan.¹ The City will direct interested producers to technical and financial assistance resources available from the Lincoln SWCD, MidCoast Watersheds Council, The Beaver Coalition, OSU County Extension Agent, ODA, and the Natural Resources Conservation Service. These resources can assist producers in implementing management measures that protect water quality, as well as developing individual farm plans for source water protection.

6.2.3 Critical Area Protection Programs

In addition to protecting sensitive locations described in Section 3.4, the City may also consider land acquisition or conservation easements to protect critical areas in the Yachats River watershed where development or intensive use could pose a risk to the drinking water source. This may include lands that are currently used for growing crops or animal grazing in close proximity to the Yachats River or its major tributaries. Additional areas of concern include areas with highly erodible soils or landslide potential, especially those lands adjacent to streams with water quality limitations described in the SWA. The City should begin prioritizing critical areas for protection of future drinking water quality prior to development of the Yachats River as a water source.

6.2.4 Municipal Policies and Infrastructure Management

At this time, the City is not proposing to construct an intake at the point of diversion closest to the estuary that is subject to saltwater intrusion (POD 2). Diversion of drinking water supply from the Yachats River would be limited to the upstream point of diversion. The City will document the risks at POD 2 to maintain institutional knowledge for future water managers.

6.2.5 Plan and Program Development and Enhancement

6.2.5.1 Property management: septic systems

A septic system inspection and repair assistance program will be developed, potentially in conjunction with partner organizations to protect drinking water quality outside of the City's jurisdiction. The program would provide free or low cost septic system inspection, property owner education, and financial assistance for any needed repairs. In some cases, the County may require advanced treatment technology when replacing a failed septic system, and this program would seek to provide financial assistance with upgrading to an approved technology. The City will also explore alternative wastewater management approaches that reduce water demand, such as composting and incinerating toilets and graywater systems. If the City were to implement such a program, the City's approach will take into account the balance between inadvertently encouraging development and mitigating potential threats to drinking water sources. The City may also explore the possibility of a septic system inspection program implemented upon property transfer.

6.2.5.2 Property management: wells

Similar to the program described above for septic systems, the City will develop a well inspection and repair assistance program. This program will include free or low cost well inspection and financial assistance for

¹ Visit ODA's website for more details at www.oregon.gov/oda/programs/NaturalResources/AgWQ/Pages/AgWQPlans.aspx.

repairs that are needed to protect water quality. The City will also work with OWRD to verify proper well abandonment in sensitive areas of the watershed that may impact municipal surface water intakes.

6.2.6 Monitoring

6.2.6.1 Water quality monitoring: property management

The City will monitor for salinity at any proposed new municipal water intake in the Yachats River watershed. This will enable the City to detect any changes that may threaten water quality in the municipal supply.

6.2.6.2 Water quality monitoring: agriculture

As needed, the City will undertake a program of water quality monitoring downstream of any identified problem areas to ensure that water quality is not degraded by contaminated runoff. This may include areas affected by soil erosion and sedimentation from tillage for crop production, livestock pastures and animal waste storage areas, and storage and application locations for agricultural pesticides.

6.2.7 Contamination Prevention Programs

6.2.7.1 Contamination prevention: agriculture

The City will work with agricultural producers to understand their usage of chemical applications, such as pesticides and fertilizers within the drinking water source area. Integrated pest management strategies and the minimization of chemical applications will be encouraged in locations where there is a potential for chemicals to contaminate drinking water sources. The City may also sponsor hazardous waste collection events for agricultural chemicals combined with producer education about the need for safe disposal of contaminants.

To prevent non-point source pollution from animal grazing, the City will partner with and support entities, such as the MidCoast Watersheds Council, The Beaver Coalition, and Lincoln SWCD in helping producers implement voluntary practices to protect and improve water quality. These practices may include fencing of riparian areas or riparian vegetation enhancements to help exclude livestock and protect streambanks from erosion, as well as providing off-channel livestock watering.

6.2.8 Watershed Restoration Support

As mentioned above, partnerships with the MidCoast Watersheds Council, The Beaver Coalition, Lincoln SWCD, and similar entities will focus on projects that improve water quality and fish and wildlife habitat. In addition to restoration of forestlands and municipal, commercial, and residential properties described in Section 3.9, restoration in the Yachats River watershed may also include restoration of agricultural properties using some of the same techniques presented above for contamination prevention. Restoration may also focus on areas with highly erodible soils, improve beaver habitat, or provide vegetative buffers to filter pollution before it reaches streams with known water quality impairment.

Appendices

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APPENDIX A

City of Yachats 2016 Source Water Assessment and 2020
Update

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City of Yachats
2016 Source Water Assessment

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Updated Source Water Assessment

City of Yachats Public Water System

PWS #4100966

October 2016

Prepared for:

City of Yachats



Prepared by:



State of Oregon
Department of
Environmental
Quality



Oregon

Kate Brown, Governor

Department of Environmental Quality

Agency Headquarters

Water Quality Program

811 SW Sixth Avenue, Suite 600

Portland, OR 97204-1390

503-229-5696

(FAX) 503-229-6037

TTY 711

October 14, 2016

Rick McClung, Public Works
City of Yachats
PO Box 345
Yachats, Oregon 97498

Re: **Updated Source Water Assessment for PWS # 4100966**

Dear Mr. McClung,

On behalf of the Oregon Health Authority (OHA), the Oregon Department of Environmental Quality (DEQ) is pleased to provide your community with important information in this Updated Source Water Assessment. The updated assessment is intended to provide information and resources to assist you and your community to **implement local drinking water protection efforts**. Since the first source water assessments were completed in 2005, state agencies have significantly expanded analytical capabilities, including more detailed data for analyzing natural characteristics and potential pollutant sources. DEQ is currently completing the updated assessments for surface water systems and OHA is updating the groundwater system assessments.

As you know, assuring safe drinking water depends on public water suppliers implementing multiple successful practices. **First, protect the drinking water source.** Second, practice effective water treatment. Third, conduct regular monitoring for contaminants to assure safety. Fourth, protect the distribution system piping and finished water storage from recontamination. Finally, practice competent water system operation, maintenance, and construction. These practices are collectively called “multiple barrier public health protection”. **Source water protection is an important first step because starting with the best possible quality source water helps assure that water treatment can be effective at all times.**

Source water protection is accomplished by effective state public health programs, environmental protection, land use policies, pro-active land stewardship, and by implementation of local drinking water protection efforts. The susceptibility of the public drinking water system source depends on both the natural conditions in the watershed as well as the anthropogenic activities in the watershed.

This letter, with attached figures and technical information, constitutes your **Updated Source Water Assessment**. It supplements your original Source Water Assessment (link here: <http://www.deq.state.or.us/wq/dwp/swrpts.asp>). One of the most important assets a public water system can have is accurate source water area mapping and visual resources to share with the community citizens and officials. The figures include a new regional map view of your watershed, topographic basemap with the source area delineated, and maps with natural characteristics, anthropogenic land uses, potential sources of pollutants, and historic landslides. Information on anthropogenic land uses in a drinking water source area is important for evaluating potential pollutant

sources and working with stakeholders upstream. Tables are provided that include a summary of the types of potential pollutant sources present in your drinking water source area.

There are also a variety of resources included in this document to assist you with drinking water source protection efforts. **Appendix #1** provides a summary of how to use the information provided in the assessment to move forward to develop and implement source water protection. **Appendix #3** lists websites and resources available to public water systems and community members seeking technical assistance for work on watershed protection. **Appendix #4** provides brief descriptions and contact information for grants and loans to fund both drinking water infrastructure and source protection projects.

State agency resources are available to help you with mapping and information needs. Larger sizes of the source area maps and more details of landslide potential and other natural characteristics are available for you upon request (contact Steve Aalbers at 503-229-6798). DEQ is currently developing "Resource Guides" with more extensive information to assist public water systems in protecting their source waters. Resource Guides will be developed for both Oregon surface water systems and groundwater systems by 2017.

For direct assistance and/or additional information regarding watershed protection, call Sheree Stewart at DEQ (503-229-5413). For more information on drinking water policies and procedures, call Casey Lyon at OHA (541-726-2587).

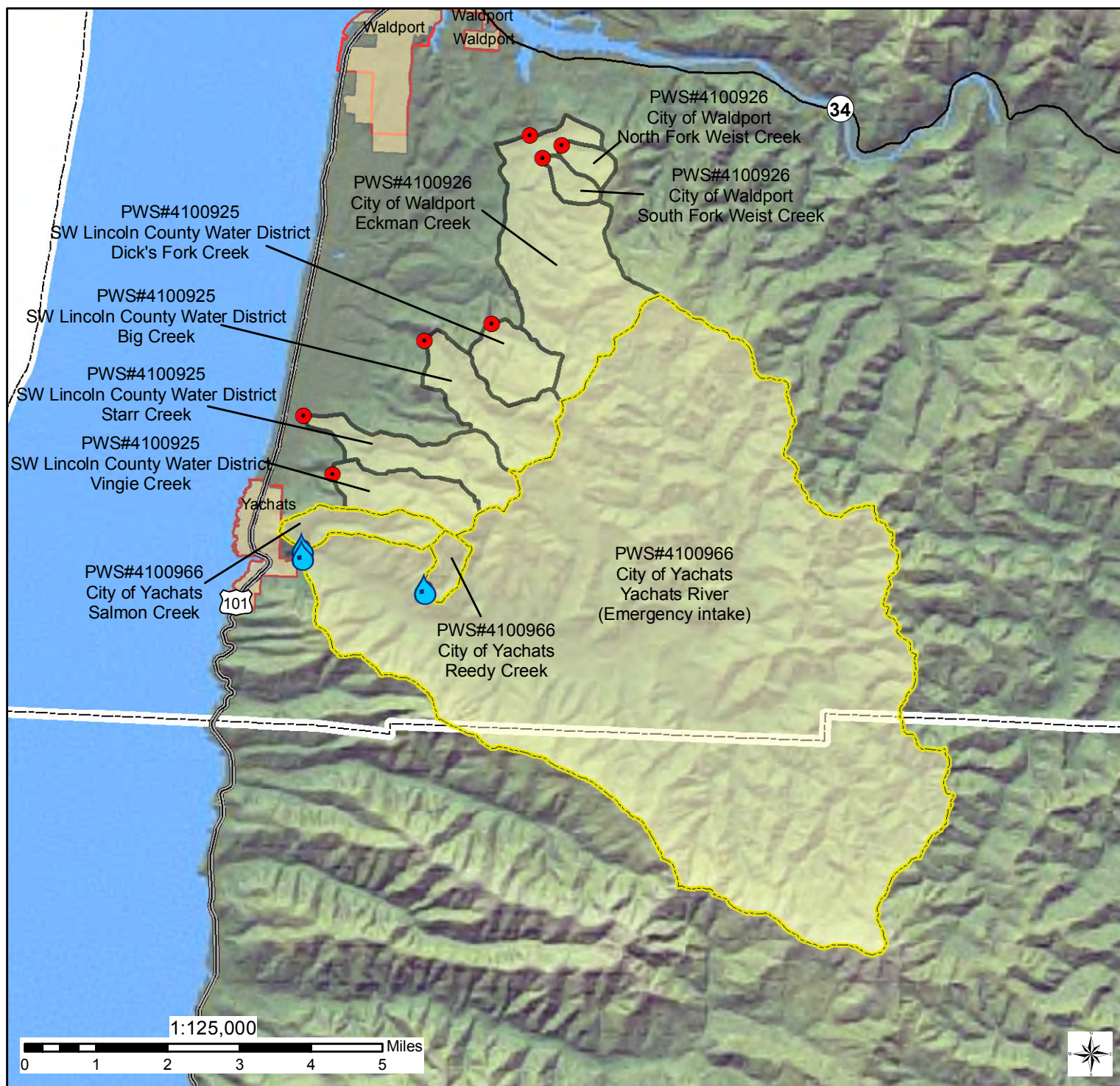
Sincerely,

A handwritten signature in black ink, appearing to read 'Sheree Stewart', with a large, stylized initial 'S'.

Sheree Stewart, Drinking Water Protection Coordinator
Environmental Solutions Division

Cc: Casey Lyon, Technical Services Manager, Oregon Health Authority

**Figure 1. City of Yachats (PWS 00966)
Drinking Water Source Area
and Adjacent Source Areas**



Legend

- City of Yachats surface water intake
- City of Yachats Drinking Water Source Area
- Surface Water Intake
- Surface Water DWSAs
- Urban Growth Boundary (2010)
- City limits (ODOT, 2013)
- County Boundary
- Interstate
- U.S. Routes
- Oregon Routes

This data analysis was conducted for strategic planning purposes in drinking water protection. If other uses are considered for the data, please contact DEQ's Drinking Water Protection Program for details on how this query was performed. It is important to understand the limitations and qualifications of queries to ensure appropriate interpretation of this data. No warranty expressed or implied is made regarding the accuracy or utility. This disclaimer applies both to individual use of the data and aggregate use with other data.

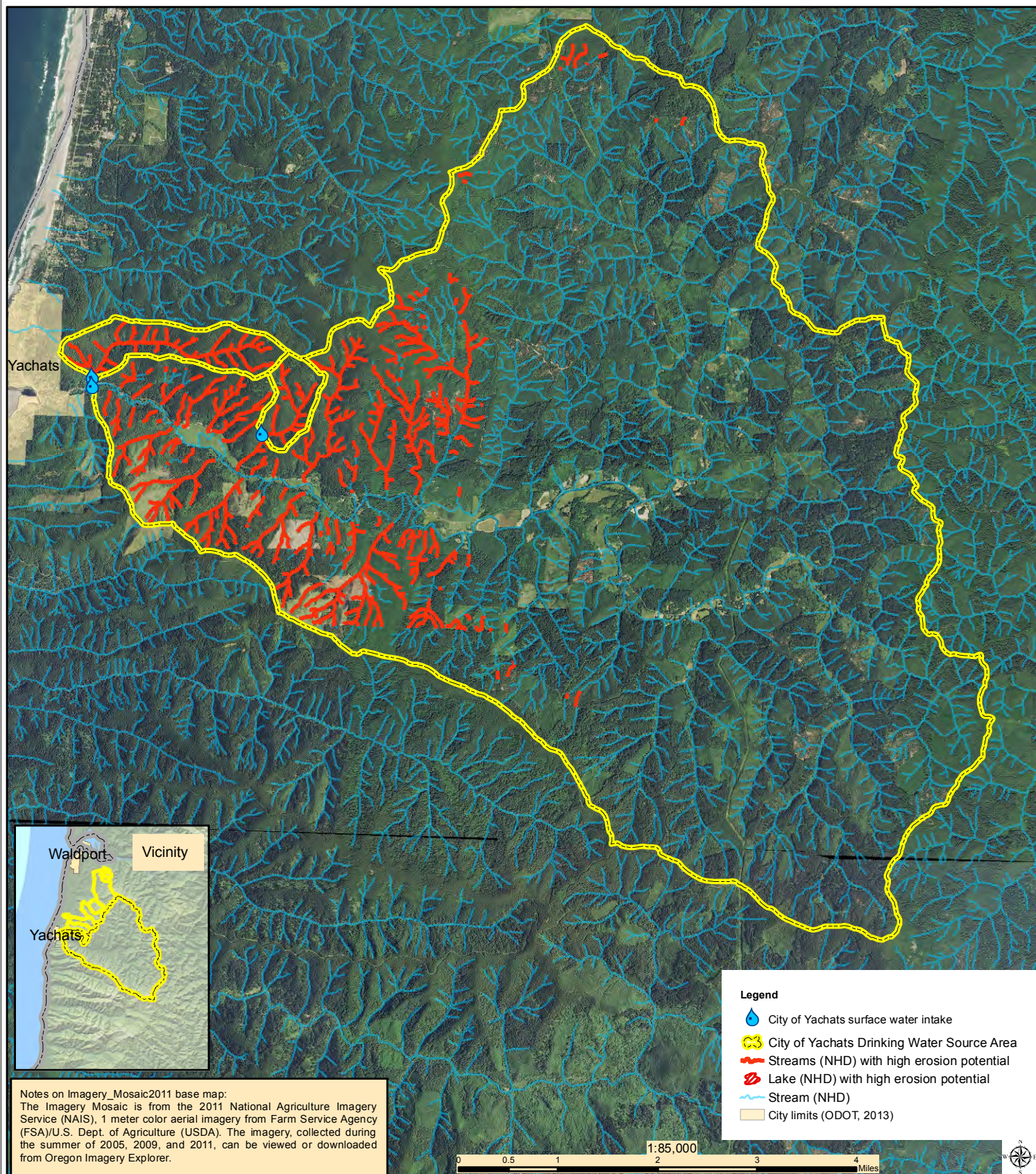
Oregon Dept of Environmental Quality/Environmental Solutions Division/Water Quality Program
Drinking Water Protection Program/GIS
Projection: Oregon Lambert (Lambert Conformal Conic)
GCS_North_American_1983, Datum: D_North_American_1983
File: \\deqhq1\dwpl\SWA Reports & Plan\Update SWA SW
2016\PWSReports\4100966_Yachats\USWA_Fig1_SW_CityOfYachats_VicinityMap.mxd
Prepared by: jkh(21DEC2015, Rev. 13JUL2016 (sda)), Printed: 13JUL2016 (sda)

Note on Base Layer: The hillshade color effect shown here is the result of additional processing of digital elevation models (DEM - 30 meter grid) data from 1:24000 topographic maps. A "hillshade" was produced first and then color adjusted. The original DEM files were developed by the OR Dept. of Forestry. Additional processing of the hillshade data with Red, Green, Blue (RGB) color scheme resulted in the "orshade.sid" dataset displayed here. The data set is provided for use by the Oregon Geospatial Data Center.

Figure 2. City of Yachats (PWS 00966)

Drinking Water Source Area Erosion Potential

 (See Appendix 2 for Key to map details and metadata)



**Figure 3. City of Yachats (PWS 00966)
Drinking Water Source Area Landslide Hazards Map
(See Appendix 2 for Key to map details and metadata)**

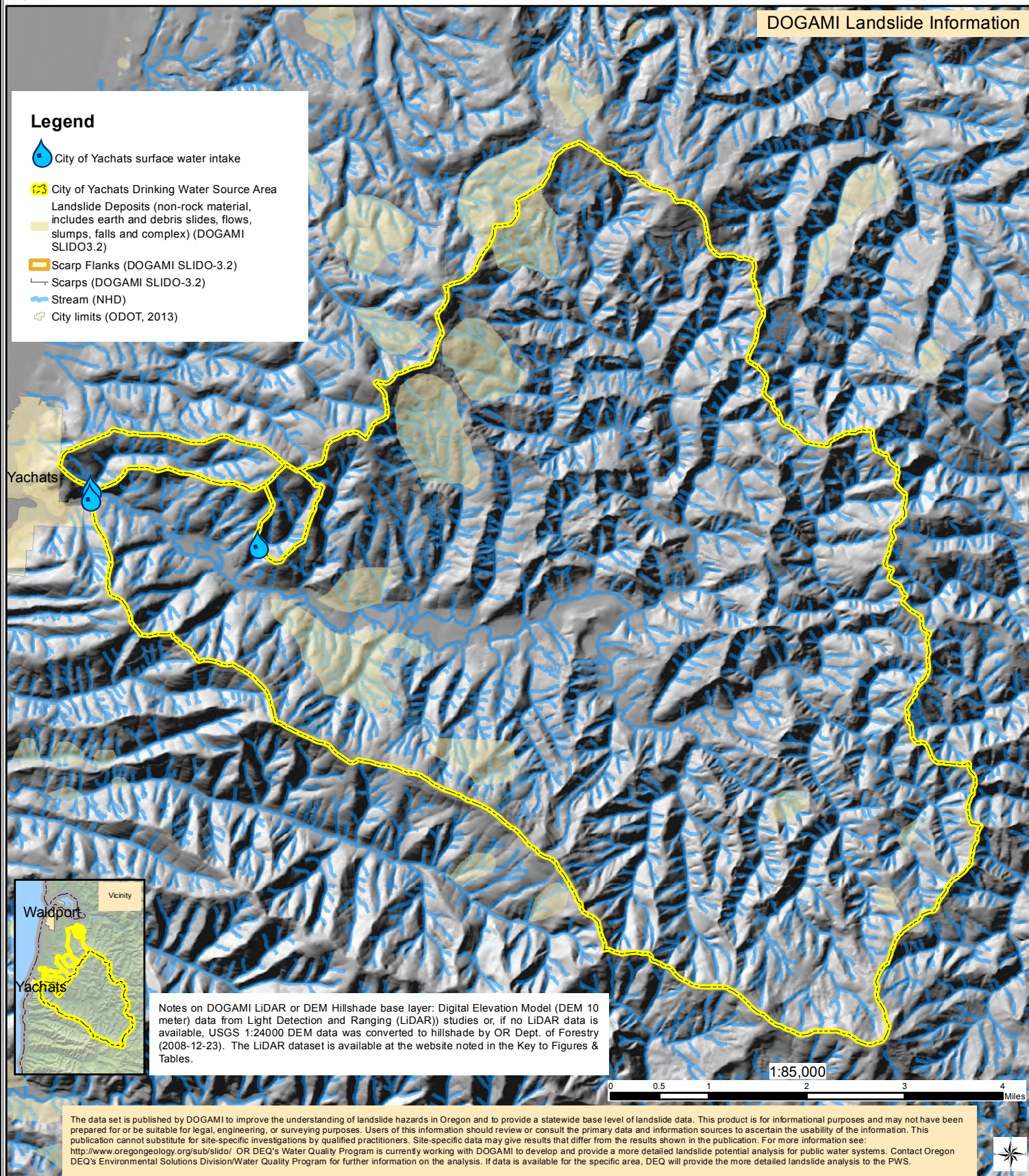


Figure 4. City of Yachats (PWS 00966)

Drinking Water Source Area - Potential Anthropogenic Sources, Transportation Corridors and Land Ownership/Use

 (See Appendix 2 for Key to map details and metadata)

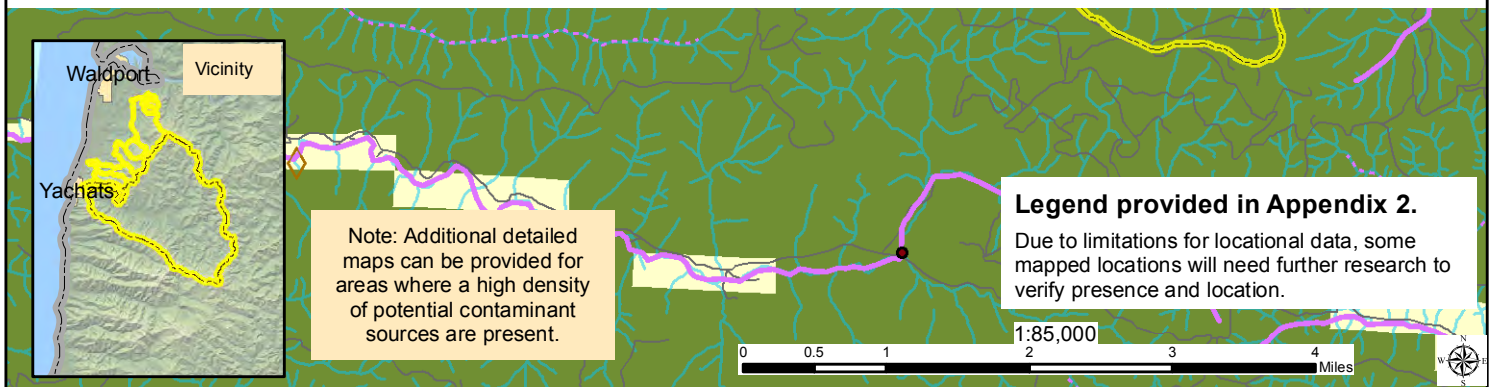
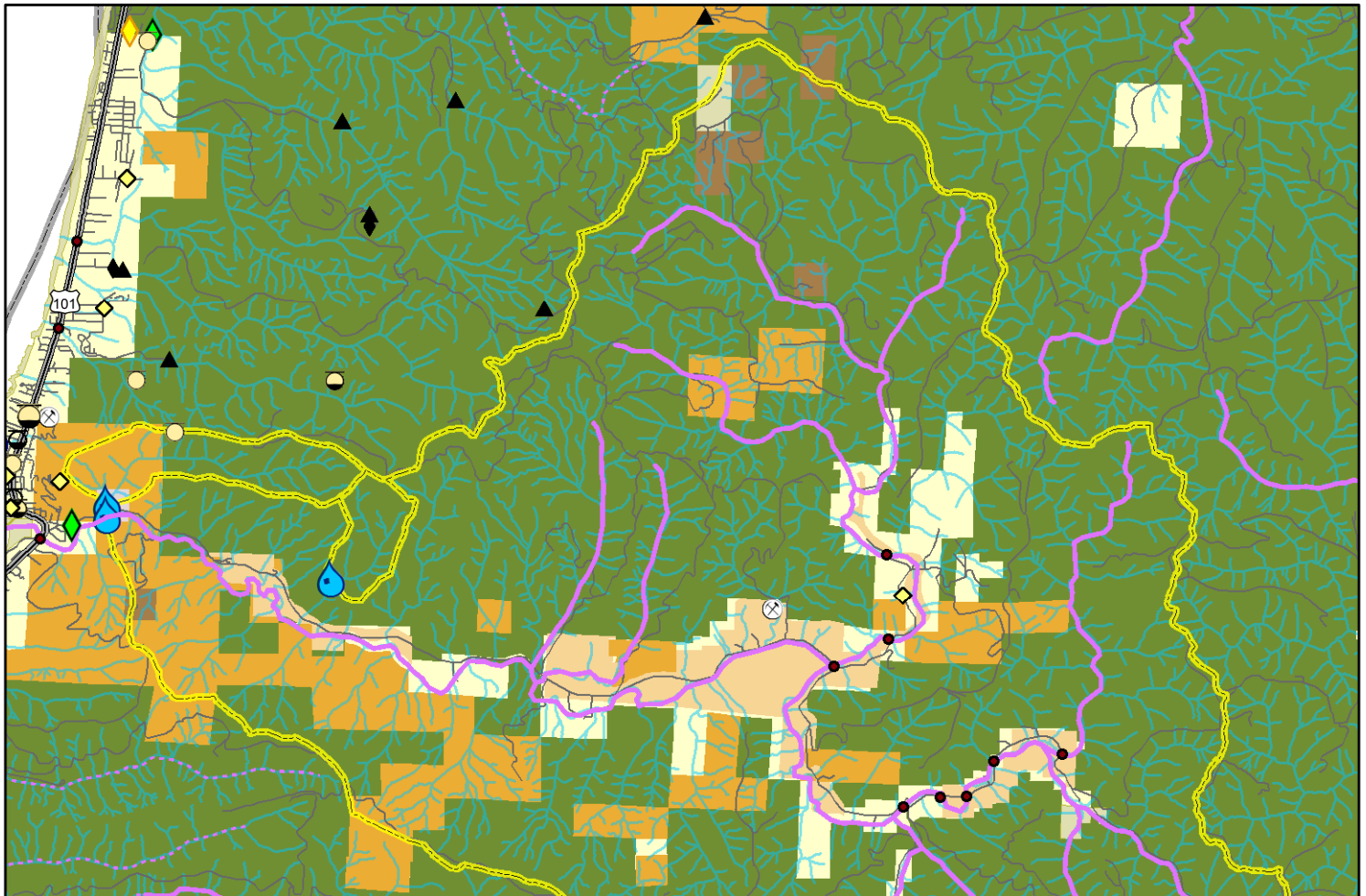




Table 1: Drinking Water Source Area Land Use and Susceptibility Analysis Summary

See Appendix 2 for Key to Tables and Notes

Public Water System Name

PWS ID

County Served

Population (includes wholesale buyers) ⁽²⁾

Number of Public Water Systems Served ⁽²⁾

City of Yachats

00966

Lincoln

1,000

1

Drinking Water Source Name Subbasin Drinking Water Source Area (DWSA) Site ⁽¹⁾ Stream Miles in DWSA		Salmon and Reedy Creek Alsea 1.21 sq.mi. / 773 acres 9.36		Yachats River (emergency intake) Alsea 41.46 sq.mi./26,536 acres 341.70		Notes
Owner Type		Area (acres)	% of DWSA	Area (acres)	% of DWSA	
Agricultural		0	0%	1,392	5%	Salmon/Reedy DWSA: ~10 acres near Salmon Cr. Intake owned by PWS. Lot near Salmon Cr. intake owned by water district. 2 large lots in lower watershed owned by investment co (possible development) high priority for protection. Rest by US Forest Service/BLM Yachats R. DWSA: private ownership along the Yachats River and major tributaries with Federal lands throughout the headwaters.
Private Industrial Forest		178	23%	3,128	12%	
Private (Rural/Non-Industrial)		0	0%	1,408	5%	
Local Govt		15	2%	2	0%	
State Forest		0	0%	57	0%	
Other State Lands		0	0%	39	0%	
BLM		0	0%	264	1%	
USFS		580	75%	20,246	76%	
Tribal		0	0%	0	0%	
Other (Water)		0	0%			
Land Use / Ownership ⁽³⁾						
Natural and Anthropogenic Potential Pollutants						
Stream Miles in Erodeble Soils (4)		9.36		59.93		see note 4 in Appendix 2
High Soil Erosion Potential Percent (4) (% stream mi w/ high erosion)		100%		18%		see note 4 in Appendix 2 More details on shallow landslide susceptibility may be available. Contact DEQ Drinking Water Protection for additional information.
Shallow Landslide Potential		NA		NA		Includes earth and debris slides, flows, slumps, falls and complex landslide types. Does not include rock material landslide deposits.
Landslide Deposits (5) (DOGAMI - SLUDO 3.2)		none mapped		present in Yachats River intake source area - see map and note		
Treatment Process		Rapid sand & rapid mix				
Safe Drinking Water Information System Results ⁽⁶⁾		MCL Violations ⁽⁶⁾	Significant Detections (2005- 2016) ⁽⁶⁾	MCL Violations ⁽⁶⁾	Significant Detections (2005-2016) ⁽⁶⁾	Water quality data not available in OHA Safe Drinking Water System Data Online for the Yachats River intake since it is not currently active.
Regulated volatile organic chemicals, synthetic organic chemicals and inorganic compounds Disinfection byproducts (Total Trihalomethanes (THM), Haloacetic acids (five) (HAAs), bromate, and chlorite) Bacteria (Ecoli and TCR=Total Coliform Rule)		none	none	not applicable	not applicable	
DEQ/OHA Source Water Monitoring project test data ⁽⁷⁾ ND = All parameters not detected and NA = source water not analyzed		none	none	not applicable	not applicable	
Additional raw water quality monitoring data for the drinking water source may be available from other sources including USGS, DEQ's IASAR database, individual water providers, local partners (i.e. soil and water conservation districts or watershed councils) or local volunteer monitoring.		not applicable		not applicable		

Updated with additional NRCS data 11/2/2016



Table 2: Inventory of Potential Sources of Pollution
as identified in readily accessible state and federal databases and GIS layers
Updated Source Water Assessment
see Appendix 2 for Key to Tables for Notes and Descriptions of Acronyms

PWS Name: City of Yachats
PWS Number: 00966

This information supplements the Original Source Water Assessment Inventory dated between 2000 and 2005 and should be used in conjunction with the original inventory to provide a more detailed analysis of potential sources of pollution. Note that due to limitations for locational data in state databases, some locations will need further research to verify presence and location.

Primary Land Ownership/Use(s)							Data Source	
Primarily Federal land (USFS) with some private industrial forestry land use especially near the Salmon and Reedy Creek intakes. Private Non-Industrial/Urban (rural residential) and agricultural land use also present in the river valleys of the Yachats River (emergency intake) delineation.							Land use map - Figure 4	
Other potential sources of pollution identified based on aerial photographs, topographic maps or local knowledge.								
Name	Address/location			City	County	Data Source		
Utility right-of-way - power lines in upper watershed						aerial photograph		
Database Identifier (DB_ID)	Site Identifier (Site_ID)	Status	Common Name	Address	City	County	Retrieval Date (RET_DATE)	Data Source
Identified in Salmon and Reedy Creeks Source Area (Emergency Intake)								
UST - SHAMROCK LODGETTES	12039	0 Upgraded, 1 Decommissioned, 0 Unknown	SHAMROCK LODGETTES	105 HWY 101 SOUTH	YACHAT S	LINCOLN	01/25/2016	OR Dept. of Environmental Quality Underground Storage Tank Program (DEQ/UST - 2016)
Identified in Yachats River Intake Source Area (Emergency Intake)								
SFM - HSIS - YACHATS CITY OF	024349	OTHER GENERAL GOV SUPPORT with 2 different chemicals reported on site (liquids and solids only)	YACHATS CITY OF	936 YACHATS RIVER RD	YACHAT S	LINCOLN	09/29/2008	OR State Fire Marshall Hazardous Substance Information System database (SFM/HSIS - 2009)
DOGAMI - Otter Crest Quarry	21-0054	Closed -	Otter Crest QuarryDevils Lake Rock Company		Not applicable	Lincoln	10/21/2015	OR Dept. of Geology and Mineral Industries Mineral Information layer for Oregon Release 2 (DOGAMI/MILO-2 - 2014)
Bridge - North Fork Yachats River, Yachats River Rd	12035A	Highway, major road, bridge, or stream	North Fork Yachats River, Yachats River Rd	Not Applicable	UNKNO WN	Lincoln	2013	Oregon Dept. of Transportation, Technical Services Branch, Bridges Section (ODOT - 2013)
Bridge - North Fork Yachats River, North Yachats River Rd	12036A	Highway, major road, bridge, or stream	North Fork Yachats River, North Yachats River Rd	Not Applicable	UNKNO WN	Lincoln	2013	Oregon Dept. of Transportation, Technical Services Branch, Bridges Section (ODOT - 2013)
Bridge - North Fork Yachats River, North Yachats River Rd	12037	Highway, major road, bridge, or stream	North Fork Yachats River, North Yachats River Rd	Not Applicable	UNKNO WN	Lincoln	2013	Oregon Dept. of Transportation, Technical Services Branch, Bridges Section (ODOT - 2013)
Bridge - South Fork Yachats River, Yachats River Rd	12039A	Highway, major road, bridge, or stream	South Fork Yachats River, Yachats River Rd	Not Applicable	UNKNO WN	Lincoln	2013	Oregon Dept. of Transportation, Technical Services Branch, Bridges Section (ODOT - 2013)
Bridge - South Fork Yachats River, Yachats River Rd	12040A	Highway, major road, bridge, or stream	South Fork Yachats River, Yachats River Rd	Not Applicable	UNKNO WN	Lincoln	2013	Oregon Dept. of Transportation, Technical Services Branch, Bridges Section (ODOT - 2013)

Database Identifier (DB_ID)	Site Identifier (Site_ID)	Status	Common Name	Address	City	County	Retrieval Date (RET DATE)	Data Source
Bridge - South Fork Yachats River, Yachats River Rd	12041A	Highway, major road, bridge, or stream	South Fork Yachats River, Yachats River Rd	Not Applicable	UNKNO WN	Lincoln	2013	Oregon Dept. of Transportation, Technical Services Branch, Bridges Section (ODOT - 2013)
Bridge - South Fork Yachats River, Yachats River Rd	12042A	crossing Highway, major road, bridge, or stream	South Fork Yachats River, Yachats River Rd	Not Applicable	UNKNO WN	Lincoln	2013	Oregon Dept. of Transportation, Technical Services Branch, Bridges Section (ODOT - 2013)
Bridge - School Fork Creek, Yachats River Rd	19581	crossing Highway, major road, bridge, or stream	School Fork Creek, Yachats River Rd	Not Applicable	UNKNO WN	Lincoln	2013	Oregon Dept. of Transportation, Technical Services Branch, Bridges Section (ODOT - 2013)
Water Quality Limited streams, Cat4A & Cat5, DEQ-2012 - Beamer Creek	124024544296	Cat 5: Water quality limited, 303(d) list, TMDL needed - Dissolved Oxygen	Beamer Creek	Not applicable	Not applicable	Not applicable	10/31/2014	OR Dept. of Environmental Quality Water Quality Assessment 2012 - (DEQ/WQ - 10/31/2014)
Water Quality Limited streams, Cat4A & Cat5, DEQ-2012 - Carson Creek	124022744294	Cat 5: Water quality limited, 303(d) list, TMDL needed - Temperature	Carson Creek	Not applicable	Not applicable	Not applicable	10/31/2014	OR Dept. of Environmental Quality Water Quality Assessment 2012 - (DEQ/WQ - 10/31/2014)
Water Quality Limited streams, Cat4A & Cat5, DEQ-2012 - Depew Creek	123971644330	Cat 5: Water quality limited, 303(d) list, TMDL needed - Temperature	Depew Creek	Not applicable	Not applicable	Not applicable	10/31/2014	OR Dept. of Environmental Quality Water Quality Assessment 2012 - (DEQ/WQ - 10/31/2014)
Water Quality Limited streams, Cat4A & Cat5, DEQ-2012 - Grass Creek	123938744283	Cat 5: Water quality limited, 303(d) list, TMDL needed - Temperature	Grass Creek	Not applicable	Not applicable	Not applicable	10/31/2014	OR Dept. of Environmental Quality Water Quality Assessment 2012 - (DEQ/WQ - 10/31/2014)
Water Quality Limited streams, Cat4A & Cat5, DEQ-2012 - Keller Creek	123967144281	Cat 5: Water quality limited, 303(d) list, TMDL needed - Dissolved Oxygen, E. Coli, Temperature	Keller Creek	Not applicable	Not applicable	Not applicable	10/31/2014	OR Dept. of Environmental Quality Water Quality Assessment 2012 - (DEQ/WQ - 10/31/2014)
Water Quality Limited streams, Cat4A & Cat5, DEQ-2012 - North Fork Yachats River	123977544297	Cat 5: Water quality limited, 303(d) list, TMDL needed - Dissolved Oxygen, E. Coli, Temperature	North Fork Yachats River	Not applicable	Not applicable	Not applicable	10/31/2014	OR Dept. of Environmental Quality Water Quality Assessment 2012 - (DEQ/WQ - 10/31/2014)
Water Quality Limited streams, Cat4A & Cat5, DEQ-2012 - School Fork	123944444290	Cat 5: Water quality limited, 303(d) list, TMDL needed - Dissolved Oxygen, E. Coli, Temperature	School Fork	Not applicable	Not applicable	Not applicable	10/31/2014	OR Dept. of Environmental Quality Water Quality Assessment 2012 - (DEQ/WQ - 10/31/2014)
Water Quality Limited streams, Cat4A & Cat5, DEQ-2012 - Stump Creek	123962244278	Cat 5: Water quality limited, 303(d) list, TMDL needed - Dissolved Oxygen, E. Coli, Temperature	Stump Creek	Not applicable	Not applicable	Not applicable	10/31/2014	OR Dept. of Environmental Quality Water Quality Assessment 2012 - (DEQ/WQ - 10/31/2014)

Database Identifier (DB_ID)	Site Identifier (Site_ID)	Status	Common Name	Address	City	County	Retrieval Date (RET DATE)	Data Source
Water Quality Limited streams, Cat4A & Cat5, DEQ-2012 - Williamson Creek	1239748443170	Cat 5: Water quality limited, 303(d) list, TMDL needed - Dissolved Oxygen, E. Coli, Temperature	Williamson Creek	Not applicable	Not applicable	Not applicable	10/31/2014	OR Dept. of Environmental Quality Water Quality Assessment 2012 - (DEQ/WQ - 10/31/2014)
Water Quality limited streams, Cat4A & Cat5, DEQ-2012 - Yachats River	1241083443080	Cat 5: Water quality limited, 303(d) list, TMDL needed - Dissolved Oxygen, E. Coli, Temperature	Yachats River	Not applicable	Not applicable	Not applicable	10/31/2014	OR Dept. of Environmental Quality Water Quality Assessment 2012 - (DEQ/WQ - 10/31/2014)
Water Quality limited streams, Cat3 - Keller Creek	1239671442810	Cat 3: Insufficient data - E. Coli	Keller Creek	Not applicable	Not applicable	Not applicable	10/31/2014	OR Dept. of Environmental Quality Water Quality Assessment - (DEQ/WQ - 10/31/2014)
Water Quality limited streams, Cat3 - Keller Creek	1239671442810	Cat 3: Insufficient data - pH	Keller Creek	Not applicable	Not applicable	Not applicable	10/31/2014	OR Dept. of Environmental Quality Water Quality Assessment - (DEQ/WQ - 10/31/2014)
Water Quality limited streams, Cat3 - North Fork Yachats River	1239775442970	Cat 3: Insufficient data - E. Coli, habitat Modification, pH, Sedimentation, Biological Criteria	North Fork Yachats River	Not applicable	Not applicable	Not applicable	10/31/2014	OR Dept. of Environmental Quality Water Quality Assessment - (DEQ/WQ - 10/31/2014)
Water Quality limited streams, Cat3 - School Fork	1239444442900	Cat 3: Insufficient data - E. Coli, pH	School Fork	Not applicable	Not applicable	Not applicable	10/31/2014	OR Dept. of Environmental Quality Water Quality Assessment - (DEQ/WQ - 10/31/2014)
Water Quality limited streams, Cat3 - Stump Creek	1239622442780	Cat 3: Insufficient data - Habitat Modification, E. Coli	Stump Creek	Not applicable	Not applicable	Not applicable	10/31/2014	OR Dept. of Environmental Quality Water Quality Assessment - (DEQ/WQ - 10/31/2014)
Water Quality limited streams, Cat3 - Williamson Creek	1239748443170	Cat 3: Insufficient data - E. Coli, pH	Williamson Creek	Not applicable	Not applicable	Not applicable	10/31/2014	OR Dept. of Environmental Quality Water Quality Assessment - (DEQ/WQ - 10/31/2014)

Appendix #1

Developing Strategies For Drinking Water Protection

Many¹ public water systems in Oregon will receive an Updated Source Water Assessment (USWA) developed by the Oregon Department of Environmental Quality (DEQ) and the Oregon Health Authority (OHA) drinking water protection team by 2017. USWAs provide the water systems and communities more detailed information on the watershed or recharge area that supplies their well, spring or intake (the “drinking water source area”). Public water systems and local communities can use the information in the assessments to voluntarily develop and implement drinking water protection strategies.

Requirements for water quality monitoring of public water systems in Oregon provide some degree of assurance of safe drinking water; however, all systems are vulnerable to potential contamination. **One of the best ways to ensure safe drinking water and minimize future treatment costs is to develop local strategies designed to protect against potential contamination.** Not only will this add a margin of safety; it will also raise local community awareness of drinking water contamination risks and provide information about how communities and local landowners can help protect their drinking water sources.

Using Place-Based Planning to Develop Protection Strategies

The drinking water source area for most communities lies partially, if not entirely, outside of their jurisdiction and may include several different governing agencies as well as a diverse mix of landowners, businesses and residents. When developing protection strategies, DEQ and OHA highly recommend that the water system and community involve potentially affected stakeholders early in the process to foster stakeholder awareness and trust in the resulting strategies.

Oregon adopted an “Integrated Water Resources Strategy (IWRS)” in 2012 that provides recommendations for how to do a place-based and integrated approach to water resources planning. This approach helps communities achieve the level of coordination and collaboration to successfully address local water quality and water quantity challenges, such as developing and implementing strategies to protect their drinking water sources. The IWRS Place-Based Planning guidelines describe elements to consider for building a collaborative process, characterizing water-related issues, quantifying existing and future water needs, developing a suite of solutions, and adopting and implementing the plan. More information about the process can be found in this Water Resources Department document:

http://www.oregon.gov/owrd/LAW/docs/IWRS/2015_February_Draft_Place_Based_Guidelines.pdf

Strategies to Achieve Risk Reduction

The primary goal of the drinking water protection strategies should be to reduce or minimize the risks of pollution in the source water. It is highly improbable that one can

¹ All water systems using surface water will receive a USWA. Because of the number of water systems using groundwater in Oregon, the Oregon Health Authority has prioritized completing assessments for new Community and Non-Transient Non-Community water systems and systems that have added a new water source since their original source water assessment was completed.



State of Oregon
Department of
Environmental
Quality

Environmental Solutions
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Fax: (503) 229-5408
Contact: Sheree Stewart
<http://www.deq.state.or.us/wq/dwp/dwp.htm>



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Drinking Water Program**
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<http://www.healthoregon.org/dwp>

Alternative formats
Alternative formats (Braille, large type) of this document can be made available. Contact DEQ's Office of Communications & Outreach, Portland, at (503) 229-5696, or toll-free in Oregon at 1-800-452-4011, ext. 5696.

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By: Sheree Stewart

eliminate risks in any area, but by applying one or more protection strategies, a community will be able to reduce the likelihood of pollutants affecting the water supply in the future. Potential strategies include both general management practices such as conservation or efficiency measures that will apply to the entire drinking water protection area and management practices that can be applied most appropriately by land-use category (commercial/industrial, agricultural/rural, forestry, residential/municipal, and miscellaneous). The following list provides some of the most common management options as an example to public water suppliers and communities:

Example Strategies for Drinking Water Protection
Non-Regulatory Options
Notify and Educate the Public: Contact property owners within the protection area so they are aware of the need for protection measures. Let them know this is voluntary. Focus educational efforts on basic information about the source water and the relationship between surface activities and the water quality; familiarity with the location of the protected area; basic information on sources of contamination; and effective strategies for safe management of all potential contaminants. Public education/notification can be accomplished using local news media outlets, letters to residents, letters to land owners/operators, and bill stuffers/customer mailings. Information signs could be placed adjacent to roadways entering the protection area. Include on the sign the name of the water system/jurisdiction and a phone number where callers can obtain more information or report releases.
Use Technical Assistance Resources: Work with local or state providers of technical assistance (e.g., DEQ's regional offices, Soil and Water Conservation Districts, OSU Extension) to encourage the use of best management practices for pollution prevention and waste reduction. Apply for grants or funding to provide financial incentives such as pollution prevention tax credits, low-interest loans or direct subsidies/cost sharing. Provide recognition for environmental friendly businesses and operations (e.g., green awards, plaques/door signs).
Sponsor Hazardous Waste/Unused Chemical Collection: Establishing a permanent location or holding one-day events to collect hazardous wastes from community residents (including households and small businesses) is an effective way to reduce risks posed by storing hazardous wastes or other chemicals within the protection area. Hold an amnesty (free-disposal) event for unused business or agricultural chemicals stored in the protection area. Set up a local materials exchange program (or publicize existing programs).
Develop Spill Response Plans: Encourage and assist your local fire department and transportation department with spill response planning. Jurisdictions within protection areas could develop specific spill response procedures to allow quicker response and notifications should a hazardous material spill or release occur. These can be integrated into your county's Emergency Management Plan. Contact the Oregon Department of Transportation (ODOT) for state highways.
Acquire Land or Rights to Development: Community ownership of as much as possible of the critical land areas within the protection area and managed for water quality protection provides some of the best assurance of long-term protection of the public water supply. Protection could be provided by ownership accomplished through methods such as capital or bond fund programs, or through easements and deed restrictions. Private non-profit land conservation organizations or local land trusts in your area can assist you in acquiring land within your protection area by conveyance to a trust, seeking donations, or direct land purchases for conservation.
Local Regulatory Options
Existing Regulations and Permits: Take advantage of opportunities to provide public comment and input when existing regulatory programs are reviewing permits or programs which affect the siting, design, construction, operation or closure of facilities within your protection area. Ensure you are included on regulatory agency contact lists so that you receive announcements for public involvement opportunities. Consider participating in advisory group meetings for specific topics of interest. Ensure that the regulatory programs are aware of your protection area and request that compliance inspections or technical assistance is prioritized in critical areas.
Land Use Controls (Zoning/Health Ordinances): There are many different types of zoning tools. Your community can identify the protection area with an overlay map and enact specific requirements for land uses and development within these boundaries in order to protect public health. Ordinances applying to sites that pose a risk to water quality within the overlay area may include prohibition of various land uses (such as landfills or underground fuel storage tanks); subdivision controls (such as limiting density or requiring larger lot sizes); special permitting or siting requirements (i.e. placing limitations on the use of toxic and hazardous materials, pesticides, salts); and performance standards (i.e. requiring secondary containment for petroleum or chemical storage over a certain volume).

How do communities use the Updated Source Water Assessments?

The Updated Source Water Assessment (USWA) provides the information for developing local protection strategies. The USWAs include details characterizing the source area and potential source water risks. It also provides key information that will allow the community to focus limited resources on higher-risk areas within the watershed or recharge zones for wells. The USWA information should be supplemented with local knowledge of the water system and community. The water system and community can refine the delineation of sensitive areas and identification of potential contamination sources through further research, local input and coordination with state agencies.

The USWA source area characterization should be reviewed to clarify the presence, location, operational practices, and actual risks of the identified facilities and land-use activities. Additional potential contaminant sources or sensitive areas may also be added based on local knowledge or additional research. Potential sources with low or no risk (such as landowners who have already incorporated best management practices into their operations to protect your source of drinking water) can be screened out or selected for low priority outreach or technical assistance. Local and state resources can then be directed to the highest priority potential problems in the drinking water source area.

Another way to use the information in the USWA is in developing the water system's contingency plan. Contingency planning focuses on potential threats to the drinking water supply (such as mechanical problems, chemical detections in the source water, chemical spills in the source area, or natural disasters) and the development of procedures to be followed should these events occur. Guidance for preparing a contingency plan and examples are available from OHA. Many contingency plan elements may have already been completed by public water systems as part of their required Emergency Response Plan. Additional elements can be added as drinking water source protection strategies are developed.

Public water systems may also find it necessary, as a result of either existing or projected increased demand, to explore the development of additional sources for drinking water. Drinking water source protection provides a mechanism that can be used to help select the best site and identify areas that should be protected now so they will provide quality drinking water in the future. Additionally, development of a new groundwater source in the vicinity of existing sources may modify the movement of groundwater in the subsurface, perhaps changing the shape and orientation of existing drinking water source areas. Evaluation of the significance of those changes should be addressed in the protection planning process to ensure that the management strategy in place will continue to protect the community's drinking water supply.

Need assistance?

Drinking water source protection is already at work in Oregon. A number of Oregon communities are currently developing and implementing strategies to protect their drinking water source areas. Successful drinking water protection plans developed in Oregon are available to communities as templates or examples. Staff members at OHA and DEQ are available to provide assistance, and extensive written materials are available to local community groups or consultants to assist in developing drinking water protection plans or strategies.

Detailed information about developing drinking water source protection strategies can be found on DEQ's Drinking Water Protection Program website. The website also includes Updated Source Water Assessment methods and results, sample Drinking Water Protection Plans, information for schools, and links to many other useful sites:

<http://www.deq.state.or.us/wq/dwp/dwp.htm>

The OHA – Drinking Water Program website includes system characteristics, monitoring data, contacts for all public water systems in Oregon, drinking water standards, fact sheets on contaminants, information on the Safe Drinking Water Revolving Loan Fund, Consumer Confidence Reports, and more: <http://www.healthoregon.org/dwp>

Water systems or community members interested in the potential of developing drinking water protection strategies should contact the respective DEQ and OHA coordinators. Those systems using surface water sources should initially contact Sheree Stewart, Drinking Water Protection Program Coordinator, DEQ, Portland, (503) 229-5413. Groundwater-based water systems should initially contact Tom Pattee, Groundwater Coordinator, OHA, Springfield, (541) 726-2587 x24. As the state moves further into the protection phase of the Oregon program, DEQ and OHA will be able to direct individual requests for assistance to specific staff trained and experienced in that area, both within the state agencies and in other partner organizations.

Key to Figures and Tables including Notes and Symbols Updated Source Water Assessments

General Legend:

-  Public water system surface water
-  Public water system drinking water source
-  Nearby public water system surface water
-  Nearby public surface water system drinking water source area
-  Stream (NHD)
-  Interstate
-  U.S. Routes
-  Oregon Routes
-  City limits (ODOT, 2013)
-  Urban Growth Boundary
-  County Boundary

Erosion Potential:

-  Streams (NHD) with high erosion potential
-  Lake (NHD) with high erosion potential

Landslide Information

-  Landslide Deposits (non-rock material, includes earth and debris slides, flows, slumps, falls and complex) (DOGAMI SLIDO3.2)
-  Scarp Flanks (DOGAMI SLIDO-3.2)
-  Scarps (DOGAMI SLIDO-3.2)

Land Ownership/Use:

-  Private Non-Industrial/Urban (includes residential, municipal, commercial, industrial, and rural residential land uses)
-  Agriculture (Ag Zoning (BLM) and NASS 2013)
-  Private Industrial Forests (ODF data); Lands Managed by Private Industry (BLM)
-  Local Government
-  State Dept. of Forestry
-  State - Other
-  Bureau of Land Management
-  U.S. Forest Service
-  Federal - Other
-  Bonneville Power
-  Bureau of Indian Affairs
-  Undetermined
-  Water

Potential Sources of Pollutants identified in State and Federal Regulatory Databases:

-  Boating access sites (OSMB as of 1/2016)
-  Confined Animal Feeding Operations (ODA as of 1/2016)
-  Dry Cleaner, Active (DEQ as of 1/2016)
-  Dry Cleaner, Dry Store (DEQ as of 2015)
-  Dry Cleaner, Closed (DEQ as of 2015)
-  Dry Cleaner, Inactive (DEQ as of 2015)
-  Dry Cleaner, Solvent Supplier (DEQ as of 2015)
-  Environmental cleanup site with known contamination (DEQ as of 01/2016)
-  Environmental cleanup site No Further Action required or otherwise lower risk (DEQ as of 01/2016)
-  Hazardous Material Large Quantity Generator (DEQ - HW as of 1/02/2016)
-  Hazardous Material Small Quantity or Conditionally Exempt Generator (DEQ - HW as of 1/02/2016)
-  Hazardous Material Transport, Storage, and Disposal sites (DEQ - HW as of 1/2016)
-  Hazardous Substance Information System (OSFM as of 2009)
-  Hazardous Substance Information System - AST (OSFM as of 2009)
-  Leaking underground storage tank - Confirmed (DEQ as of 9/2012) (Location will likely need verification.)
-  Leaking underground storage tank with No Further Action required or otherwise lower risk (DEQ as of 9/2015) (Location will likely need verification.)
-  Mining permits (DOGAMI as of 1/16/2014)
-  Oil and Gas wells (permitted only) (DOGAMI as of 7/2016)
-  Original Source Water Assessment Potential Contaminant Source - Area-wide source (DEQ as of 2005)
-  Original Source Water Assessment Potential Contaminant Source - Point source (DEQ as of 2005)
-  Other Source Water Assessment Potential Contaminant Source - SWA Update (OHA/DEQ as of 2016)
-  School Locations OR (DHS as of 2015)
-  Solid Waste sites (DEQ - SW as of 1/25/2016)
-  Underground Injection Control - Non-stormwater (UIC - DEQ as of 9/12/2016)
-  Underground Injection Control - Stormwater (UIC - DEQ as of 9/12/2016)
-  Underground Storage Tanks (DEQ as of 1/25/2016) (Location will likely need verification.)
-  Water Quality domestic wastewater treatment sites (DEQ - SIS as of 1/25/2016)
-  Water Quality permits (DEQ - SIS as of 1/25/2016)
-  Major route stream crossings and bridges (ODOT - 2013)
-  Water Quality effluent outfalls (DEQ - WQ as of 2009)
-  Water Quality Concern; lakes - Cat3 (DEQ - 2012)
-  Major route stream crossings & bridges (ODOT - 2013)
-  Water quality limited stream/lake, DEQ 303(d) list Cat 4A or 5, TMDL approved or needed (DEQ - 2012)
-  Water Quality Concern stream/lake, DEQ 303(d) Cat.3, Insufficient Data (DEQ - 2012)

Key to Figures and Tables including Notes and Symbols Updated Source Water Assessments

Notes

(1) DWSA - drinking water source area - delineated as the 5th-field watershed upstream of the intake. Note that Oregon's surface water source areas are delineated intake to intake. For watersheds with more than one intake, the DWSA is the watershed segment from the PWSs intake to the next intake upstream. All protection areas upstream of a specific water system's intake are included in the drinking water source area for that water system and PWSs are encouraged to work with other water providers and other entities within the Subbasin as they evaluate potential sources and move forward with developing protection strategies.

(2) There are independent public water systems that purchase water from the water systems listed and distribute it within their service areas. The total population served listed includes these "wholesale" customers and the total number of PWSs using the source water is also provided.

(3) Land Ownership/Use

The dataset is a combination of multiple datasets and was developed by DEQ in 02/2015. The primary dataset is from Bureau of Land Management BLM (OWNERSHIP_POLY.shp dated 06/20/2013) obtained from BLM at: <http://www.blm.gov/or/gis/data-details.php?id=425>. Publication date: 20130718. The dataset has been modified by grouping land owner categories in order to simplify data display on the map and using geospatial techniques to add additional data to capture the following land uses:

- agricultural land using a combination of the National Agricultural Statistics Service (NASS) data from Natural Resource Conservation Service (2007 "cdl_awifs_r_or_2007.tif") and agricultural land zoning from OR Dept. of Land Conservation and Development (note that public water systems may obtain more detailed information on potential crop types using the US Department of Agriculture National Agricultural Statistics Service "CropScape-cropland data layer." Available at <https://nassgeodata.gmu.edu/CropScape/>),
- private industrial forests using Oregon Dept. of Forestry's (ODF) "Private_Industrial_2006_ORLambert.shp" last updated in 2013,
- local government land combined from BLM ownership, tax lot ownership information from local county tax lot data and "OR Map" on-line application: <http://www.ormap.net/>, and
- all other categories (BLM, USFS, State, etc) from BLM 06202013 data. Note that Private Non-Industrial/Urban includes residential, municipal, commercial, industrial, and rural residential land uses.

Because of the nature of combining multiple datasets, minor discrepancies will be seen in some maps especially at larger scales. Public water systems and communities could use tax lot data available from the counties or other datasets to further refine the analysis if higher accuracy is needed.

(4) High Soil Erosion Potential

This layer was developed in accordance with the methods detailed in Oregon's Source Water Assessment program to assist public water systems prioritize drinking water protection strategies within their source area and was updated in 2016 using with Natural Resource Conservation Service (NRCS) 1:24,000 Soil Survey Geographic Database (SSURGO) and State Soil Geographic Database (STATSGO) data downloaded 25OCT2016. High Soil Erosion Potential for non-Forest Service lands with steeper slopes is determined by combining the effects of slope and the soil erodibility factor ("K-factor") using SSURGO and STATSGO data. The K-factor quantifies the susceptibility of soil particles to detachment and movement by water including the effects of rainfall, runoff, and infiltration. Soils with "high" soil erodibility ratings are considered sensitive to extensive ground disturbance such as some yarding methods and road building activities. Soils classified as "high" include soil with slopes of 30% (or greater) and K-factors (kfactor - rock free) of 0.25 (or greater). Soil Resource Inventory (SRI) information from the US Forest Service was used to determine erosion potential on National Forest lands. Erosion potential for soils represented in the SRI data is based on available representative data attributes such as sedimentation yield potential, sediment, or surface soil erosion potential. Specific information on the factors used for each National Forest to evaluate sensitivity is available from DEQ upon request. For future assessment on flatter terrains or in areas where K-factor is not available, a comparable approach will be developed and vetted with input from Natural Resource Conservation Service and others.



Key to Figures and Tables including Notes and Symbols Updated Source Water Assessments

(5) Landslide Information

OR Department of Geology and Mineral Industries (DOGAMI) Statewide Landslide Information Database of Oregon Release 3.2 (SLIDO-3.2). Includes earth and debris slides, flows, slumps, falls and complex landslide types. Does not include rock material landslide deposits. The landslide data set is published to improve the understanding of landslide hazards in Oregon and to provide a statewide base level of landslide data. This product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information. This publication cannot substitute for site-specific investigations by qualified practitioners. Site-specific data may give results that differ from the results shown in the publication. For more information see: <http://www.oregongeology.org/sub/slido/>

OR DEQ's Water Quality Program is currently working with DOGAMI to develop and provide a more detailed landslide potential analysis for public water systems. Contact Oregon DEQ's Environmental Solutions Division/Water Quality Program for further information on the analysis. If data is available for the specific area, DEQ will provide the more detailed landslide analysis to the public water system.

(6) Safe Drinking Water Information System (SDWIS) data is obtained from Oregon Health Authority's Data Online available at <https://yourwater.oregon.gov/>.

- "Significant detections" indicate water quality tests with analytical results greater than the detection limit (for volatile and synthetic organic compounds (VOCs and SOC)) or one-half of the maximum allowable contaminant level (for inorganic compounds (IOC), arsenic and nitrate). Significant detections are not water quality violations but may require follow-up actions by the OHA Drinking Water Program. Significant detections are available as "alerts" in OHAs Data Online.
- Maximum Contaminant Level (MCL) Violations indicate samples that exceed the MCL and may be based on an average of samples or violation of a treatment technique (i.e. lead and copper rule). Maximum Contaminant levels and action levels for chemicals are available OAR 333-061-0030. Does not include violations for late/non-reporting or treatment/distribution system deficiencies.
- A full list of tested and regulated volatile organic chemicals, synthetic organic chemicals and inorganic compounds and disinfection byproducts is provided in OAR 333-061-0030 and OAR 333-061-0036. Only regulated chemicals are reported in SDWIS. It is important to note that public water system compliance data is collected after drinking water treatment, typically at the entry point to the distribution system.

(7) DEQ/OHA source water monitoring project samples were collected between 2008 and 2012 and analyzed for several hundred compounds, including Oregon-specific herbicides, insecticides, pharmaceuticals, volatile organic compounds (including cleaners), fire retardants, polycyclic aromatic hydrocarbons (organic compounds produced as byproducts of fuel burning) and plasticizers. Only the contaminants that were detected are listed. The concentrations of compounds listed were detected at very low levels well below existing standards and guidelines and are well within acceptable limits. The primary objective of this ongoing monitoring program is to identify priorities for drinking water protection through water quality data. Water quality samples are taken from raw source waters, not treated drinking water. A comprehensive list of analytical methods, compounds, and detection limits is available in each Analytical Report (search DEQ database or by request) and information is summarized at <http://www.deq.state.or.us/wq/dwp/monitoring.htm>.

Key to Figures and Tables including Notes and Symbols Updated Source Water Assessments

Inventory of Potential Sources of Pollution (Table 2 and Figures)

This information is intended to supplement the original Source Water Assessment completed for the water system between 2000 and 2005 by DEQ and Oregon Health Authority. This update should be used in conjunction with the original inventory. DEQ can provide more information on potential impact, risk and status as the public water system moves into developing protection strategies.

The inventory of potential sources of pollution is based on the readily-available state and federal regulatory databases listed below and general categories of land use/ownership. The primary intent is to identify and locate significant potential sources of contaminants of concern. Areas with agricultural, septic systems, or managed forests are generally not identified in the regulated databases but are presented in the figures as a factor of land ownership/use.

It is important to remember that the sites and areas identified are only potential sources of contamination to the drinking water. Water quality impacts are not likely to occur when contaminants are used and managed properly and land use activities occur in such a way as to minimize erosion and contaminant releases.

It is highly recommended that the community “enhance” or refine the delineation of the sensitive areas and the identification of the potential contamination sources through further research and local input. If there were no potential sources of contamination identified during the review of regulatory databases or community’s enhanced inventory, the water system and community should consider the potential for future development to impact the source water.

Table 2 Header	Description
Database Identifier (DB_ID)	Database Type and site name for identified potential pollutant
Site Identifier (Site ID)	Program specific identifier. This is the number or name used to look the site up in the programs regulatory database.
Status	Select information on the site that helps to evaluate potential risk to water quality
Common Name, Address, City	Common Name, Address and City as listed in the regulatory database. Note that some sites may have addresses associated with responsible party, not the physical location of the site.
County	County site is located in
Retrieval Date (Ret_Date)	Date the information was retrieved from the individual programs regulatory database
Data Source	Source for geographic information system (GIS) data

State and Federal Regulatory Database Information

CAFO		Oregon Department of Agriculture's Confined Animal Feeding Operation database of livestock owners. Includes permitted, non-permitted, and applications. Status indicates facility designation and animal type. Permits typically address conditions for animal waste management. More information at http://www.oregon.gov/ODA/programs/NaturalResources/Pages/CAFO.aspx
DOGAMI		Oregon Department of Geology and Mineral Industries list of mining sites. Status includes permit status and primary material extracted.

Key to Figures and Tables including Notes and Symbols Updated Source Water Assessments

DC  Active  Dry Store  Closed  Inactive  Solvent Supplier	DEQ Dry Cleaners list Status indicates Facility type and information on historic and current solvent use: Facility Type: <i>Dry Cleaner</i> - currently active <i>Dry Store</i>: current 'dry store': pickup and drop off point that does not have a dry cleaning machine on site. These sites may still pose a risk as the industry has consolidated over past decades, so many of these used to be dry cleaners and may have contamination. <i>Closed site</i>: There is no longer a dry cleaner or dry store on site, and the site has not opted to stay in the program as 'inactive'. Note that when a site changes ownership, the old Dry Cleaner ID (DCID) may be identified as Closed and a new dry cleaner record may be added for the new owner resulting in the potential for on address to have more than one status <i>Listed Inactive</i>: Site is no longer a dry cleaner or dry store but the property owner or former operator has opted to continue paying dry cleaner program fees in order to maintain their liability protection & cleanup coverage. <i>Solvent Supplier</i>: This may be a chemical supply businesses or individual dry cleaner that imports their own solvent from out-of-state SolventBefore1998: true if dry cleaning solvent was used at this site prior to spill prevention regulations that came in around 1998. If this field is true, there's a higher likelihood that there may be contamination on site. PercUseOngoing: true if perchloroethylene solvent is currently used at the site.
DWP-PCSs  area wide  point source	Potential sources of contamination (PCS) identified by the DEQ and Oregon Health Authority drinking water protection (DWP) program in the original source water assessments completed between 2000 and 2005. Status includes DEQ's potential contaminant source Code (i.e. M31 or R15), Source type (P= point source, A=Area wide source) and a description of the land use type. Note that sources classified as "Area-wide" were marked at a point on the map closest to the intake, well or spring. Additional detailed maps can be provided upon request for source areas where DWP PCSs are not shown on maps to improve map clarity.
DWP-PCS (update) 	Potential sources of contamination (PCS) identified by the OHA or DEQ in the Source Water Assessment updates completed in 2016 and 2017. May include information from interviews with public water system operators, field visits, aerial photograph or topographic map review.
ECSI 	DEQ Environmental Cleanup Site Information database. Includes the U.S. EPA National Priorities List (NPL) and the U.S. EPA Comprehensive Environmental Response, Compensation and Liability Information System (CERCLA) list. Includes sites where further assessment or action is needed. More information available at http://www.deq.state.or.us/lq/ECSI/ecsi.htm
ECSI-NFA 	DEQ Environmental Cleanup Site Information database site where no further action (NFA) is required. Public water system may consider verifying with DEQ that standards used during site investigation were protective of drinking water.
HW  LQG  SQG or CEG	DEQ Hazardous Waste generators that submit an annual report to DEQ. This list includes active facilities in HazWaste.NET (http://www.deq.state.or.us/lq/hw/hwrptonlineforms.htm). Status includes information on generator size including LQG (Large Quantity Generator), SQG (Small Quantity Generator), CEG (Conditionally Exempt Generator), and Unknown (may be used oil or universal waste activities or old generators that require further assessment).
HW/TSD 	DEQ Hazardous Waste Program registered sites that treat, store or dispose of hazardous waste. Includes both active and inactive sites in the process of closing or in post-closure care that are registered in HazWaste.NET (http://www.deq.state.or.us/lq/hw/hwrptonlineforms.htm).
LUST 	DEQ leaking underground storage tank (LUST) list - includes sites that have reported releases from petroleum-containing underground storage tanks, including residential heating oil tanks, regulated tanks at gas stations and other commercial facilities, and non-regulated tanks.
LUST-NFA 	DEQ leaking underground storage tank (LUST) list where no further action (NFA) is required or cleanup is completed. PWS may consider verifying with DEQ that standards used during site investigation were protective of drinking water.
Oil & Gas Wells 	Oil and Gas wells from OR Department of Geology and Mineral Industries. Only includes wells with a status of "permitted".
OSMB 	Oregon State Marine Board's Boating Access Sites.

Key to Figures and Tables including Notes and Symbols Updated Source Water Assessments

School		School as identified by Department of Human Services. Further evaluation may be needed to identify if school has onsite/septic system, pesticide use, chemistry lab, vehicle maintenance, or other potential contaminant sources.
SFM-HSIS AST		Aboveground storage tank(s) as identified in the State Fire Marshall Hazardous Material Information System (HMIS) site list. Aboveground tanks storing gas products were not included since gaseous compounds rarely pose a threat to surface water or groundwater. Additional information on material stored and tank size is available upon request.
SFM (HSIS)		State Fire Marshall Hazardous Material Information System (HMIS) site list. Status indicates number of different chemicals stored on site. A full list of chemicals with information on storage type and a range of amounts is available on request. Information on materials in a gas-form was not included in the chemical counts since gaseous compounds rarely pose a threat to surface water or groundwater.
Stream Crossing/Bridge		Oregon Department of Transportation structure in the "Bridge" layer for interstates, highways, or Oregon Routes. Does not include crossings over ODOT 2012 Roads layer. Includes some culverts. Name indicates water body (or other structure) crossed and the highway/route name.
SW		DEQ Active Solid Waste Disposal Permits list. Status includes permit type and activity (active, terminated, closure, pending). Solid waste disposal site permits are issued for the following facility types: landfill, solid waste treatment, transfer station/material recovery, composting, incineration, conversion technology, and energy recovery.
UIC – Stormwater		DEQ Underground Injection Control (UIC) list of facilities with registered underground injection control systems that manage Stormwater. Status includes type and number of UIC wells registered.
UIC – Non-Stormwater		DEQ Underground Injection Control (UIC) facilities with registered underground injection control systems that do not manage stormwater. Status includes type and number of UIC wells registered.
UST		DEQ registered underground storage tank (UST) list with details on number of tanks that are upgraded to current standards, decommissioned and with unknown status that require further assessment.
WQ SIS		DEQ Site Information System (SIS) which includes Water Pollution Control Facility (WPCF) permits where discharge to surface water is not allowed and National Pollutant Discharge Elimination System (NPDES) permits for "point source" discharges into surface water. Includes both individual permits (site specific) and general permits covering a category of similar discharges.
WQ SIS-WWTP		Subset of water quality Site Information System (SIS) for domestic wastewater treatment plants that discharge to surface water
WQ SIS Outfalls		Water quality effluent outfalls - location of permitted outfall to water body. May vary from facility address or permitted activity location.
WQL Streams/Lakes TMDL approved or needed Insufficient data		Streams and lakes identified by DEQ under Section 303(d) of the Clean Water Act as Water Quality Limited and either having (Category 4A) or needing (Category 5) a Total Maximum Daily Load pollutant load limit. Streams and lakes with insufficient data (Category 3) to make a determination are also shown. Based on Oregon's 2012 Integrated Report and 303(d) list. Contact DEQ basin coordinator for more information (http://www.deq.state.or.us/WQ/TMDLs/docs/basincoordinators.pdf)
Transportation Sources		
Interstate/Highway Interstate U.S. Roads Oregon Routes		Oregon Department of Transportation interstate, highway, road or route identified in the Integrated Transportation Information System database.
Roads		Oregon Department of Transportation 2012 Roads layer - note roads are usually mapped by section so there will be many duplications of road names.
Railways		Railways
Stream Crossing/Bridge		Oregon Department of Transportation structure in the "Bridge" layer for interstates, highways, or Oregon Routes. Does not include crossings over ODOT 2012 Roads layer. Includes some culverts. Name indicates water body (or other structure) crossed and the highway/route name.

Appendix #3

Technical Information and Factsheets for Water Quality



PLEASE NOTE: The Internet URL Addresses listed in this document were included as a convenience for the users of this document. All URL Addresses were functional at the time this publication was last updated (September 2016). For active links, this list is located at <http://www.oregon.gov/DEQ/WQ/pages/index.aspx>

General Water Quality Information	
Handbook for Developing Watershed Plans to Restore and Protect Our Waters (EPA)	https://www.epa.gov/polluted-runoff-nonpoint-source-pollution/handbook-developing-watershed-plans-restore-and-protect
Water Quality Model Code and Guidebook (DLCD)	http://www.oregon.gov/LCD/pages/waterqualityqb.aspx
DEQ Toxics Reduction Strategy	http://www.deq.state.or.us/toxics/docs/ToxicsStrategyNov28.pdf
Oregon's Groundwater Protection Program – who does what? (DEQ)	http://www.deq.state.or.us/wq/groundwater/agencies.htm
Groundwater Basics for Drinking Water Protection (DEQ)	http://www.deq.state.or.us/wq/pubs/factsheets/drinkingwater/GroundwaterBasics.pdf
Protecting Oregon's Groundwater from Contamination (OSU)	http://groundwater.orst.edu/groundwater/
Oregon Climate Change Research Institute	http://occri.net/
Climate Impacts in the Northwest (EPA)	http://www3.epa.gov/climatechange/impacts/northwest.html
Climate science, data, tools, and information (NOAA)	http://www.noaa.gov/climate.html
Harmful Algae Blooms (OHA) FAQs, guidelines for lake managers and outreach materials	https://public.health.oregon.gov/HealthyEnvironments/Recreation/HarmfulAlgaeBlooms/Pages/index.aspx
Harmful Algal Blooms (DEQ) - agency strategy, actions to control/eliminate & prevention	http://www.deq.state.or.us/wq/algae/algae.htm
Residential Areas, Parks and Golf Courses	
Domestic Well Safety Program (OHA) – Resources and contacts for domestic/private wells	http://public.health.oregon.gov/HealthyEnvironments/DrinkingWater/SourceWater/DomesticWellSafety/Pages/index.aspx
Well Water Program (OSU) - tech. assistance for domestic/private wells & septic systems	http://wellwater.oregonstate.edu/
Oregon's Domestic Well Testing Program for Real Estate Transactions	http://public.health.oregon.gov/HealthyEnvironments/DrinkingWater/SourceWater/DomesticWellSafety/Pages/Testing-Regulations.aspx
After You Buy: Wells, Septic Systems, and a Healthy Homesite (NRCS)	http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs14202_042403.pdf
Household Hazardous Waste Program website (DEQ)	http://www.deq.state.or.us/qgsw/hhw/index.htm
Household Hazardous Waste - locally-sponsored collection programs	http://www.deq.state.or.us/qgsw/hhw/collection.htm
Household Pharmaceutical Waste Disposal (OHA)	https://public.health.oregon.gov/HealthyEnvironments/DrinkingWater/SourceWater/Pages/takeback.aspx

Residential Areas, Parks and Golf Courses (cont.)	
Household Hazardous Wastes (EPA)	https://www.epa.gov/hw/household-hazardous-waste-hhw
Recycle Used Motor Oil Resources (EPA)	https://www.epa.gov/recycle/managing-reusing-and-recycling-used-oil
Frequently Asked Questions About Heating Oil Tanks (DEQ)	http://www.deq.state.or.us/lq/tanks/hot/homeowners.htm
Proper Care/Maintenance of Heating Oil and Other Unregulated Tank Systems	http://www.deq.state.or.us/lq/pubs/factsheets/tanks/hot/ProperCareMaintenance.pdf
Oregon resources for on-site septic systems (DEQ)	http://www.oregon.gov/deq/WQ/Pages/onsite/SepticSmartHome.aspx
Oregon's Onsite Wastewater Management Program (Septic Systems) (DEQ)	http://www.deq.state.or.us/wq/onsite/onsite.htm
Local Outreach Toolkit for Septic Systems (EPA)	https://www.epa.gov/septic/septic-systems-outreach-toolkit
A Homeowners Guide to Septic Systems (EPA)	http://www.nesc.wvu.edu/pdf/wv/septic/epa_septic_guide.pdf
Septic Tank Maintenance (DEQ)	http://www.deq.state.or.us/wq/pubs/factsheets/onsite/septic_tankmaint.pdf
Septic Systems OSU Extension website (OSU)	http://wellwater.oregonstate.edu/septic-systems-0
Groundwater protection and your septic system (National Small Flows Clearinghouse)	http://www.nesc.wvu.edu/pdf/wv/septic/septic_tank3.pdf
Combating Illegal Dumping (DEQ)	http://www.deq.state.or.us/lq/sw/disposal/illegaldumping.htm
Water Well Owner's Handbook & other related guidance documents (WRD)	http://www.oregon.gov/owrd/pages/pubs/index.aspx
Oregon Water Resources Department	http://egov.oregon.gov/OWRD/
Disposal of Chlorinated Water from Swimming Pools and Hot Tubs (DEQ)	http://www.deq.state.or.us/wq/pubs/factsheets/wastewater/bmpchlorwaterdisp.pdf
Source Water Protection Publications (EPA) for managing various including: Septic Systems Turfgrass and Garden Fertilizer Application Small-Scale Application of Pesticides Small Quantity Chemical Use Pet and Wildlife Waste Storm Water Runoff	http://www.deq.state.or.us/wq/dwp/assistance.htm
Integrated Plant Protection Center (OSU)	http://ipmnet.org/
National Pesticide Information Center	http://npic.orst.edu/
Integrated Pest Management and Pesticide Safety for Schools (OSU)	http://www.ipmnet.org/Tim/PSEP_home.htm
School Lab Cleanout Program (DEQ)	http://www.deq.state.or.us/lq/labcleanout.htm
Golf Course Integrated Pest Management (IPM) tool and BMP Generator	http://www.greengolfusa.com/tiki-index.php
Ecobiz Certified Landscapers and Auto Repair Shops	http://ecobiz.org/find-an-ecobiz/

Agriculture/Forestry Land Uses (cont.)	
Tips for Small Acreages in Oregon (NRCS) - Fact Sheets on wells, septic systems, animals, crops, weeds, streamside erosion protection. Includes specific fact sheets for Eastern and Western Oregon.	http://www.nrcs.usda.gov/wps/portal/nrcs/detail/or/newsroom?cid=nrcs142b2_046062
Source Water Protection Pubs (EPA) for managing various activities including: Agricultural Fertilizer Application Large-Scale and Small-Scale Application of Pesticides Livestock, Poultry and Horse Waste Above Ground and Underground Storage Tanks Small Quantity Chemical Use Turfgrass and Garden Fertilizer Application	http://www.deq.state.or.us/wq/dwp/assistance.htm
Oregon Small Farms (OSU Extension) Information on Crops, Grains, Livestock, Pastures, and Soils (see tabs at top of page for multiple resources)	http://smallfarms.oregonstate.edu/
Oregon Pesticide Stewardship Partnerships and Waste Pesticide Collection Events	http://www.oregon.gov/oda/programs/pesticides/water/pages/pesticidesstewardship.aspx http://www.oregon.gov/oda/programs/pesticides/water/pages/pesticidesstewardship.aspx
Managing Waste Pesticide (DEQ)	http://www.deq.state.or.us/iq/hw/pesticide.htm
Oregon Department of Agriculture (ODA) – resources for reducing impacts	http://www.oregon.gov/oda/Pages/default.aspx
Soil and Water Conservation Districts (OACD) – technical assistance for rural landowners, family forests and growers	http://oacd.org/conservation-districts/directory
Natural Resources Conservation Service, Oregon (NRCS)	http://www.or.nrcs.usda.gov/
NRCS Financial Assistance Programs	http://www.nrcs.usda.gov/wps/portal/nrcs/main/or/programs/financial/
Oregon Department of Fish and Wildlife Hatchery Information (ODFW)	http://www.dfw.state.or.us/fish/hatchery/
Animal Care and Handling Facilities (from California stormwater program)	https://www.casqa.org/sites/default/files/BMPHandbooks/BMP_IndComm_Appendix_D.pdf
Managing Small-acreage Horse Farms (OSU)	https://catalog.extension.oregonstate.edu/ec1558/viewfile
Irrigation well use and maintenance	See resources for domestic wells under Information for Residential Areas
Oregon State University Forestry & Natural Resources Extension Program	http://extensionweb.forestry.oregonstate.edu/
Oregon Department of Forestry Stewardship Foresters	http://www.oregon.gov/ODF/Working/Pages/FindAForester.aspx
Oregon Department of Forestry Grants and Incentives	http://www.oregon.gov/ODF/AboutODF/Pages/GrantsIncentives.aspx
US Department of Agriculture Pacific Northwest Research Station	http://www.fs.fed.us/pnw/
US Department of Agriculture Forest Incentive Programs Available in Oregon	http://www.srs.fs.usda.gov/econ/data/forestincentives/or.htm
US Forest Service State & Private Forestry–Cooperative Forestry, Forest Health Protection, Sustainable Development & Urban/ Community Forestry	http://www.fs.fed.us/spf/
Water quality impacts information from US Forest Service - Part III: Chapter 10: Forest Management; Chapter 13: Pesticides and Part IV: Chapter 14-16 Animals	http://www.srs.fs.fed.us/pubs/gtr/gtr_srs039/

Agriculture/Forestry Land Uses (cont.)	
National Management Measures to Control Nonpoint Source Pollution from Forestry (EPA)	http://water.epa.gov/pollwaste/nps/forestry/forestrymgmt_index.cfm
Managing Nonpoint Source Pollution from Forestry (EPA)	https://www.epa.gov/polluted-runoff-nonpoint-source-pollution/forestry-additional-resources
Oregon Forest Practices Act	https://www.oregon.gov/ODF/Working/Pages/FPA.aspx
Forest Practices Board Manual (Washington Dept. of Natural Resources)	http://www.dnr.wa.gov/about/boards-and-councils/forest-practices-board/rules-and-guidelines/forest-practices-board-manual
Sustainable Forest Management Programs/Certifications: American Tree Farm Systems (ATFS) Forest Stewardship Council (FSC) Sustainable Forestry Initiative (SFI) Dovetail Partners, Inc.	https://www.oregon.gov/ODF/Documents/AboutODF/ForestCertificationFactsheet.pdf https://www.treefarmssystem.org/ https://us.fsc.org/en-us/certification http://www.oregonsfi.org/ http://www.dovetailinc.org/
Commercial/Industrial/Municipal Land Uses	
Drinking Water Protection Strategies for Commercial & Industrial Land Uses (DEQ)	http://www.deq.state.or.us/wq/dwp/docs/DWPStrategiesCommercialIndustrial.pdf
Business and Industry tips for reducing water quality impacts (DEQ)	http://www.deq.state.or.us/wq/pubs/factsheets/drinkingwater/businessindtips.pdf
Source Water Protection Publications (EPA) for managing various including: Above Ground and Underground Storage Tanks Aircraft and Airfield Deicing Operations Highway Deicing Operations Vehicle Washing Pet and Wildlife Waste Small Quantity Chemical Use Storm Water Runoff	http://www.deq.state.or.us/wq/dwp/assistance.htm
Free Assistance from DEQ's Toxics Use and Waste Reduction Assistance Program	http://www.deq.state.or.us/lq/pubs/docs/hw/TABrochure.pdf
10 Ways for Businesses to Prevent Pollution, Conserve Resources and Save Money (with pollution prevention resources for various industry sectors) (DEQ)	http://www.deq.state.or.us/programs/sustainability/10ways-businesses.htm
Managing Used Computers and Other Electronic Equipment (DEQ)	http://www.deq.state.or.us/lq/pubs/factsheets/ManagingUsedComputers.pdf
Computer and Electronic Equipment Recyclers (DEQ)	http://www.deq.state.or.us/lq/pubs/factsheets/OregonECyclesConsumers.pdf
Underground Injection Control (UIC) Program (DEQ)	http://www.deq.state.or.us/wq/uic/overview.htm
Industrial Stormwater Best Management Practices Manual (DEQ)	http://www.deq.state.or.us/wq/wqpermit/docs/IndBMP021413.pdf
Best Mgmt Practices for Industrial Activity Storm Water Discharges (DEQ)	http://www.deq.state.or.us/wq/stormwater/docs/nwr/Indbmps.pdf
Construction Stormwater Best Management Practices Manual (DEQ)	http://www.deq.state.or.us/wq/wqpermit/docs/general/npdes1200c/BMPManual.pdf

Commercial/Industrial/Municipal Land Uses (cont.)	
Illicit Discharge and Source Tracing Guidance Manual (Washington Stormwater Center)	http://www.wastormwatercenter.org/Illicit-connection-illicit-discharge
Low Impact Development O&M guidance (Washington Stormwater Center)	http://www.wastormwatercenter.org/lid-om-guidance/
Water quality impacts information from USFS - Part V: Chapter 18-20 Mining and Oil/Gas	http://www.srs.fs.fed.us/pubs/qtr/qtr_srs039/
Dam Safety Publications and Resources FEMA website	https://www.fema.gov/dam-safety-publications-resources
Healthcare: Pollution Prevention & Best Management Practices (EPA)	http://www3.epa.gov/region9/waste/p2/hospart.html
Boating/Marinas/Recreation Areas	
Oregon Clean Boater Program (OSMB)	http://www.oregon.gov/OSMB/boater-info/Pages/Clean-Boater.aspx
Clean Boater Guide (OSMB)	http://www.oregon.gov/OSMB/boater-info/Documents/2015_osmb_clean_boater_guide_forweb.pdf
Best Management Practices for Oregon's Marinas (DEQ)	http://www.deq.state.or.us/wq/pubs/bmps/marinas.pdf
Clean Marina Program (OSMB)	http://www.oregon.gov/OSMB/boater-info/Pages/Clean-Marinas.aspx
Clean Marina Guidebook (OSMB)	http://www.oregon.gov/OSMB/forms-library/Documents/Environmental/entire_clean_marina_guidebook.pdf
Marine Sewage and Wastewater Disposal (DEQ)	http://www.oregon.gov/OSMB/Pages/Pumpout-and-Dump-Stations.aspx
Water quality impacts information from US Forest Service - Part II: Chapters 7-8: Recreation; Chapter 5: Dams and Chapter 9: Roads	http://www.srs.fs.fed.us/pubs/qtr/qtr_srs039/

FUNDS AND RESOURCES for Drinking Water Source Protection

This document provides brief descriptions and contact information for resources available to public water systems, including grants and loans to fund drinking water infrastructure and source protection projects. DEQ's list of "[Technical Information and Factsheets for Water Quality Protection](#)" provides other websites and resources available to public water systems and community members seeking to work on watershed protection.

Note: The Internet links listed in this document were included as a convenience for the users of this document. All URL Addresses were functional at the time this publication was last updated (October 2016).

Oregon Health Authority (OHA)

Drinking Water Services

Phone: 971-673-0405

Website: www.healthoregon.org/dwp

The Oregon Health Authority (OHA) is the primacy agency for the implementation of the federal Safe Drinking Water Act (SWDA) in Oregon. ORS 338.277 authorizes the OHA to administer the federal Safe Drinking Water Act in Oregon as the Primacy Agency in agreement with the federal government. ORS 448.131 further authorizes the adoption of standards necessary to protect public health through insuring safe drinking water within a water system. Standards in OAR 333-061 outlines requirements for systems to meet MCLs, submit to periodic inspections, and meet enforcement requirements as administered by OHA. As the primacy agency, OHA also approves drinking water treatment plans and sets construction standards, operator certification standards, and enforces rules to ensure safe drinking water. The OHA website has extensive information on drinking water treatment requirements: <http://healthoregon.org/dwp>

In order to assist systems in complying with standards, OHA also provides technical assistance and oversight of grants and loans from the Safe Drinking Water Act for public water system operation and improvements. *For those Safe Drinking Water Act loans and grant funds, the Oregon Health Authority partners with Oregon Infrastructure Finance Authority to provide the financial services (see below).*

Business Oregon - Infrastructure Finance Authority (IFA)

Infrastructure Finance Authority (IFA)

Municipal Infrastructure Funding

Phone: (503) 986-0123

Website: www.orinfrastructure.org

IFA is a division of Business Oregon that provides funding for municipally owned infrastructure projects. IFA manages federal infrastructure funds for agencies such as Oregon Health Authority and Housing and Urban Development. IFA is not a regulatory agency but collaborates and supports our state and federal partners with financing programs and technical assistance.



State of Oregon
Department of
Environmental
Quality

Environmental Solutions
Division
Drinking Water Protection
811 SW 6th Ave.
Portland, OR 97204
Phone: (503) 229-5413
(800) 452-4011
Fax: (503) 229-5408
Contact: Sheree Stewart
<http://www.deq.state.or.us/wq/dwp/dwp.htm>



Oregon Health Authority
Drinking Water Program
444 "A" Street
Springfield, OR 97477
Phone: (541) 726-2587
Fax: (541) 726-2596
Contact: Tom Pattee
<http://www.healthoregon.org/dwp>

Alternative formats
Alternative formats (Braille, large type) of this document can be made available. Contact DEQ's Office of Communications & Outreach, Portland, at (503) 229-5696, or toll-free in Oregon at 1-800-452-4011, ext. 5696.

Last Updated 10/2016
By: Sheree Stewart

The list of available funding programs for drinking water infrastructure and source protection is:

- **Safe Drinking Water Revolving Loan Fund (SDWRLF)**
- **Drinking Water Source Protection Fund (DWSP)**
- **Water/Wastewater Financing Program (WWFP)**
- **Special Public Works Fund (SPWF)**
- **Community Development Block Grant Program (CDBG)**
- **Port Revolving Loan Fund (PRLF)**

Safe Drinking Water Revolving Loan Fund (SDWRLF)

This loan program funds drinking water system improvements needed to maintain compliance with the Federal Safe Drinking Water Act. The Safe Drinking Water Fund is funded by annual grants from the U.S. Environmental Protection Agency (EPA) and matched with funds from the state Water/Wastewater Financing Program. The program is managed by the Oregon Health Authority (OHA), Drinking Water Services. The loans are managed by the Oregon Infrastructure Finance Authority (IFA).

The Safe Drinking Water Revolving Loan Fund (SDWRLF) is designed for water source, treatment, distribution, storage and related infrastructure projects. Funding is available for all sizes of water systems, although 15 percent of the funds are reserved for systems serving a population of fewer than 10,000. Eligible applicants can be owners of water systems that provide service to at least 25 year-round residents or systems that have 15 or more connections (or a nonprofit with 25 or more regular users). Owners can be a nonprofit, private party or municipality, but systems cannot be federally owned or operated.

To be eligible for funding, a project must solve an existing or potential health hazard or noncompliance issue under federal/state water quality standards. The following are the main types of eligible activities:

- Engineering, design, upgrade, construction or installation of system improvements and equipment for water intake, filtration, treatment, storage, transmission
- Acquisitions of property or easements
- Planning, surveys, legal/technical support and environmental review
- Investments to enhance the physical security of drinking water systems, as well as water sources

SDWRLF loan amount: The program provides up to \$6 million per project (more with additional approval) with the possibility of subsidized interest rate and principal forgiveness for a Disadvantaged Community. The standard loan term is 20 years or the useful life of project assets, whichever is less, and may be extended up to 30 years under SDWRLF for a Disadvantaged Community. Interest rates are 80 percent of state/local bond index rate.

To apply, the municipality should first submit a Letter of Interest to Oregon Health Authority where it will be rated and ranked. Call Oregon OHA Drinking Water Services at 971-673-0422 or go to the OHA website:

www.healthoregon.org/srf

Projects placed on the Project Priority List will be invited to apply through IFA for funding. Contact your IFA Regional Coordinator for assistance and more information. Call IFA at 503-986-0123 or <http://www.orinfrastructure.org/>

Drinking Water Source Protection Fund (DWSP)

From the Safe Drinking Water Act, loans and grants are also available for drinking water protection projects: low interest *loans up to a maximum of \$100,000 per project*, and *grant funds up to \$30,000 per water system*. Eligible systems include any public and privately-owned Community and Nonprofit Non-Community water systems with a completed Source Water Assessment are able to demonstrate a direct link between the proposed project and maintaining or improving drinking water quality. Eligible activities include those that lead to risk reduction within the delineated source water area or would contribute to a reduction in contaminant concentration within the drinking water source. Projects can take either a local or regional approach. Local projects are defined as activities that concentrate on a public water system's source area(s). Regional projects are defined as activities that involve multiple communities and/or water systems attempting to address a common source water issue or group of issues.

The categories for eligible projects for DW Source Protection funding include the following:

Refined Delineation OHA and DEQ have completed delineations for most drinking water source areas (DWSA) for the community and non-community public water systems. DWSAs include aquifer recharge areas for groundwater sources and watershed areas for surface sources. DW Source Protection funding can be used to complete, update, or refine DWSA delineations using new or additional site-specific information as part of a more comprehensive protection strategy.

Updated Assessment

Inventory – Projects that improve upon existing potential contaminant source inventories available from the DEQ database, Geographic Information System, and Assessment Reports prepared by OHA/DEQ. A project could involve expanding or updating the inventory of land uses or existing and potential point and non-point contaminant sources.

Evaluation – Projects establishing a water quality monitoring project to evaluate existing and potential threats to water quality. This could include evaluating and prioritizing potential threats (or protection activities) based upon new or more detailed information.

Source Protection Planning

Projects designed to identify appropriate protection measures, including development of a comprehensive DW Source Protection plan, educational projects, projects to identify and ensure implementation of Best Management Practices (BMPs), development of local DW Source Protection ordinances, development of restoration or conservation plans for the source area for future easement or land acquisition.

Implementation

Funds can be used to implement many types of protection strategies in drinking water source areas. This can include implementation of any *eligible activities that will reduce risks within the source water area or would contribute to a reduction of contaminant concentration within the drinking water source(s).*

Examples of the types of projects that can be funded include:

- Implementing drug-take-back projects in source areas
- Projects for reducing pesticide application rates and loadings in source area
- Implementing pesticide and household hazardous waste collection events
- Closure of high-risk abandoned or unused (private or irrigation) wells close to supply well
- Projects for reforestation or replanting in sensitive or riparian areas
- Installation of fencing to protect sensitive riparian source areas
- Installation of signs at boundaries of zones or protection areas
- Projects for assessing risks from onsite systems near supply wells, inspections, pump-outs, or decommissioning onsite systems.
- Secondary containment for high-risk ABOVE ground tanks
- Focused workshop events for household/business instruction for changing to alternative nonhazardous product usage (“green chemical” products)
- Seismic spill prevention or inspection project in proximate areas for high-risk sources
- Permanent abandonment (i.e. filling in) of inadequately constructed private wells within the source area
- Installation of fencing around the immediate intake or well area to provide protection
- Structures to divert contaminated stormwater runoff affecting the source area
- Set up ecosystem services (or similar) project in watershed to fund preservation areas
- Implementation of pollution prevention or waste reduction projects
- Restoration and/or conservation projects within the drinking water source area
- Implementation of water reuse and other conservation measures related to source protection
- Implementation of best management practice projects
- Implementation of conservation easements to protect sensitive source areas
- Implementation of a drinking water source protection ordinance
- Establishing management plans for easements or lands purchased within source areas
- Development of educational flyers/brochures for purposes of public education

- Purchase of lands within the drinking water source area (funded only via low interest loans)

Any *Public and Privately-owned Community and Nonprofit Non-Community water systems* with a completed *Source Water Assessment* are eligible for funds. A “community water system” is defined as a public water system that has 15 or more service connections used by year-round residents, or which regularly serves 25 or more year-round residents. This includes water systems that are owned privately, by non-profit or public entities such as a city, district, or port. A “nonprofit non-community water system” is a public water system that is not a community water system and that regularly serves at least 25 people (more than 6 months per year) and is legally recognized under Oregon law as a nonprofit entity.

For the source water protection funds, contact OHA regarding the letter of interest submittal schedule. Call Oregon OHA Drinking Water Services at 971-673-0422 or go to the OHA website: www.healthoregon.org/srf or contact IFA at 503-986-0123; www.orinfrastructure.org

Water/Wastewater Funding Program (WWFP)

This loan program funds the design and construction of public infrastructure needed to ensure compliance with the Safe Drinking Water Act or the Clean Water Act. The public entities that are eligible to apply for the program are cities, counties, county service districts, tribal councils, ports, and special districts as defined in ORS 198.010. Municipalities must either have a documented compliance issue or the potential of a compliance issue in the near future.

Allowable funded project activities may include:

- Construction costs, including Right of Way and Easements, for improvement or expansion of drinking water, wastewater or stormwater systems
- Design and construction engineering
- Planning/technical assistance for small communities

WWFP Loans

The maximum loan term is 25 years or the useful life of the infrastructure financed, whichever is less. The maximum loan amount is \$10 million per project (more with additional approval) through a combination of direct and/or bond funded loans. Loans are generally repaid with utility revenues or voter approved bond issues. A limited tax general obligation pledge also may be required. "Credit worthy" borrowers may be funded through the sale of state revenue bonds.

WWFP Grants

Grant awards up to \$750,000 may be awarded based on a financial review. An applicant is not eligible for grant funds if the applicant's annual median household income is equal or greater than 100 percent of the state average median household income for the same year.

Funding for Technical Assistance

The Infrastructure Finance Authority offers technical assistance financing for municipalities with populations of less than 15,000. The funds may be used to finance preliminary planning, engineering studies and economic investigations. Technical assistance projects must be in preparation for a construction project that is eligible and meets the established criteria.

Grants up to \$20,000 may be awarded per project.

Loans up to \$60,000 may be awarded per project.

To apply, call IFA at 503-986-0123, then contact your IFA Regional Coordinator for assistance and more information. <http://www.orinfrastructure.org/>

Special Public Works Fund (SPWF)

The Special Public Works Fund (SPWF) provides funds for publically owned facilities that support economic and community development in Oregon. Funds are available to public entities for planning, design, purchasing, improving and constructing publically owned facilities, replacing publically owned essential community facilities, emergency projects as a result of a disaster, and for planning. Public agencies that are eligible to apply for funding are cities,

counties, county service districts (ORS 451), tribal councils, ports, districts as defined in ORS 198.010, and airport districts (ORS 838).

SPWF Loans

Loans for development (construction) projects range from less than \$100,000 to \$10 million (more with additional approval). The Infrastructure Finance Authority offers very attractive interest rates that reflect tax-exempt market rates for highly qualified borrowers. Initial loan terms can be up to 25 years or the useful life of the project, whichever is less.

SPWF Grants

Grants are available for construction projects that create or retain traded-sector jobs. They are limited to \$500,000 or 85 percent of the project cost, whichever is less, and are based on up to \$5,000 per eligible job created or retained. Limited grants are available to plan industrial site development for publically owned sites and for feasibility studies.

To apply, call IFA at 503-986-0123, then contact your IFA Regional Coordinator for assistance and more information. <http://www.orinfrastructure.org/>

Community Development Block Grant (CDBG)

Grants and technical assistance are available to develop livable urban communities for persons of low and moderate incomes by expanding economic opportunities and providing housing and suitable living environments. Non-metropolitan cities and counties in rural Oregon can apply for and receive grants. *[Oregon tribes, urban cities (Albany, Ashland, Bend, Corvallis, Eugene, Gresham, Hillsboro, Medford, Portland, Salem and Springfield) and counties (Clackamas, Multnomah, Washington) receive funds directly from HUD.]* Funding amounts are based on the applicant's need, the availability of funds, and other restrictions defined in the program's guidelines. The maximum available grant for drinking water system projects is \$3,000,000.

All projects must meet one of three national objectives:

- The proposed activities must benefit low- and moderate-income individuals.
- The activities must aid in the prevention or elimination of slums or blight.
- There must be an urgent need that poses a serious and immediate threat to the health or welfare of the community.

To apply, call IFA at 503-986-0123, then contact your IFA Regional Coordinator for assistance and more information. <http://www.orinfrastructure.org/>

Port Revolving Loan Fund (PRLF)

The Port Revolving Loan Fund (PRLF) is a loan program to assist Oregon ports in the planning and construction of facilities and infrastructure. Ports must be incorporated under ORS Chapter 777 or 778. The Fund may be used for port development projects (facilities or infrastructure) or to assist port-related private business development projects. The variety of eligible projects is very broad and may include water-oriented facilities, industrial parks, airports and commercial or industrial developments. Eligible project costs can include engineering, acquisition, improvement, rehabilitation, construction, operation, and maintenance or pre-project planning. Projects must be located within port district boundaries. The maximum loan amount is \$3 million at any one time. The loan term can be as long as 25 years or the useful life of the project, whichever is less. Interest rates are set by the IFA at market rates, but not less than Treasury Notes of a similar term minus one percent.

Note: Flexible manufacturing space projects will not accrue interest until the building is at least 25 percent occupied or until three years after the date of the loan contract, whichever is earlier.

To apply, call IFA at 503-986-0123, then contact your IFA Regional Coordinator for assistance and more information. <http://www.orinfrastructure.org/>

Oregon Department of Environmental Quality (DEQ)

Clean Water State Revolving Fund (CWSRF)

Clean Water State Revolving Fund

503-229-6412

Website: www.deq.state.or.us/wq/loans/loans.htm

Low-cost loans for planning, design, and construction projects to attain and maintain water quality standards, and necessary to protect beneficial uses such as fish habitat, drinking water sources, irrigation, and recreation. Eligible borrowers are public entities, such as cities and counties, Indian tribal governments, sanitary districts, soil and water conservation districts, irrigation districts, various special districts and some intergovernmental entities. CWSRF offers:

- Low-cost loans and bond purchases
- Lower than market interest rates
- Fixed interest rates
- Terms up to 30 years
- Up to 100% of eligible costs covered
- No match required
- Repayment begins after project is constructed
- No pre-payment penalty
- Additional financial incentives, including principle forgiveness

Applications are accepted year round with scheduled review and ranking in the first week of January, May and September. Contact the Oregon Department of Environmental Quality (DEQ); for a list of CWSRF project officers, go to www.deq.state.or.us/wq/loans/loans.htm

Financial incentives make CWSRF loans worth exploring. Principle forgiveness is available for communities meeting affordability criteria, or for meeting green project criteria. Implement a non-planning nonpoint source project *and* a traditional point source wastewater treatment project through the same application to reduce your interest rate on the combined two projects to as low as 1%. This combined application is called a sponsorship option.

CWSRF Pollution Reduction Funding

The Clean Water State Revolving Fund loan program provides low-cost loans to public entities for the planning, design or construction of both point source and nonpoint source projects that *prevent or mitigate water pollution*. Wastewater facility improvements and stormwater management projects are funded with CWSRF.

CWSRF loans fund development of nonpoint source water quality improvement plans, such as an integrated water resources plan and a regional or municipality-wide stormwater management plan. Planning loans can also fund the establishment of watershed partnerships, local ordinances to implement a stormwater master/management plan, engineering and development standards for new and redevelopment, permanent riparian buffers, floodplains, wetlands and other natural features.

CWSRF offers a Local Community Loan, which allows the borrower to make loans to private entities like home owners and farmers. The Local Community Loans fund the repair and replacement of failing decentralized systems. This loan type can also fund nonpoint source agricultural best management practices such as building manure containment structures, manure digesters, and fences to protect riparian resources capture and convert methane, and purchase calibrated application equipment.

CWSRF loans fund a variety of nonpoint source watershed improvement implementation projects such as establishing or restoring permanent riparian buffers and floodplains, and daylighting streams from pipes. Loans can fund protecting and restoring streamside areas, wetlands and floodplains, and to acquire riparian land, wetlands, conservation easements, and land to protect drinking water sources.

More information on DEQ's Clean Water State Revolving Fund program can be found here:

<http://www.deq.state.or.us/wq/loans/loans.htm>. For specific information on the Sponsorship Option, Planning

Loans, Nonpoint Source Loans, or Local Community Loans, see <http://www.deq.state.or.us/wq/loans/apps.htm>. The application requirements for CWSRF loans may take some lead-time to develop and may require out-of-pocket expense to prepare. Prospective CWSRF applicants should discuss any questions about the required content of these items with a regional DEQ CWSRF Project Officer at the earliest opportunity (<http://www.deq.state.or.us/wq/loans/contacts.htm>)

Supplemental Environmental Projects (SEPs)

Supplemental Environmental Projects are administered by DEQ's Office of Compliance and Enforcement. When DEQ assesses civil penalties for environmental law violations, violators can offset up to 80% of their monetary penalty by agreeing to pay for a Supplemental Environmental Project that improves Oregon's environment. SEPs can be for pollution prevention or reduction, public health protection, environmental restoration and protection as long as it is a project that the respondent is not already required to do by law or where the project would be financially self-serving for the respondent. The work can be completed by a third-party like a local government, watershed council, non-profit or private entity. Coastal PWSs can develop a "SEP Application" with general information that OCE can distribute to respondents. Community organizations with proposed projects are also free to contact respondents on their own initiative. The enforcement case does not necessarily have to be in the same area (watershed/county, etc.) as the environmental project or even address the same media (i.e. air/water/land). Interested parties can sign up for DEQ's public notifications via email at <http://www.oregon.gov/deq/Pages/publicnotice.aspx> - when signing up, select types of information (select "enforcement actions") and which counties or subbasins are of interest.

Nonpoint Source Implementation 319 Grants

Nonpoint Source Grants support implementation and planning projects that address water quality problems in surface and groundwater resources resulting from nonpoint source pollution. Funds are appropriated by DEQ through the U.S. Environmental Protection Agency under Section 319 of the Clean Water Act and support a wide variety of management activities, including technical assistance, site assessment, public awareness and education, training, technology transfer, demonstration projects, and monitoring to assess the success of specific nonpoint source implementation projects. Eligible applicants include government agencies, tribal nations and nonprofit organizations. For more information including funding availability, eligible projects, and application requirements and timelines see <http://www.oregon.gov/deq/WQ/Pages/nps319.aspx>

Oregon Water Resources Department (WRD)

Water Resources Development Program
725 Summer Street NE, Suite A
Salem, OR 97301
Phone: 503-986-0900

The Water Resources Department is the state agency charged with administration of the laws governing surface and ground water resources. The Department's core functions are to protect existing water rights, facilitate voluntary streamflow restoration, increase the understanding of the demands on the state's water resources, provide accurate and accessible water resource data, and facilitate water supply solutions. WRD is charged with carrying out the water management policies and rules set by the Water Resources Commission and with overseeing the enforcement of Oregon's water laws. By law, all surface and ground water in Oregon belongs to the public.

WRD's mission is to serve the public by practicing and promoting responsible water management through two key goals:

- to directly address Oregon's water supply needs, and
- to restore and protect streamflows and watersheds in order to ensure the long-term sustainability of Oregon's ecosystems, economy, and quality of life.

WRD developed *Oregon's 2012 Integrated Water Resources Strategy* to help individuals and communities address instream and out-of-stream needs now and into the future, including water quantity, water quality and ecosystem needs. More information can be found at:

https://www.oregon.gov/owrd/Pages/law/integrated_water_supply_strategy.aspx

There is funding available to support planning, feasibility studies, and implementation of water projects:

Place-Based Integrated Water Resources Planning

Place-based planning is a voluntary, locally initiated and led effort in which a balanced representation of water interests within a basin or watershed work in partnership with the state to: characterize current water resources and issues (water quantity, water quality, ecosystem health); understand current and future instream and out-of-stream water needs and demands; identify and prioritize strategic solutions to address water needs; and, develop a place-based integrated water resources plan that informs the state-wide strategy.

Recent cycle of funding included \$750,000 in grants; requires 25% cost-share.

For more information, contact Harmony Burright at 503-986-0913.

Feasibility Study Grants

Once potential projects are identified, communities often find it difficult to secure funding to assess their viability. This program component addresses that need by providing grant funding to cover 50% of the cost of conducting feasibility studies for potential water conservation, storage and reuse projects. A feasibility study is an assessment of the practicality of a proposed project or plan and can be used to determine if and how a project should proceed to the implementation phase.

Recent cycle of funding included \$2.8 million in grants; 50% cost share required.

For more information, contact Jon Unger at 503-986-0869.

Water Project Grants & Loans (formerly Water Supply Development Grants & Loans)

This account provides grants and loans to evaluate, plan and implement instream and out-of-stream water development projects that have economic, environmental and social/cultural benefits. Eligible projects include, but are not limited to projects that: increase water use efficiency; develop new or expanded storage; allocate federally stored water; promote water reuse or conservation; and protect or restore stream flows. Recent cycle funding included \$14 million in grants or loans; 25% cost share required; applications accepted year round.

For more information, contact Jon Unger at 503-986-0869.

More details and updates for these grants can be found at:

http://www.oregon.gov/OWRD/pages/Water_Resources_Development_Program.aspx

Municipal Water Management and Conservation Planning

Municipal water management and conservation planning provides a process through which cities and other municipal water suppliers estimate long-range water supply needs and identify alternatives, including water conservation programs, to meet those needs. The Department requires many municipal water suppliers to prepare plans as conditions of their water use permits or permit extensions.

Water Rights

Oregon's water laws are based on the principle of prior appropriation. This means the first person to obtain a water right on a stream is the last to be shut off in times of low streamflows. In water-short times, the water right holder with the oldest date of priority can demand the water specified in their water right regardless of the needs of junior users. The date of application for a permit to use water usually becomes the priority date of the right. Watermasters respond to complaints from water users and determine in times of water shortage, which generally occur every year, who has the right to use water. Each summer as streamflows drop, watermasters regulate junior users to provide water to the more senior users. On many streams throughout the state, by the end of summer, there is only enough water to supply users who established their rights in the late 1800s. All of the more recently established rights will have been regulated off by the [watermaster](#).

There are "watermaster" offices located around the state. The watermaster office is an excellent source of local information. Watermasters can research water rights for a particular stream reach and provide supporting maps (above). During critical flow periods, watermasters regulate water usage to enable senior water right holders to

satisfy their water right. The watermaster may also provide information regarding instream leases, ground water rights, cancellations, transfers of water rights, streamflow data, and water right information in general (list as of 6/16).

WRD Watermasters

District 1

Nikki Hendricks

c/o Port of Tillamook Bay
4000 Blimp Blvd Ste 400
Tillamook, Oregon 97141
Ph: 503-815-1967

District 2

Michael Mattick

125 East 8th Avenue
Eugene, OR 97401-2926
Ph: 541-682-3620

District 3

Robert Wood

2705 E 2nd St
The Dalles, Oregon 97058
Ph: 541-506-2652

District 4

Eric Julsrud

201 S Humbolt, Suite 180
Grant County Courthouse
Canyon City, Oregon 97820
Ph: 541-575-0119

District 5

Greg Silbernagel

116 SE Dorion Ave
Pendleton, OR 97801
Ph: 541-278-5456

District 6

Shad Hattan

10507 N McAlister Rd #6
La Grande, Oregon 97850
Ph: 541-963-1031

District 7

David Bates

401 NE First St., Suite 11
Enterprise, Oregon 97828
Ph: 541-426-4464

District 8

Rick Lusk

Baker County Courthouse
1995 3rd Street, Suite 180
Baker City, Oregon 97814
Ph: 541-523-8224 ext 231

District 9

Ron Jacobs

Malheur County Courthouse #4
251 B St W
Vale, Oregon 97918
Ph: 541-473-5130

District 10

JR Johnson

Harney County Courthouse
450 N Buena Vista #3
Burns, OR 97720
Ph: 541-573-2591

District 11

Jeremy Giffin

231 SW Scalehouse Loop,
Ste 103
Bend, Oregon 97702
Ph: 541-306-6885

District 12

Brian Mayer

513 Center St
Lakeview, Oregon 97630
Ph: 541-947-6038

District 13

Travis Kelly

10 S Oakdale, Rm 309A
Medford, Oregon 97501
Ph: 541-774-6880

District 14

Kathy Smith

700 NW Dimmick St.
Grants Pass, Oregon 97526
Ph: 541-479-2401

District 15

David Williams

Douglas County Courthouse,
Room 306
Roseburg, Oregon 97470
Ph: 541-440-4255

District 16

Joel Plahn

725 Summer St NE, Ste A
Salem, Oregon 97301
Ph: 503-986-0889

District 17

Scott White

305 Main Street
Klamath Falls, Oregon 97601
Ph: 541-883-4182

District 18

Jake Constans

1400 SW Walnut St, Suite 240
Hillsboro, Oregon 97123
Ph: 503-846-7780

District 19

Greg Wacker

Physical Address:
225 N Adams
Coquille, Oregon 97423
Ph: 541-396-1905

District 20

Amy Kim

10722 SE Highway 212
Clackamas, Oregon 97015
Ph: 503-722-1410

District 21

Ken Thiemann

221 S Oregon St.
P.O. Box 427
Condon, OR 97823
Ph: 541-384-4207

Oregon Department of Forestry (ODF)

Salem Headquarters

2600 State Street

Salem, Oregon 97310

<http://www.oregon.gov/ODF/Pages/index.aspx>

The Oregon Department of Forestry manages and regulates activities on non-federal forestland in Oregon. There are three main divisions under ODF-- Fire Protection, Private Forests, and State Forests. The Private Forests Division administers the Forest Practices Act and various forestry incentive programs and employs the use of about 50 Stewardship Foresters who work closely with landowners and operators. The State Forests Division is responsible for forest management to provide economic, environmental, and social benefits to Oregonians.

Financial incentive programs are aimed at encouraging and assisting landowners in managing their resources and meeting their objectives. Typical forestry projects can be aimed at protecting the landowner's resources/investment from fire or insect and disease infestation, to increasing its monetary and environmental value in the future.

Information about all ODF and federal forestry-related grants and incentive programs can be found at:

<http://www.oregon.gov/ODF/AboutODF/Pages/GrantsIncentives.aspx>

Community Forest Program

The Community Forest and Open Space Conservation Program is a federal financial assistance program with grants available to local governments, Indian tribes, and qualified nonprofit organizations to establish community forests and sustainably manage them for many public benefits, including recreation, income, wildlife habitat, stewardship demonstration sites, and environmental education.

Conservation Stewardship Program

To help landowners and operators maintain existing stewardship and adopt additional conservation on privately-owned, non-industrial working forests and agricultural lands.

Forest Legacy Program

The Forest Legacy Program is a national program that addresses privately-owned forestlands that face threats of conversion to non-forest use by development pressures. The goal of the Forest Legacy Program is to promote stewardship and sustainable management of private forest lands by maintaining working forests that conserve important forest resource and conservation values. Forest Legacy provides funds for eligible private forestlands for the purchase of development rights through either conservation easement or fee-title acquisition into public ownership. All properties entered into Oregon's Forest Legacy Program – either through conservation easement, fee acquisition or donation – have their forest resources and conservation values protected and managed in accordance with a State Forester-approved Forest Stewardship Plan (see below).

Forest Stewardship Program

Oregon's Forest Management Planning System recognizes that forest management planning is a journey – Pathways to Stewardship -- involving several distinct steps. A landowner's initial interest may be related to a specific project or action that is pressing on their property – such as reducing hazardous wildfire fuels or combating an invasive weed. Landowner assistance organizations and agencies usually first cross paths through outreach efforts defined around mutual interests or resource concerns. Landowners who are just beginning the management planning process begin a more formal journey by taking the [Woodland Discovery](#) step. Woodland Discovery consists of gathering basic property information and solidifying management goals. The remaining steps for completing your forest management plan include organizing the planning elements into specific management planning modules: soil and water, forest vegetation, fish and wildlife, access and protection, scenery and enjoyment and tax and business. Every step completed

along the way results in the identification of specific actions that a landowner can take to improve conditions of the forestland or otherwise meet goals in owning forestland. Completion of a forest management plan opens up formal types of engagement such as forest certification and the enrollment of lands into specialized conservation programs that define a long-term commitment to sustainable forestry.

Healthy Forests Reserve Program (HFRP)

The goal is to restore and enhance ecosystems and habitat for threatened and endangered species while promoting sustainable timber harvests on working forest lands.

Oregon Department of Agriculture Natural Resources Program

635 Capitol St. NE

Salem, OR 97301-2532

Phone: 503 986-4700

<http://www.oregon.gov/ODA/programs/NaturalResources>

The Oregon Department of Agriculture (ODA) is responsible for developing plans to prevent and control water pollution from agricultural activities and soil erosion on rural lands. ODA's Natural Resources Program aims to conserve, protect, and develop natural resources on public and private lands in order to ensure that agriculture will continue to be productive and economically viable in Oregon. Natural Resources Programs work to do the following:

- Address water quality and natural resource conservation on agricultural lands
- Protect Oregon's environment and public health by ensuring the proper and legal sale, use, and distribution of pesticide products
- Assist local soil and water conservation districts as they help landowners properly manage Oregon's natural resources

More information on the Agricultural Plan Areas and Regulations can be found at:

<https://www.oregon.gov/ODA/programs/NaturalResources/AgWQ/Pages/AgWQPlans.aspx>

Information on local management plans and your area's ODA Water Quality Specialist can be found at:

<http://www.oregon.gov/ODA/programs/NaturalResources/AgWQ/Pages/AgWQPlans.aspx>

More information on the regulation and use of pesticides can be found at:

<http://www.oregon.gov/ODA/programs/Pesticides/Pages/default.aspx>

Department of Agriculture Pesticide Analytical and Response Center (PARC)

<http://www.oregon.gov/ODA/programs/Pesticides/Pages/PARC.aspx>

The Pesticide Analytical and Response Center (PARC) was created by executive order in 1978. The program was reauthorized under the Oregon Department of Agriculture (ODA) as ORS 634.550, in 1991.

PARC is mandated to perform the following activities with regard to pesticide-related incidents in Oregon that have suspected health or environmental effects: Collect incident information, mobilize expertise for investigations, identify trends and patterns of problems, make policy or other recommendations for action, report results of investigations, and prepare activity reports for each legislative session.

PARC does not have regulatory authority. Their primary function is to coordinate investigations to collect and analyze information about reported incidents. Investigation coordination includes collecting reports produced by member agencies and consultation as necessary with a toxicologist with Oregon State University. Member agencies conduct most of the investigations and take any necessary enforcement action(s). The eight member agencies include the following: [Oregon Health Authority \(OHA\)](#), [Oregon Department of Fish and Wildlife \(ODF&W\)](#), [Oregon Department of Environmental Quality \(DEQ\)](#), [Oregon](#)

[Department of Forestry \(ODF\)](#), [Oregon Occupational Safety and Health Administration \(OR OSHA\)](#), [Office of the State Fire Marshal \(SFM\)](#), [Oregon Poison Center \(OPC\)](#), [Oregon Department of Agriculture \(ODA\)](#).

To report a pesticide incident that has impacted people, animals, or the environment, contact: Theodore Bunch Jr., PARC Coordination Team Leader at 503-986-6470 or toll-free at 844-688-7272

PARC@oda.state.or.us

Christina Higby, Citizen Advocate Liaison at 503-986-5105 chigby@oda.state.or.us

Department of Agriculture

Soil and Water Conservation Districts

<http://www.oregon.gov/ODA/SWCD/>

SWCD Program and Water Quality Program Manager: John Byers, 503-986-4718

The Soil and Water Conservation District (SWCD) Program provides services to the 45 Soil and Water Conservation Districts throughout Oregon (list current as of 6/16). SWCDs are local government entities that have authorities to address soil, erosion, and water quality issues.

Benton SWCD

456 SW Monroe Ave., Suite 110
Corvallis, OR 97333
Phone: 541 753-7208
Website: www.bentonswcd.org

Burnt River SWCD

3990 Midway Drive
Baker City, OR 97814
Phone: 541 523-7121 Ext. 109
Email: whitney.collins@bakercountyswcds.com

Clackamas SWCD

221 Molalla Ave., Suite 102
Oregon City, OR 97045
Phone: 503 210-6000
Website: www.conservationsdistrict.org

Clatsop SWCD

750 Commercial St., Room 207
Astoria, OR 97103
Phone: 503 325-4571
Website: www.clatsopswcd.org

Columbia SWCD

35285 Millard Road
St. Helens, OR 97051
Phone: 503 397-4555
Website: www.columbiaswcd.com

Coos SWCD

371 N Adams St.
Coquille, OR 97423
Phone: 541 396-6879
Website: www.coosswcd.org

Crook County SWCD

498 SE Lynn Blvd.
Prineville, OR 97754
Phone: 541 447-3548

Curry County SWCD

29692 Ellensburg Ave.
Gold Beach, OR 97444
Phone: 541 247-2755 Ext. 0#
Website: www.currywatersheds.org

Deschutes SWCD

625 SE Salmon Ave., Suite 7
Redmond, OR 97756
Phone: 541 923-2204
Website: www.deschuteswcd.com

Douglas SWCD

2741 West Harvard Ave.
Roseburg, OR 97471
Phone: 541 957-5061
Website: www.douglasswcd.org

Eagle Valley SWCD

3990 Midway Drive
Baker City, OR 97814
Phone: 541 523-7121 Ext. 109

East Multnomah SWCD

5211 N Williams Ave.
Portland, OR 97217
Phone: 503 222-SOIL (7645)
Website: www.emswcd.org

Fort Rock / Silver Lake SWCD

17612 Highway 395
Lakeview, OR 97630
Phone: 541 947-5855
Email: LakeviewSWCD2@hotmail.com

Gilliam County SWCD

Dunn Office Building
333 S Main St.
Condon, OR 97823
Phone: 541 384-2672
Email: gilliamswcd@gmail.com

Grant SWCD

721 S Canyon Blvd.
John Day, OR 97845
Phone: 541 575-0135 Ext. 3
Email: jkehrberg@ortelco.net

Harney SWCD

530 Highway 20 S
Hines, OR 97738
Phone: 541 573-5010
Email: marty.suter@or.nacdn.net

Hood River SWCD

3007 Experiment Station Drive
Hood River, OR 97031
Phone: 541 386-4588 / 386-6719
Website: www.hooddriverswcd.org

Illinois Valley SWCD

Josephine Co. Office Building
102 S Redwood Highway
Cave Junction, OR 97523
Phone: 541 592-3731
Email: amy@ivstreamteam.org

Jackson SWCD

89 Alder Street
Central Point, OR 97502
Phone: 541 664-1070
Website: www.jswcd.org

Jefferson County SWCD

625 SE Salmon Ave., Suite 6
Redmond, OR 97756
Phone: 541 923-4358 Ext. 101
Email: debbe.chadwick@oacd.org

Josephine SWCD

1440 Parkdale Drive
Grants Pass, OR 97527
Phone: 541 474-6840
Email: joswcd@outreachinternet.com

Keating SWCD

3990 Midway Drive
Baker City, OR 97814
Phone: 541 523-7121 Ext. 109
Email: whitney.collins@bakercountyswcds.com

Klamath SWCD

2316 S 6th St., Suite C
Klamath Falls, OR 97601
Phone: 541 883-6932 Ext. 101
Website: www.klamathswcd.org

Lakeview SWCD

17612 Highway 395
Lakeview, OR 97630
Phone: 541 947-5855
Email: lakeviewswcd2@hotmail.com

Lincoln SWCD

23 North Coast Highway
Newport, OR 97365
Phone: 541 265-2631
Website: www.lincolnswcd.org

Linn SWCD

33935 Highway 99E, Suite C
Tangent, OR 97389
Phone: 541 926-2483
Website: www.linnswcd.oacd.org

Malheur County SWCD

2925 SW Sixth Ave., Suite 2
Ontario, OR 97914
Phone: 541 889-2588 Ext. 101
Email: LRowe@malcoswcd.org

Marion SWCD

338 Hawthorne Ave. NE
Salem, OR 97301
Phone: 503 391-9927
Website: www.marionswcd.net

Monument SWCD

Columbia Power Building
311 Wilson St.
Monument, OR 97864
Phone: 541 934-2141
Website: www.monumentswcd.org

Morrow SWCD

430 Linden Way
Heppner, OR 97836
Phone: 541 676-5452
Email: swcdmanager@centurytel.net

Polk SWCD

580 Main St., Suite A
Dallas, OR 97338
Phone: 503 623-9680
Website: www.polkswcd.org

Sherman County SWCD

302 Scott St.
Moro, OR 97039
Phone: 541 565-3216 Ext. 3
Website: www.shermancountyswcd.com

Siuslaw SWCD

1775 Laurel Place, Suite 4
Florence, OR 97439
Phone: 541 997-1272
Website: www.siuswcd.com

Tillamook SWCD

4000 Blimp Blvd., Suite 200
Tillamook, OR 97141
Phone: 503 842-2240 Ext. 110
Website: tillamookcountyswcd.org/

Tualatin SWCD

1080 SW Baseline St., Suite B-2
Hillsboro, OR 97123
Phone: 503 648-3174 Ext. 4
Website: www.swcd.net

Umatilla County SWCD

1 SW Nye Ave., Suite 130
Pendleton, OR 97801
Phone: 541 278-8049
Website: www.umatillacountyswcd.com

Umpqua SWCD

1877 Winchester Ave.
Reedsport, OR 97467
Phone: 541 662-1341
Website: www.umpquasoilandwater.com

Union SWCD

10507 N McAlister Road, Room 7
La Grande, OR 97850
Phone: 541 963-1313
Website: unionswcd.org

Upper Willamette SWCD

780 Bailey Hill Road, Suite 5
Eugene, OR 97402
Phone: 541 465-6443 Ext. 102
Website: www.uwswcd.org

Wallowa SWCD

401 NE 1st St., Suite E
Enterprise, OR 97828
Phone: 541 426-4521
Email: cynthia.a.warnock@gmail.com

Wasco County SWCD

2325 River Road, Suite 3
The Dalles, OR 97058
Phone: 541 296-6178 Ext. 3
Website: www.wascoswcd.org

West Multnomah SWCD

2701 NW Vaughn St., Suite 450
Portland, OR 97210
Phone: 503 238-4775
Website: www.wmswcd.org

Wheeler SWCD

40535 Highway 19
Fossil, OR 97830
Phone: 541 468-2990
Website: www.wheelerswcd.org

Yamhill SWCD

2200 SW Second St.
McMinnville, OR 97128
Phone: 503 472-6403
Fax: 503 472-6407
Website: www.yamhillswcd.org

Oregon Watershed Enhancement Board (OWEB)

775 Summer St. NE Suite 360
Salem, OR 97301
Phone: (503) 986-0178
Website: www.oregon.gov/OWEB

The Oregon Watershed Enhancement Board (OWEB) is a state agency that provides grants to help Oregonians take care of local streams, rivers, wetlands and natural areas. Community members and landowners use scientific criteria to decide jointly what needs to be done to conserve and improve rivers and natural habitat in the places where they live. OWEB grants are funded from the Oregon Lottery, federal dollars, and salmon license plate revenue. The agency is led by a 17 member citizen board drawn from the public at large, tribes, and federal and state natural resource agency boards and commissions.

OWEB provides grants to projects that contribute to the Oregon Plan for Salmon and Watersheds and the Oregon Conservation Strategy by protecting, restoring and improving clean water and fish and wildlife habitat. See the OWEB website for more information on grants: <http://www.oregon.gov/OWEB/GRANTS/pages/index.aspx>

Oregon Sea Grant (OSG)

Oregon State University

Corvallis, Oregon

Phone 541-737-2714

<http://seagrants.oregonstate.edu/>

Oregon Sea Grant serves Oregon coastal communities through integrated research, education and public engagement on ocean and coastal issues. Based at Oregon State University, OSG is part of the national network of NOAA Sea Grant College Programs, dedicated to promoting environmental stewardship, long-term economic development and responsible use of America's coastal, ocean and Great Lakes resources. OSG targets research on better defining the relationships between the many pressures that can degrade water quality: climate change, upland and coastal land use, fish and habitat restoration efforts, aquatic invasive species. OSG works with groups whose interests sometimes come in conflict - landowners, outdoor recreationists, farmers and woodland managers, local government, the general public - to seek solutions that will help sustain healthy watersheds and our precious water resources. OSG focuses on the question of resilience - the ability to plan, adapt and rebound in the face of change by supporting physical and social science research aimed at better understanding ocean and coastal processes and the socio-economic barriers to hazard and climate change preparation. Publications and resources available from OSG can be found here:

<http://seagrants.oregonstate.edu/sgps>.

OSG and OSU Extension produce textbooks and other publications on such topics as conservation-friendly gardening, sustainable living and low-impact development. OSG also partners with the Oregon State Marine Board to develop the Clean Vessel Act (CVA) Education Initiative. Funded by the Clean Vessel Act of 1992, the goal of the CVA Education Initiative is to improve boaters' awareness, accessibility and use of sewage pump-outs, dump stations, and floating toilets. Publications and resources available from OSG about watershed health can be found here: <http://seagrants.oregonstate.edu/sgps> by using "watersheds and wetlands" in the "Search by Subject" field.

Every two years, OSG awards approximately \$2 million in research grants addressing community preparedness for climate change, watershed health, other urgent or emerging regional needs with high relevance to coastal communities. For more information on grants, see:

<http://seagrants.oregonstate.edu/research>

Source Water Collaborative

– led by U.S. Environmental Protection Agency

Technical assistance and lists of resources and contacts are available from this national network that has worked to promote drinking water protection for several years. The Source Water Collaborative is a network of federal, state, and local organizations led by US EPA. Some of the key Source Water Collaborative members include the US EPA, US Department of Agriculture, AWWA, American Planning Association, ASDWA, ACWA, National Rural Water Association, Groundwater Protection Council, National Association of Counties, and The Trust for Public Land. Resources can be found here:

<http://sourcewatercollaborative.org/>



U.S. Environmental Protection Agency

Catalog of Federal Funding Sources for Watershed Protection

This is an online, free searchable database of financial assistance sources (grants, loans, cost-sharing) available to fund a variety of watershed protection projects.

<https://ofmpub.epa.gov/apex/watershedfunding/f?p=fedfund:1>

U.S. Environmental Protection Agency - Environmental Finance Centers

Free technical assistance is available through EPA's Environmental Finance Centers. There is currently no Environmental Finance Center for US EPA Region 10, but the resources are still available through the US EPA website. The program mission is to provide help to those facing the "how to pay" challenges of environmental protection. EFC is committed to helping the regulated community build and improve the technical, managerial, and financial capabilities needed to comply with federal and state environmental protection laws.

<https://www.epa.gov/envirofinance>

U.S. Environmental Protection Agency

Community Action for a Renewed Environment (CARE) Grants

Eligible Projects: Prevention of human exposure to harmful pollution; improve water quality. Form community-based collaborative partnerships; identifying and developing an understanding of the many local sources of risk from toxic pollutants and environmental concerns; and setting priorities for the reduction of the identified risks and concerns of the community

Eligible Applicants: Local, public non-profit institution/organizations, federally-recognized Indian tribal government, Native American organizations, private non-profit institution/organization, quasi-public nonprofit institution/organization both interstate and intrastate, local government, colleges, and universities

Funding Available: \$75,000 to \$100,000 with an average project funding of about \$90,000

How To Apply: www.epa.gov/care

U.S. Bureau of Reclamation

Cooperative Watershed Management Program

Eligible Projects: Improve water quality; improve ecological resiliency of a river or stream; and to reduce conflicts over water at the watershed level by supporting the formation of watershed groups to develop local solutions to address water management issues

Eligible Applicants: States, Indian tribes, local and special districts (e.g., irrigation and water districts, county soil conservation districts, etc.), local governmental entities, interstate organizations, and non-profit organizations. To be eligible, applicants must also meet all of the following requirements: (1) Significantly affect or be affected by the quality or quantity of water in a watershed; (2) Be capable of promoting the sustainable use of water resources; (3) Be located in the western United States specifically: Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington.

Funding Available: \$22,000-\$100,000 in the past

How To Apply: <http://www.usbr.gov/WaterSMART/cwmp/index.html>



U.S. Department of Agriculture

Farm Service Agency Conservation Programs

<http://www.fsa.usda.gov/programs-and-services/conservation-programs/index>

USDA Farm Service Agency oversees a number of voluntary conservation-related programs. These programs work to address a large number of farming and ranching related conservation issues including:

- Drinking water protection
- Reducing soil erosion
- Wildlife habitat preservation
- Preservation and restoration of forests and wetlands
- Aiding farmers whose farms are damaged by natural disasters

Source Water Protection Program (SWPP)

The SWPP is designed to protect surface and ground water used as drinking water by rural residents. Through a partnership with the National Rural Water Association, local teams are formed to develop plans to reduce pollutant impacts in rural areas.

<http://www.fsa.usda.gov/programs-and-services/conservation-programs/source-water-protection/index>

Conservation Reserve Program (CRP)

The CRP pays a yearly rental payment in exchange for farmers removing environmentally sensitive land from agricultural production and planting species that will improve environmental quality. In exchange for a yearly rental payment, farmers enrolled in the program agree to remove environmentally sensitive land from agricultural production and plant species that will improve environmental health and quality. Contracts for land enrolled in CRP are 10-15 years in length. The long-term goal of the program is to re-establish valuable land cover to help improve water quality, prevent soil erosion, and reduce loss of wildlife habitat.

<http://www.fsa.usda.gov/programs-and-services/conservation-programs/conservation-reserve-program/index>

Conservation Reserve Enhancement Program (CREP)

The CREP, an offshoot of CRP, targets high-priority conservation issues identified by local, state, or tribal governments or non-governmental organizations. In exchange for removing environmentally sensitive land from production and introducing conservation practices, farmers, ranchers, and agricultural land owners are paid an annual rental rate. Participation is voluntary, and the contract period is typically 10–15 years, along with other federal and state incentives as applicable per each CREP agreement.

<http://www.fsa.usda.gov/programs-and-services/conservation-programs/conservation-reserve-enhancement/index>

Emergency Conservation Program (ECP)

The ECP provides funding and technical assistance for farmers and ranchers to restore farmland damaged by natural disasters and for emergency water conservation measures in severe droughts. The ECP also provides funding and assistance to help ranchers and farmers install water conservation measures during severe drought.

<http://www.fsa.usda.gov/programs-and-services/conservation-programs/emergency-conservation/index>

Emergency Forest Restoration Program (EFRP)

The EFRP, which is very similar to the ECP, provides funding to restore privately owned forests damaged by natural disasters.



<http://www.fsa.usda.gov/programs-and-services/disaster-assistance-program/emergency-forest-restoration/index>

Farmable Wetlands Program (FWP)

The FWP is designed to restore wetlands and wetland buffer zones that are farmed. FWP gives farmers and ranchers annual rental payments in return for restoring wetlands and establishing plant cover.

<http://www.fsa.usda.gov/programs-and-services/conservation-programs/farmable-wetlands/index>

U.S. Department of Agriculture

Natural Resources Conservation Service

NRCS provides farmers, ranchers and forest managers with free technical assistance, or advice, for their land. Common technical assistance includes: resource assessment, practice design and resource monitoring. The conservation planner will help you determine if financial assistance is right for you. Technical assistance is also available online through [Conservation Client Gateway](#). More information about NRCS can be found on their home page:

<http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/about/>

Environmental Quality Incentives Program (EQIP)

Grants are available for best management practices and conservation on private, non-industrial forestland and agricultural lands. Financial assistance is available to help plan and implement conservation practices that address natural resource concerns and for opportunities to improve soil, water, plant, animal, air and related resources on agricultural land and non-industrial private forestland. In addition, EQIP can help producers meet Federal, State, Tribal and local environmental regulations.

<http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/eqip/>

Eligible Applicants: Owners of land in agricultural or forest production or persons who are engaged in livestock, agricultural or forest production on eligible land and that have a natural resource concern on the land

Funding Available: Financial and technical assistance to agricultural and forestland producers through contracts up to 10 years. Not to exceed \$300,000 for all EQIP contracts entered into during any six-year period. If NRCS determines project has special environmental significance the payment limitation is a maximum of \$450,000.

Conservation Stewardship Program (CSP)

CSP helps agricultural producers maintain and improve their existing conservation systems and adopt additional conservation activities to address priority resources concerns. Through CSP, participants take additional steps to improve resource condition including soil quality, water quality, water quantity, air quality, and habitat quality, as well as energy. Participants earn CSP payments for conservation performance - the higher the performance, the higher the payment.

<http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/csp/>

Wetlands Reserve Easements (WRE)

WRE provides habitat for fish and wildlife, including threatened and endangered species, improve water quality by filtering sediments and chemicals, reduce flooding, recharge groundwater, protect biological diversity and provide opportunities for educational, scientific and limited recreational activities.

NRCS also provides technical and financial assistance directly to private landowners and Indian tribes to restore, protect, and enhance wetlands through the purchase of a wetland reserve easement. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/or/home/?cid=stelprdb1249312>



Agricultural Land Easements (ALE)

ALE is designed to protect the long-term viability of the nation's food supply by preventing conversion of productive working lands to non-agricultural uses. Land protected by agricultural land easements provides additional public benefits, including environmental quality, historic preservation, wildlife habitat and protection of open space.

<http://www.nrcs.usda.gov/wps/portal/nrcs/detail/or/home/?cid=stelprdb1249312>

Emergency Watershed Protection (EWP)

The EWP program was set up by Congress to respond to emergencies created by natural disasters. The United States Department of Agriculture's Natural Resources Conservation Service is responsible for administering the program. EWP is designed to relieve imminent hazards to life and property caused by floods, fires, windstorms, and other natural occurrences. It is not necessary for a national emergency to be declared for an area to be eligible for assistance. Activities include providing financial and technical assistance to remove debris from streams, protect destabilized streambanks, establish cover on critically eroding lands, repairing conservation practices, and the purchase of flood plain easements. The purpose of EWP is to help groups of people with a common problem. EWP is generally not an individual assistance program. All projects undertaken must be sponsored by a political subdivision of the State, such as a city, county, general improvement district or conservation district, or by a tribal government.

<http://www.nrcs.usda.gov/wps/portal/nrcs/main/or/programs/financial/ewp/>

Other NRCS Programs

There are other NRCS programs that are specific to Oregon geographic areas---Wildfire Rehabilitation Initiative, Organic Initiative, drought funding, and restoration funding---see the Oregon NRCS link for more information on those:

<http://www.nrcs.usda.gov/wps/portal/nrcs/main/or/programs/financial/eqip/>

Anyone applying for EQIP or any of the other NRCS grants for the first time should schedule a meeting with NRCS to discuss their options before moving forward.

U.S. Department of Agriculture

Rural Development Water and Waste Disposal Direct Loans and Grants

Eligible Projects: Pre-construction and construction associated with building, repairing, or improving drinking water, solid waste facilities and wastewater facilities

Eligible Applicants:

- Cities or towns with fewer than 10,000 population
- Counties, special purpose districts, non-profit corporations or tribes unable to get funds from other sources at reasonable rates and terms

Funding Available: Loans (40-year term), grants in some cases, interest rates vary (currently 2.125 – 3.5%)

How To Apply: Applications accepted year-round on a fund-available basis.

<http://www.rd.usda.gov/programs-services/water-waste-disposal-loan-grant-program>

U.S. Department of Commerce

Community Development Block Grant Planning Program

Region 10 HUD

Seattle Regional Office

Phone: (206) 220-5101

<http://portal.hud.gov/hudportal/HUD?src=/states/washington/offices>



http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/communitydevelopment/programs

Eligible Projects: Comprehensive plans, Infrastructure plans, Feasibility studies, Community action plans, Low-income housing assessments

Eligible Applicants: Projects must principally benefit low- to moderate-income people in non-entitlement cities and counties.

- Cities or towns with fewer than 50,000 people
- Counties with fewer than 200,000 people

Funding Available: Grants

- Up to \$24,000 for a single jurisdiction
- Up to \$35,000 for single jurisdiction projects that address urgent public health and safety needs
- Up to \$40,000 for multiple jurisdictions/joint application

How To Apply: <http://portal.hud.gov/hudportal/HUD?src=/states/washington/offices>

Rural Community Assistance Corporation (RCAC)

Environmental Programs

1020 S.W. Taylor Street Suite 450

Portland, OR 97205

Local contacts:

Chris Marko, Rural Development Specialist 503- 228-1780

RosAnna Noval, Rural Development Specialist 503-308-0207

Email: cmarko@rcac.org; rnoval@rcac.org

Website: www.rcac.org

At the national level, RCAC has a variety of loans for water and/or wastewater planning, environmental work, and other work to assist in developing an application for infrastructure improvements

Eligible Applicants: Non-profit organizations, public agencies, tribes, and low-income rural communities with a 50,000 population or less, or 10,000 or less if guaranteed by USDA Rural Development financing.

Funding Available:

- Maximum \$50,000 for feasibility loan
- Maximum \$350,000 for pre-development loan
- 1 year term
- 5.5% interest rate

How To Apply: Applications accepted anytime. www.rcac.org

National contact: Josh Griff, 720-951-2163, jgriff@rcac.org

Water Research Foundation - Source Water Protection Cost-Benefit Tool

This is a free, online suite of tools designed to assist in evaluating the triple bottom-line costs and benefits of different source water protection options. Cost/benefit calculations help evaluate, prioritize, justify, and ultimately implement source water protection initiatives.

<http://www.swptool.org/index.cfm>

Healthy Watersheds Consortium

The Healthy Watersheds Consortium Grant Program has just published a Request for Proposals (RFP) to support local projects that protect and sustain healthy watersheds (including drinking water sources). Through this program, EPA will provide approximately \$3.75 million over six years to the U.S. Endowment for Forestry and Communities for projects that develop and/or



support state, interstate, and tribal healthy watersheds programs and enhance collaboration among the many groups who benefit from protecting healthy watersheds such as drinking water utilities, hunters and fisherman, foresters and farmers, and more. The Endowment is also matching a portion of EPA's financial commitment to the partnership and expects to leverage additional funding from other public and private sources.

The goal of the Healthy Watersheds Consortium Grant Program is to accelerate strategic protection of healthy, freshwater ecosystems and their watersheds. This goal will be achieved by: Funding key projects identified in existing watershed protection or conservation plans; Building the sustainable organizational infrastructure, social support, and long-term funding commitments necessary to implement large-scale protection of healthy watersheds; and supporting innovative or catalytic projects that may accelerate or broadly advance the field of practice for watershed protection efforts. For more information and to view and download the RFP and other helpful documents, visit the website:

<http://usendowment.org/partnerships/hwcgrantprogram.html>

For questions, please contact Peter Stangel at peter@usendowment.org.

Ecotrust

<http://www.ecotrust.org/>

Ecotrust works to protect and restore watersheds and the economic and public health of the communities that depend upon them. Ecotrust develops and applies strategic approaches that improve habitat for native fish and wildlife, create local jobs and recreational opportunities, increase public awareness of the value of nature's services like water, and ensure a more reliable access to clean water for all members of the Oregon communities. Ecotrust provides Ecosystem Services, GIS Analysis, Mapping, Cartography, Data and Software Development, Economic Impact Assessment, etc.

Ecotrust Forest Management

<http://ecotrustforests.com>

Ecotrust Forest Management is a for-profit forestland investment management company that acquires and manages land on behalf of investors and forestland owners to enhance forest health and productivity, and to produce a diverse array of forest products and services including timber, biomass, carbon, and improved habitat and water quality. Where possible, our goal is to transition land to long-term, local, stewards of land like Tribes, Community Forests, Public or State Agencies etc. EFM is adept at using a wide array of financing sources— New Market Tax Credits, carbon credits, conservation easements, and restoration funding — to supplement private capital resources in the acquisition and management of forestland. Contact:

info@ecotrustforests.com

LAND TRUSTS

Resources to assist in locating a land trust can be found here:

<http://findalandtrust.org/states/oregon41>

Coalition of Oregon Land Trusts

The Coalition of Oregon Land Trusts (COLT) is a newly formed nonprofit representing and serving Oregon's land trusts. Its mission is to serve and strengthen the land trust community in Oregon. Oregon's land trust community is working at local, regional, and statewide scales with



landowners, communities, public agencies and other partners to maintain the state's natural heritage and the economies it supports. COLT will accomplish its mission by strengthening public policies and programs that are supportive of land conservation, helping to build capacity within and across land trusts, and communicating to key audiences about the role of land trusts in conserving Oregon's natural heritage and healthy human communities that depend on it. There are currently 18 land trusts that are members of COLT.

Coalition of Oregon Land Trusts

322 NW 5th, Suite 312 Portland, OR 97209

Phone: 503-719-4732 <http://oregonlandtrusts.org/>

Land Trust Alliance

The Land Trust Alliance is a national conservation organization that works preserve land through conservation and easements, so land and natural resources get protected. The Alliance is based in Washington, D.C., and has several regional offices.

Northwest Conservation Manager

1353 Officers Row Vancouver, WA 98661

Phone: (971) 202-1483 <http://www.landtrustalliance.org/>

Individual land trusts which may be of assistance include:

The Trust for Public Land

<http://www.tpl.org/services/conservation-transactions>

The Nature Conservancy

<http://www.nature.org/>

FOUNDATIONS

The Oregon Community Foundation / Community Grant Program

Eligible Projects: Community Livability, Environment & Citizen Engagement (*10 to 20 percent of grants*)

- Promote leadership development, volunteerism, immigrant integration, and civic participation
- Support stewardship and appreciation of Oregon's outdoor spaces and scenic beauty
- Address social, economic and environmental challenges or opportunities by bringing together disparate stakeholders
- Preserve places essential to communities' civic and historic identities

Eligible Applicants: nonprofits with tax-exempt status under Section 501(c)(3)

Funding Available: average grant is \$20,000

Contact: <http://www.oregoncf.org/grants-scholarships/grants/community-grants>

National Fish and Wildlife Foundation

Eligible Projects: Environmental Solutions for Communities (1:1 match required)

- Supporting sustainable agricultural practices and private lands stewardship;
- Conserving critical land and water resources and improving local water quality;



- Restoring and managing natural habitat, species and ecosystems that are important to community livelihoods;
- Facilitating investments in green infrastructure, renewable energy and energy efficiency; and
- Encouraging broad-based citizen and targeted youth participation in project implementation.

Eligible Applicants: non-profit 501(c) organizations, state government agencies, local governments, municipal governments, Indian tribes, educational institutions

Funding Available: grants range from \$25,000 to \$100,000

Contact: 202-595-2434 - Community-Based Conservation

Access Fund Foundation

Eligible Projects: land acquisitions; considering the management and financial resources of land ownership, the Access Fund views land acquisitions as a tool of last resort and have adopted the following guidelines for land acquisition projects. If you are requesting funds for a land acquisitions please call the Access Fund before submitting your application.

- The area must be imminently threatened with permanent closure or sale to an outside party that may consider land development opportunities or other uses threatening its climbing and/or access resources.
- The area can be acquired for a reasonable price (reasonable price being one that falls within existing market values and is not in excess of appraised value), together with a reasonable budget (including secured funding) or secured exit-strategy for management by another land trust, local climbers organization or governmental agency.
- A fully executed purchase agreement stating how the project will be funded is required before Access Fund grant funds will be allocated to any acquisition.
- A high degree of matching funds is required. The Access Fund's role in land acquisitions is as an additional, not primary, funding resource.
- Applicants whose projects require continued payments and/or financing should submit a plan describing how these payments will be met in the future. These include, but are not limited to, property tax payments, loan payments, lease and mortgage payments. This payment plan will be taken into consideration during the grant review process.

Eligible Applicants: Local climbing groups, individuals or organizations (Note: tax exempt 501(c)(3) status is not a pre-requisite); governmental agencies that wish to sponsor or organize a local project; conservation organizations and land trusts.

Funding Available: \$1,000 to \$4,000. (The Access Fund considers requests for over \$10,000, but these projects should have national significance and utilize a high degree of matching funds.)

Contact: <http://www.accessfund.org/>

The Collins Foundation

Eligible Projects: land acquisitions; grants are for projects that directly benefit the residents of Oregon

Eligible Applicants: nonprofits with tax-exempt status under Section 501(c)(3) / agencies that have current registration with the offices of the Oregon State Attorney General and the Secretary of State

Funding Available: varies; grants may range from \$3000 to \$150,000

Contact: www.collinsfoundation.org



Giles W. and Elise G. Mead Foundation

Eligible Projects: Preserving and improving the environment; primary emphasis forestry, fisheries and the sustainable use of natural resources in western North America

Eligible Applicants: nonprofits with tax-exempt status under Section 501(c)(3) in western North America

Funding Available: past grants ranged from \$15,000 to \$100,000

Contact: <http://www.gileswmeadfoundation.org/>

Rose E. Tucker Charitable Trust

Eligible Projects: giving limited to organizations and projects in Oregon, with emphasis on the metropolitan Portland area; land acquisition is eligible

Eligible Applicants: nonprofits with tax-exempt status under Section 501(c)(3)

Funding Available: past grants ranged from \$6,000 to \$150,000

How to Apply: apply anytime; board meets approximately every 2 months

Contact: Tuckertrust@stoel.com

Doris Duke Charitable Foundation

Eligible Projects: The foundation's grant-making is designed to provide frameworks and concrete examples of how practitioners can protect biodiversity in light of climate change through strategic land conservation. The program's adaptation efforts focus on three critical land conservation activities undertaken by non-profit organizations and government natural resource agencies:

- Habitat conservation planning (i.e., the identification of which sites should be conserved in their natural state to benefit wildlife);
- Permanent land protection (i.e., the acquisition of conservation easements or fee title to secure high priority sites); and C) Management of lands already in protected status. The goal for each of these activities is to encourage the conservation community to augment the dominant species-based approach to wildlife conservation with a focus on maintaining ecosystem functionality as climate change takes hold.
- The program has adopted three approaches to achieve its objectives: 1) Identifying resilient landscapes; 2) Protecting resilient landscapes; and 3) Managing conserved lands.

Eligible Applicants: nonprofits with tax-exempt status under Section 501(c)(3)

Funding Available: past grants ranged in the \$100K

Contact: <http://www.ddcf.org/what-we-fund/environment/>

Bonneville Environmental Foundation

Eligible Projects: renewable power and acquire, maintain, preserve, restore, protect, and/or sustain fish and wildlife habitat within the Pacific Northwest.

Interest area: Watershed Restoration Program---supports restoration of damaged watershed ecosystems; supports communities trying to heal their local watersheds by supporting watershed restoration projects grounded in the best available watershed science

Eligible Applicants: nonprofit organizations

Funding Available: varies

Contact: www.b-e-f.org



The Bullitt Foundation

Program priorities:

- Manage freshwater resources: control, use, distribution, conservation;
- Conserve and restore resilient watersheds, wetlands and estuaries;
- Maintain a working land base for sustainable agriculture and forestry;
- Enforce laws and policies intended to assure air and water quality;
- Create landowner incentives for maintaining and enhancing ecosystem services, including the development of market-based mechanisms.

Eligible Applicants: nonprofit organizations in Washington, Oregon, Idaho, western Montana, south-central Alaska, and British Columbia. Within that broad geographic range, work is targeted to specific sub-regions generally associated with major population centers.

Funding Available: varies---past grants ranged from \$10,000 to over \$600,000

Contact: <http://www.bullitt.org/>

Weyerhaeuser Foundation

Eligible Projects: forestry practices, manufacturing's effects on air, water and land; free trade, recycling, diversity, land conservation and environmental education; land acquisitions or conservation easement projects may fit with the Foundation's priorities and goals

Eligible Applicants: educational institutions, non-profit organizations, research institutions in Oregon and Washington

Funding Available: \$1,000 - \$50,000

Contact: <http://www.wfamilyfoundation.org/>

Laird Norton Foundation

Eligible Projects: projects contribute to a heightened awareness of the ecological, social and economic significance of water sources and watersheds. Preference will be given to projects which demonstrate innovative measures for protecting and restoring water resources and which involve local communities and/or regional institutions.

Eligible Applicants: nonprofit organizations working in Hood Canal (WA), Upper Deschutes (OR), and Rogue (OR) watersheds

Funding Available: varies; past grants ranged from \$10k to \$100k

Contact: <http://www.lairdnorton.org>



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City of Yachats
2020 Source Water Assessment Update

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Table 2: Inventory of Potential Sources of Pollution
as identified in readily accessible state and federal databases and GIS layers
Updated Source Water Assessment
see *Appendix 2 for Key to Tables for Notes and Descriptions of Acronyms*

PWS Name: City of Yachats
PWS Number: 00966

This information supplements the Original Source Water Assessment Inventory dated between 2000 and 2005 and should be used in conjunction with the original inventory to provide a more detailed analysis of potential sources of pollution. Note that due to limitations for locational data in state databases, some locations will need further research to verify presence and location.

Primary Land Ownership/Use(s)							Data Source	
Primarily Federal land (USFS) with some private industrial forestry land use especially near the Salmon and Reedy Creek intakes. Private Non-Industrial/Urban (rural residential) and agricultural land use also present in the river valleys of the Yachats River (emergency intake) delineation.							Land use map - Figure 4	
Other potential sources of pollution identified based on aerial photographs, topographic maps or local knowledge.								
Name	Utility right-of-way - power lines in upper watershed		Address/location	City	County	Data Source		
Database Identifier (DB_ID)	Site Identifier (Site_ID)	Status	Common Name	Address	City	County	Retrieval Date (RET_DATE)	Data Source
Identified in Salmon and Reedy Creeks Source Area								
Note: There were no potential sources of contamination identified in the regulatory databases for the Surface Water protection area during this Source Water Assessment. Various land uses and natural sources in the watershed (i.e. recreation, wildlife) may contribute contaminants to the water supply. The water system and community should consider the potential for future development(s) or land use/management changes in the watershed to impact the source water.								
Identified in Yachats River Intake Source Area (Emergency Intake)								
SFM - HSIS - YACHATS CITY OF	024349	OTHER GENERAL GOV SUPP PORT with 2 different chemicals reported on site (liquids and solids only)	YACHATS CITY OF	936 YACHATS RIVER RD	YACHATS	LINCOLN	09/29/2008	OR State Fire Marshall Hazardous Substance Information System database (SFM/HSIS - 2009)
DOGAMI - Otter Crest Quarry	21-0054	Closed -	Otter Crest Quarry/Devils Lake Rock Company		Not applicable	Lincoln	10/21/2015	OR Dept. of Geology and Mineral Industries Mineral Information layer for Oregon Release 2 (DOGAMI/MILO-2 - 2014)
Bridge - North Fork Yachats River, Yachats River Rd	12035A	Highway, major road, bridge, or stream crossing	North Fork Yachats River, Yachats River Rd	Not Applicable	UNKNO WN	Lincoln	2013	Oregon Dept. of Transportation, Technical Services Branch, Bridges Section (ODOT - 2013)
Bridge - North Fork Yachats River, North Yachats River Rd	12036A	Highway, major road, bridge, or stream crossing	North Fork Yachats River, North Yachats River Rd	Not Applicable	UNKNO WN	Lincoln	2013	Oregon Dept. of Transportation, Technical Services Branch, Bridges Section (ODOT - 2013)
Bridge - North Fork Yachats River, North Yachats River Rd	12037	Highway, major road, bridge, or stream crossing	North Fork Yachats River, North Yachats River Rd	Not Applicable	UNKNO WN	Lincoln	2013	Oregon Dept. of Transportation, Technical Services Branch, Bridges Section (ODOT - 2013)
Bridge - South Fork Yachats River, Yachats River Rd	12039A	Highway, major road, bridge, or stream crossing	South Fork Yachats River, Yachats River Rd	Not Applicable	UNKNO WN	Lincoln	2013	Oregon Dept. of Transportation, Technical Services Branch, Bridges Section (ODOT - 2013)

Database Identifier (DB_ID)	Site Identifier (Site_ID)	Status	Common Name	Address	City	County	Retrieval Date (RET DATE)	Data Source
Bridge - South Fork Yachats River, Yachats River Rd	12040A	Highway, major road, bridge, or stream	South Fork Yachats River, Yachats River Rd	Not Applicable	UNKNO WN	Lincoln	2013	Oregon Dept. of Transportation, Technical Services Branch, Bridges Section (ODOT - 2013)
Bridge - South Fork Yachats River, Yachats River Rd	12041A	crossing Highway, major road, bridge, or stream	South Fork Yachats River, Yachats River Rd	Not Applicable	UNKNO WN	Lincoln	2013	Oregon Dept. of Transportation, Technical Services Branch, Bridges Section (ODOT - 2013)
Bridge - South Fork Yachats River, Yachats River Rd	12042A	crossing Highway, major road, bridge, or stream	South Fork Yachats River, Yachats River Rd	Not Applicable	UNKNO WN	Lincoln	2013	Oregon Dept. of Transportation, Technical Services Branch, Bridges Section (ODOT - 2013)
Bridge - School Fork Creek, Yachats River Rd	19581	crossing Highway, major road, bridge, or stream	School Fork Creek, Yachats River Rd	Not Applicable	UNKNO WN	Lincoln	2013	Oregon Dept. of Transportation, Technical Services Branch, Bridges Section (ODOT - 2013)
Water Quality Limited streams, Cat4A & Cat5, DEQ-2012 - Beamer Creek	124024544296	crossing Cat 5: Water quality limited, 303(d) list, TMDL needed - Dissolved Oxygen	Beamer Creek	Not applicable	Not applicable	Not applicable	10/31/2014	OR Dept. of Environmental Quality Water Quality Assessment 2012 - (DEQ/WQ - 10/31/2014)
Water Quality Limited streams, Cat4A & Cat5, DEQ-2012 - Carson Creek	124022744294	Cat 5: Water quality limited, 303(d) list, TMDL needed - Temperature	Carson Creek	Not applicable	Not applicable	Not applicable	10/31/2014	OR Dept. of Environmental Quality Water Quality Assessment 2012 - (DEQ/WQ - 10/31/2014)
Water Quality Limited streams, Cat4A & Cat5, DEQ-2012 - Depew Creek	123971644330	Cat 5: Water quality limited, 303(d) list, TMDL needed - Temperature	Depew Creek	Not applicable	Not applicable	Not applicable	10/31/2014	OR Dept. of Environmental Quality Water Quality Assessment 2012 - (DEQ/WQ - 10/31/2014)
Water Quality Limited streams, Cat4A & Cat5, DEQ-2012 - Grass Creek	123938744283	Cat 5: Water quality limited, 303(d) list, TMDL needed - Temperature	Grass Creek	Not applicable	Not applicable	Not applicable	10/31/2014	OR Dept. of Environmental Quality Water Quality Assessment 2012 - (DEQ/WQ - 10/31/2014)
Water Quality Limited streams, Cat4A & Cat5, DEQ-2012 - Keller Creek	123967144281	Cat 5: Water quality limited, 303(d) list, TMDL needed - Dissolved Oxygen, E. Coli, Temperature	Keller Creek	Not applicable	Not applicable	Not applicable	10/31/2014	OR Dept. of Environmental Quality Water Quality Assessment 2012 - (DEQ/WQ - 10/31/2014)
Water Quality Limited streams, Cat4A & Cat5, DEQ-2012 - North Fork Yachats River	123977544297	Cat 5: Water quality limited, 303(d) list, TMDL needed - Dissolved Oxygen, E. Coli, Temperature	North Fork Yachats River	Not applicable	Not applicable	Not applicable	10/31/2014	OR Dept. of Environmental Quality Water Quality Assessment 2012 - (DEQ/WQ - 10/31/2014)
Water Quality Limited streams, Cat4A & Cat5, DEQ-2012 - School Fork	123944444290	Cat 5: Water quality limited, 303(d) list, TMDL needed - Dissolved Oxygen, E. Coli, Temperature	School Fork	Not applicable	Not applicable	Not applicable	10/31/2014	OR Dept. of Environmental Quality Water Quality Assessment 2012 - (DEQ/WQ - 10/31/2014)
Water Quality Limited streams, Cat4A & Cat5, DEQ-2012 - Stump Creek	123962244278	Cat 5: Water quality limited, 303(d) list, TMDL needed - Dissolved Oxygen, E. Coli, Temperature	Stump Creek	Not applicable	Not applicable	Not applicable	10/31/2014	OR Dept. of Environmental Quality Water Quality Assessment 2012 - (DEQ/WQ - 10/31/2014)

Database Identifier (DB_ID)	Site Identifier (Site_ID)	Status	Common Name	Address	City	County	Retrieval Date (RET DATE)	Data Source
Water Quality Limited streams, Cat4A & Cat5, DEQ-2012 - Williamson Creek	123974844317 0	Cat 5: Water quality limited, 303(d) list, TMDL needed - Dissolved Oxygen, E. Coli, Temperature	Williamson Creek	Not applicable	Not applicable	Not applicable	10/31/2014	OR Dept. of Environmental Quality Water Quality Assessment 2012 - (DEQ/WQ - 10/31/2014)
Water Quality limited streams, Cat4A & Cat5, DEQ-2012 - Yachats River	124108344308 0	Cat 5: Water quality limited, 303(d) list, TMDL needed - Dissolved Oxygen, E. Coli, Temperature	Yachats River	Not applicable	Not applicable	Not applicable	10/31/2014	OR Dept. of Environmental Quality Water Quality Assessment 2012 - (DEQ/WQ - 10/31/2014)
Water Quality limited streams, Cat3 - Keller Creek	123967144281 0	Cat 3: Insufficient data - E. Coli	Keller Creek	Not applicable	Not applicable	Not applicable	10/31/2014	OR Dept. of Environmental Quality Water Quality Assessment - (DEQ/WQ - 10/31/2014)
Water Quality limited streams, Cat3 - Keller Creek	123967144281 0	Cat 3: Insufficient data - pH	Keller Creek	Not applicable	Not applicable	Not applicable	10/31/2014	OR Dept. of Environmental Quality Water Quality Assessment - (DEQ/WQ - 10/31/2014)
Water Quality limited streams, Cat3 - North Fork Yachats River	123977544297 0	Cat 3: Insufficient data - E. Coli, habitat Modification, pH, Sedimentation, Biological Criteria	North Fork Yachats River	Not applicable	Not applicable	Not applicable	10/31/2014	OR Dept. of Environmental Quality Water Quality Assessment - (DEQ/WQ - 10/31/2014)
Water Quality limited streams, Cat3 - School Fork	123944444290 0	Cat 3: Insufficient data - E. Coli, pH	School Fork	Not applicable	Not applicable	Not applicable	10/31/2014	OR Dept. of Environmental Quality Water Quality Assessment - (DEQ/WQ - 10/31/2014)
Water Quality limited streams, Cat3 - Stump Creek	123962244278 0	Cat 3: Insufficient data - Habitat Modification, E. Coli	Stump Creek	Not applicable	Not applicable	Not applicable	10/31/2014	OR Dept. of Environmental Quality Water Quality Assessment - (DEQ/WQ - 10/31/2014)
Water Quality limited streams, Cat3 - Williamson Creek	123974844317 0	Cat 3: Insufficient data - E. Coli, pH	Williamson Creek	Not applicable	Not applicable	Not applicable	10/31/2014	OR Dept. of Environmental Quality Water Quality Assessment - (DEQ/WQ - 10/31/2014)

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APPENDIX B

Risk Prioritization Matrix

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Probability of Occurrence
(P)

	1	2	3	4	5
1	Moderate Risk	Moderate Risk	High Risk	High Risk	High Risk
2	Low Risk	Moderate Risk	Moderate Risk	High Risk	High Risk
3	Low Risk	Moderate Risk	Moderate Risk	Moderate Risk	High Risk
4	Low Risk	Low Risk	Moderate Risk	High Risk	High Risk
5	Low Risk	Low Risk	Low Risk	Low Risk	High Risk

Consequence of Occurrence (C)

High Risk – Manage early and aggressively, must have a lower risk backup implementation plan and decision point defined

Moderate Risk - Manage aggressively; consider alternatives

Low Risk - Monitor On Watch List

Risk: The Probability of an Undesirable Event Occurring and the Significance of the Consequence of the Event

Risk Level	Definition
Low	Has Little Potential To Cause Disruption of Schedule, Increase in Cost, or Degradation of Performance. Normal Monitoring Will Probably Be Able To Overcome Difficulties
Moderate	Can Potentially Cause Some Disruption of Schedule, Increase in Cost, or Degradation of Performance. Special Emphasis and Close Monitoring Will Probably Be Able to Overcome Difficulties
High	Likely To Cause Serious Disruption of Schedule, Increase in Cost, or Degradation of Performance, Even With Special Emphasis and Close Monitoring

Link to materials on City website on Drinking Water Protection Plan

<https://www.yachatsoregon.org/372/Drinking-Water-Protection-Plan>

Since the Public Review version, Suzanne de Szoeki added a bit more language about student water conservation education as well as a few more details to the Contingency Plan. She reports that after the April 27 public meeting, she received one phone call and no email comments. The phone call comment was about having a tiered rate structure during times curtailment, which is covered in the draft plan.



WATER SYSTEM MASTER PLAN

DRAFT - May 2021



Westtech Engineering, Inc.
3841 Fairview Industrial Drive SE, Suite 100
Salem, OR 97302
(503) 585-2474

WATER SYSTEM MASTER PLAN

City of Yachats

DRAFT – May 2021

Prepared for
City of Yachats
441 Hwy 101 N.
PO Box 345
Yachats, OR 97498

Prepared by
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APPENDIX A

City of Yachats Water System Maps

APPENDIX B

Cost Estimates for Recommended Capital Improvement Projects

FOREWORD

Using this Report

This report will be used by many people whose needs for information will differ widely. Accordingly, an Executive Summary appears at the beginning of this report. The summary provides an overview of the report and presents the main conclusions. Readers may gain a good general understanding of the report and its contents by reading the summary. Additional detailed information is presented in the body of the report.

LIST OF ABBREVIATIONS

ADD	Average Day Demand
AWWA	American Water Works Association
bgs	Below Ground Surface
cfs	Cubic Feet Per Second
CIP	Capital Improvement Plan
EDU	Equivalent Dwelling Unit
EPA	US Environmental Protection Agency
FEMA	Federal Emergency Management Agency
fps	feet per second
gpd	gallons per day
gpcd	gallons per active certificate per day
gpm	gallon per minute
GWR	Ground Water Rule
GWUDI	Ground Water Under the Direct Influence (of surface water)
HAA5	five haloacetic acids regulated by the EPA
HP	Horsepower
LCR	Lead and Copper Rule
MDD	Maximum Day Demand
MMD	Maximum Month Demand
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MG	Million Gallons
MGD	Million Gallons Per Day
OAR	Oregon Administrative Rule
ODOT	Oregon Department of Transportation
OHA-DWS	Oregon Department of Human Services, Drinking Water Services
OWRD	Oregon Water Resources Department
PDD	Peak Day Demand
PHD	Peak Hour Demand
PLC	Programmable Logic Controller
psi	pounds per square inch
PWDS	Public Works Design Standards
SCADA	Supervisory Control and Data Acquisition system
SDC	System Development Charge
SMCL	Secondary Maximum Contaminant Level
UGB	Urban Growth Boundary
USGS	United States Geological Survey
VFD	Variable Frequency Drive
WMCP	Water Management & Conservation Plan
WTP	Water Treatment Plant

EXECUTIVE SUMMARY

Summary Outline

Introduction

Project Objectives

Basis for Master Planning

Study Area & Planning Consideration

Regulatory Requirements

Existing Water System Inventory

Present & Future Water Demands

Water Supply & Treatment Evaluation

Distribution System Evaluation

Water Storage Evaluation

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EXECUTIVE SUMMARY

INTRODUCTION

The purpose of this study is to provide a comprehensive evaluation of the City's water system with respect to its existing and future needs, identify improvements and associated costs necessary to meet those needs, and provide the City with a framework for the provision of water service through the year 2041.

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

PROJECT OBJECTIVES

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

This master plan accomplishes the following specific objectives:

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

BASIS FOR MASTER PLANNING

The City's previous water master plan was completed in 2001; it outlined recommended improvements to the water system components including the distribution, storage, and treatment systems. A number of the major improvements recommended in the previous water master plan have been addressed. The life and planning horizon for a water master planning document is 20 years, with updates typically recommended on 10-year intervals. Accordingly, a new master plan was needed to address water system issues.

STUDY AREA AND PLANNING CONSIDERATIONS - CHAPTER 2

The City's Comprehensive Plan was adopted in 2008 and recently updated in 2019. The Plan established an urban growth boundary (UGB) encompassing approximately 600 acres. The City provides water service to all areas of the City Limits and UGB. The study area for this plan includes all areas within the UGB. The UGB and the City Limits have the same boundaries in Yachats.

The planning period for this study extends through 2041. Based on data provided by the Portland State University Population Research Center, the population in Yachats in 2020 is about 760. The population is expected to increase to approximately 1,061 in 2040. However, Yachats, like many Oregon Coast communities, experiences seasonal changes in population as a result of hospitality and travelers. Therefore water demand projections were based on an estimated service population, which more accurately describes the number of users of the water system. This

methodology is described in more detail in Chapter 5. The population projections presented in Chapter 5 include estimates of permanent and seasonal residents. At maximum occupancy, the existing (i.e., 2021) population is estimated to be about 2,200 people. By 2041, this value is expected to increase to about 2,850 people.

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

REGULATORY REQUIREMENTS - CHAPTER 3

The US Environmental Protection Agency (EPA) and the State of Oregon Health Authority, Drinking Water Program (ODWP) currently enforce drinking water standards for 83 primary contaminants and 16 secondary contaminants. Primary standards regulate contaminants that pose a serious risk to public health, whereas secondary standards cover aesthetic considerations. Public water systems must sample for primary contaminants routinely to ensure that standards are met and must report the results of such sampling to the regulating agency.

The City's water system operates in compliance with the current regulatory requirements. Regulatory compliance is achieved as a function of the basic water system design, the operational modes selected by the City's licensed operators, as well as the current regulatory structure.

A more detailed discussion of existing and anticipated regulatory requirements is provided in Chapter 3.

EXISTING WATER SYSTEM INVENTORY - CHAPTER 4

The City operates and maintains the existing water system and delivers water to its consumer base. The system utilizes surface water from Reedy and Salmon Creeks. A water treatment plant near the Yachats River produces finished drinking water and conveys it to the distribution system. Six finished water storage reservoirs, six pump stations and a network of distribution pipes deliver water to users. The City also has water rights to the Yachats River and Cape Creek that are currently not in use. The City also has a connection to the Southwest Lincoln County Water People's Utility District distribution grid. This intertie is intended for emergency use only.

The City's water distribution system includes a transmission line from the water treatment plant to the main water storage reservoir, known as the Upper Radar Road Reservoir. This storage tank delivers water to the rest of the areas of town, including other reservoirs and pump stations. The distribution grid is mainly a looped network and is constructed largely in the public road rights-of-way. The distribution system consists of approximately 17.6 miles of pipe of varying materials and sizes.

PRESENT AND FUTURE WATER DEMANDS - CHAPTER 5

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

Water demand is defined as the sum of all water produced and delivered to the City's distribution system. It includes water consumed in all use categories and also includes water loss and unaccounted-for water. Water demand varies

across seasonal periods, days of the week, and hours of the day. The establishment of an average day demand rate (ADD) serves as the baseline against which other more intensified demands are measured, such as peak day demand (PDD), which is defined as the highest production day within the highest production month and peak hour demand (PHD), which is defined as the greatest flow occurring in any one-hour period.

Population projections of residents within a UGB typically serve as the basis for water demand projections in a municipality. However, Yachats is a community strongly influenced by seasonal occupancy of non-permanent residents that are vacationing. The City provides water to several hotels, second homes, and vacation rentals that greatly increase the number of users on a seasonal basis. For this reason, this plan developed water demand projections instead based upon a projected service population. At maximum occupancy during peak holiday weekends (e.g., Fourth of July), the projected service population was estimated to be about 2,850 people in the year 2041. A detailed description of the population projection methodology is in Chapter 5.

Water demand projections were based on historical water production records and the projected service population. Records from January 2017 through September 2020 were used as a basis to establish historical water demands. Table 5-8 includes a summary of the projected water demands including estimations of short-term peak demands.

WATER SUPPLY EVALUATION - CHAPTER 6

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

The City currently utilizes surface water diverted from Reedy and Salmon Creeks as its sole source of municipal water. The City has water rights to the Yachats River and Cape Creek, but these sources are not currently utilized by the City. The City also has an intertie with the Southwest Lincoln County Peoples Utility District that can be used as a water source on an emergency basis.

The City has active certificated water rights totaling 898 gpm (Reedy Creek) and permitted water rights totaling 1,795 gpm (Salmon Creek and Yachats River). In addition to these active certificated and permitted water rights, the City also has a non-active certificated water right of 220 gpm for Cape Creek. The City's total water right holding (sum of active certificates, permits, and non-active certificates) is 2,893 gpm for all available sources. This is far higher than the City's peak day demand. However, the rates of diversion allowed on paper are different than the rates at which the City can actually divert water. The City appears to have access to sufficient water under its water rights, but stream flows are less than the authorized rate of diversions during the summer months when the City needs to maximize its use of water rights

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. Chapter 6 includes a detailed analysis of the City's water supplies and recommended improvements.

WATER TREATMENT EVALUATION - CHAPTER 7

The City's existing water treatment plant was constructed in the early 1990s and has served the City well. The existing treatment plant can reliably produce about 500,000 gallons of water per day. This is significantly more than the estimated peak day demand at the end of the planning period. Therefore, the treatment plant is adequately sized to meet the projected demands and an expansion project to increase the treatment capacity is not needed. However, most of the mechanical and electrical components of the plant are the original equipment that is now about 30 years old and would be about 50 years old at the end of the planning period. This is far beyond the design life for mechanical and electrical equipment such as control panels, pumps, chemical feed equipment, and some of the internal components of the clarifier and filters. Therefore, the City should plan to make significant upgrades to the mechanical and electrical systems during the planning period. In addition to capacity and age issues, the existing treatment plant building does not meet current seismic building codes and improvements to the building structure would be beneficial. The recommended improvements are described in detail in Chapter 7. The recommended improvements are generally needed to address aging infrastructure rather than to increase the treatment capacity of the plant.

DISTRIBUTION SYSTEM EVALUATION - CHAPTER 8

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

The existing distribution system was evaluated and existing or anticipated deficiencies were identified. In general, the distribution system is sufficient to provide domestic flows, but lacks the capacity to convey flows needed for fire suppression. Chapter 8 includes an evaluation of the distribution system as well as improvement recommendations. Some of the improvements are needed to improve fire flows throughout the City and some are needed to replace pump stations and piping that are likely to reach the end of their useful life during the planning period. In addition to the various recommended piping improvements, Chapter 8 also recommends an evaluation of the City's pressure reducing valves. Correcting these problems has the potential to improve the available fire flow throughout the City.

Chapter 8 also includes a recommendation to establish two annual programs (i.e., Program 1 & Program 2). These programs include developing a better tracking system for unaccounted for water and overall water loss and a leak detection and repair program. These programs are critical in order to develop the Yachats River Water Intake as recommended in Chapter 6. The City's Yachats River water rights can only be used if the City's water loss is less than 15%. This is an attainable goal, and there is evidence to suggest that the City is already achieving this. However, the City's water production and consumption data tracking systems should be improved because the water loss data is likely to come under increased scrutiny as the City attempts to develop the Yachats River water right. In addition, as the water distribution system continues to age, new leaks and faults will develop. As such, an active leakage testing and repair program will be needed indefinitely to ensure that water loss is kept below 15%.

Table 8-1 is a summary of the recommended distribution improvements. Details of particular projects are discussed in Chapter 8.

WATER STORAGE EVALUATION - CHAPTER 9

In most municipal distribution systems, the water system service pressure is determined by the elevation of the free water surface in the storage reservoirs serving the system. Service pressures in the Yachats distribution system begin with available static pressure created by the City's 1,000,000-gallon reservoir and are reduced en-route to users by friction losses in the pipe network.

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

The analysis in Chapter 9 shows the City's existing storage tanks are able to meet the storage requirements for the remainder of the planning period. Therefore, the tanks are sufficient from a capacity standpoint. However, improvements are recommended during the planning period to address aging infrastructure and seismic concerns.

The Upper Radar Road Reservoir provides a vast majority of the City's water storage capacity. A seismic evaluation of the tank structure is needed and structural upgrades to improve the seismic resiliency of the structure will likely be required. The construction of the structural improvements will require the reservoir to be taken out of service for a prolonged period of time (i.e., several months). The City's other reservoirs cannot provide enough storage to fight a major fire without this reservoir in service. A new 250,000 gallon reservoir is recommended to be installed adjacent to the existing Lower Radar Reservoir in order to meet this need while seismic upgrades are being completed. This new reservoir is also recommended to eventually replace the existing Lower Radar Road Reservoir. The Lower Radar Road Reservoir was constructed in 1945 and is likely to reach the end of its useful life during the planning period. The new Lower Radar Road Reservoir will be designed to meet current seismic standards. Once the new Lower Radar Road Reservoir and the seismic improvements to the Upper Radar Road Reservoir are completed, the old 1945 tank can be removed from service.

SEISMIC RISK ASSESSMENT & MITIGATION PLAN - CHAPTER 10

OAR 333-061-0060(5)(J) requires communities located in high hazard zones to conduct a seismic risk assessment and mitigation plan as part of a water master planning effort. Chapter 10 includes a description of the analysis and recommended mitigation plan. The critical facilities are identified along with a discussion of the consequences of failure. The recommended capital improvement plan includes structural retrofitting of the critical facilities such as the water treatment plant and storage tanks to improve the overall seismic resiliency of the City's system. Additionally, some critical water distribution pipes are recommended to be replaced. It is recommended that the City consider replacing these pipes with materials resistant that are more resistant to ground motions such as HDPE pipe or restrained joint ductile iron pipe.

OPERATION AND MAINTENANCE - CHAPTER 11

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

RECOMMENDED CAPITAL IMPROVEMENT PLAN - CHAPTER 12

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

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

Priority 1 improvements are recommended to be undertaken as soon as practical. These are projects necessary to resolve existing or near-term system deficiencies, especially due to water rights and fire flow capacity. Priority 2 projects are needed to maintain adequate water service based on the condition of aging infrastructure, seismic risk mitigation, and to improve redundancy of water supply to users. Although not critical at this time, they should be considered as improvement projects that will be upgraded to Priority 1 prior to the end of the planning period. Priority 3 projects, while important, are not deemed critical at the present time but will eventually be needed to improve system reliability or to supply future demands.

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

Table ES-1| Cost Summary, Capital Improvement Recommendations

Priority Group	Total Estimated Project Cost
Priority 1	\$4,904,000
Priority 2	\$8,262,000
Priority 3	\$1,313,000
Total	\$14,479,000

Table ES-2 is a comprehensive listing of the recommended water system improvement projects. The location of many of the prioritized improvements is shown in Figure 12-1 through Figure 12-3 (in the body of the report). The reader is referred to the body of this report for more detailed descriptions of the individual projects.

Work on the Priority 1 improvements should begin as soon as feasible following approval of this plan by the Oregon Health Authority and formal adoption by the City Council. Priority 2 projects are expected to be needed within the planning period as the City desires to improve reliability and upgrade aging infrastructure. Priority 2 projects can begin as finances become available and as the need arises.

In addition to the recommended capital improvement projects, this plan recommends several ongoing annual programs. These are listed at the end of Table ES-2. The first of these programs includes the non-metered water use tracking work described in Chapter 8. Program 1 and Program 2 are recommended to reduce the amount of unaccounted for water in the system. As described in Chapter 6, these efforts are very important to the City's ongoing effort to demonstrate responsible use of water resources and to ensure long-term water supply. Program 3 is recommended for the periodic updates to the Water Management and Conservation Plan. This effort is also related to administration of the City's water rights. It is envisioned that the recommended annual programs will be funded from the City's operation and maintenance budget for the water system.

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

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

Project Code ⁽¹⁾	Project	Chapter	Priority	Total Estimated Project Cost ⁽²⁾
S-1	Permit S-29018 Partial Perfection and Extension Application	6	1	\$15,000
S-2	Yachats River Water Rights Planning Work	6	1	\$50,000
S-3	Evaluate Using SWLCWPUD as a Long-Term Source	6	1	\$75,000
S-4	Yachats River Intake and Raw Water Pipeline	6	1	\$2,893,000
S-5	Reedy Creek Raw Water Pipeline Improvements	6	1	\$208,000
T-1	WTP Electrical and Control System Improvements	7	1	\$814,000
D-1	Water System Design Standards	8	1	\$5,000
D-2	Pressure Reducing Valve Maintenance & Coordination	8	1	\$50,000
D-3 ⁽³⁾	Windsong Street Service Reconnections	8	1	\$11,000
D-4 ⁽³⁾	New PRV at 7th Street & Radar Road	8	1	\$101,000
D-5 ⁽³⁾	New PRV on King Street Between 7th and Prospect Ave	8	1	\$101,000
D-6 ⁽³⁾	New 8" Water Main on Radar Road at Prospect Ave	8	1	\$57,000
D-7 ⁽³⁾	New 8" Water Main on King Street at Prospect Ave	8	1	\$86,000
D-10	Retrofit Combs PRV	8	1	\$40,000
D-13	Replace 4" AC with 8" from Prospect Ave to Yachats River Road	8	1	\$398,000
Subtotal Priority 1				\$4,904,000
T-2	WTP Clarifier Rehabilitation	7	2	\$641,000
T-3	WTP Mixed Media Filter Rehabilitation	7	2	\$350,000
T-4	WTP Pump and Compressor Upgrades	7	2	\$402,000
T-5	WTP Instrumentation Upgrades	7	2	\$271,000
T-6	WTP Chemical Feed System Improvements	7	2	\$205,000
T-7	WTP Building Seismic Retrofit	7	2	\$270,000
D-8	New 8" Water Main on Third Street	8	2	\$167,000
D-9	New 4" Water Main and PRV on Horizon Hill Road	8	2	\$737,000
D-11	Yachats Ocean Road Service Reconnections	8	2	\$20,000
D-15	Pontiac Street Waterline - 3rd to 4th	8	2	\$88,000
D-16	Shell Street Waterline	8	2	\$79,000
D-17	Gender Drive and Windy Way Waterlines	8	2	\$254,000
D-18	Pontiac Street Waterline - 2nd to 3rd	8	2	\$105,000

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

Project Code ⁽¹⁾	Project	Chapter	Priority	Total Estimated Project Cost ⁽²⁾
D-19	Hanley Drive Waterline	8	2	\$47,000
P-1	New Radar Road Pump Station	8	2	\$767,000
P-2	New Horizon Hill Pump Station & Reservoir	8	2	\$1,079,000
ST-1	New 250,000-gallon Lower Radar Road Reservoir	9	2	\$1,717,000
ST-2	Upper Radar Road Reservoir Structural Inspection & Analysis	9	2	\$50,000
ST-3	Upper Radar Road Reservoir Seismic Retrofit Improvements	9	2	\$1,013,000
Subtotal Priority 2				\$8,262,000
D-12	New 8" Water Main on Green Hill Drive	8	3	\$412,000
D-14	8" Water Main Highway 101 from 6th to Marine Dr.	8	3	\$583,000
D-20	Automated Water Meter Reading System	8	3	\$318,000
Subtotal Priority 3				\$1,313,000
<i>Recurring Annual Programs</i>				
Pgm-1	Non-metered Water Use Tracking System (see section 8.4.2)	8	1	\$1,000 per year
Pgm-2	Leak Detection and Repair Program (see section 8.4.2)	8	1	\$30,000 per year
Pgm-3	Water Management & Conservation Plan Updates (see section 3.9)	3	1	\$5,000 per year
Subtotal Recurring Annual Programs				\$36,000 per year
¹ Project Code Legend: S : Water Source/Supply T : Water Treatment ST : Storage P : Pump Station D : Distribution Pgm : Recurring Annual Program				
² See Section 12.3.2 for basis of project cost estimates, January 2021 ENR 20 City Construction Cost Index of 11630				
³ As described in Chapter 8, the City may want to consider constructing Projects D-3 through D-7 as a single larger project.				

CHAPTER 1

INTRODUCTION

Chapter Outline

- 1.1 General Overview
- 1.2 Need For Water System Master Plan
- 1.3 Authorization
- 1.4 Purpose
- 1.5 Scope of Work
- 1.6 Planning Regulatory Compliance
 - 1.6.1 Master Plan Requirements
 - 1.6.2 Future Master Plan Updates
- 1.7 Previous Studies And Reports

1.1 GENERAL OVERVIEW

The City of Yachats is located near the southwest corner of Lincoln County on the Oregon Coast. The City is located at the mouth of the Yachats River. Incorporated in 1967, the City of Yachats has grown to a current population of 760 inside the urban growth boundary (UGB). The UGB and City Limits encompass the same area, which is approximately 600 acres. Being located on the rugged Oregon Coast, Yachats has developed a relatively stable economy with a strong tourism sector. The City is divided into northern and southern areas by the Yachats River.

The City owns and operates the public drinking water system that serves the entire municipal population. The City also has an interconnection with the Southwest Lincoln County Water People's Utility District (SLCWPUD), which can be used to supply the Yachats distribution system. The City currently sources water from two creeks that are close to Yachats: Reedy Creek and Salmon Creek. The City also has a water right to source water from the Yachats River. The City does not have any groundwater sources.

The first community water system serving Yachats was constructed in the 1940's. In 1945 the City constructed a 200,000 gallon storage tank and a raw water impoundment and intake on Reedy Creek. Reedy Creek is still the primary water source for the City. Raw water from Reedy Creek is delivered by gravity to a 500,000 gallon raw water storage tank. The City also has a raw water impoundment and intake structure on Salmon Creek near the treatment plant. Raw water from Salmon Creek is conveyed by gravity in to the plant.

In 1992 the City constructed the existing water treatment plant. The existing treatment plant is capable of supplying 0.5 mgd.

Finished water from the treatment plant is stored in six reservoirs that total approximately 1,590,000 gallons of storage. A majority of the distribution system is served by gravity from these reservoirs. Table 4-3 is a summary of the reservoirs.

There are seven pump stations in the distribution system that either lift water to reservoirs or boost pressure. The main pump station is integrated with the water treatment plant. Table 4-4 is a summary of the pump stations.

1.2 NEED FOR WATER SYSTEM MASTER PLAN

The City adopted their previous water master plan in 2001. The previous water master plan outlined recommended improvements to the water system components including the supply, treatment, storage, and distribution systems. A number of the improvements recommended in the previous water master plan have been completed. Some of the reasons for the preparation of a new master plan at this time include the following:

- The existing Water Master Plan is now about 20 years old. The life and planning horizon for a water master planning document is 20 years, with updates typically recommended on 10 year maximum intervals.
- Construction, operation, and replacement costs for water system components have increased significantly since 2001 when some of the improvements were recommended. There have also been a number of regulatory changes that have occurred since 2001 that influence the planning effort. Therefore, it is appropriate to have a current master planning document that lists recommended improvements together with updated estimates of construction and/or implementation costs. The recommended projects and their associated cost projections can then be included in a capital improvement plan that the City can utilize to help determine if the current water rates and system development charges (SDCs) are appropriate.

1.3 AUTHORIZATION

In the fall of 2018, the City authorized Westech Engineering to begin preparation of an updated Water System Master Plan.

1.4 PURPOSE

The purpose of this plan is to provide a comprehensive evaluation of the City's water system with respect to its existing and future needs, identify improvements and associated costs necessary to meet those needs, and provide the City with a framework for the provision of water service through the year 2041.

This master plan will assist the City in planning and implementing capital improvements. This plan also provides recommendations of how to serve areas within the UGB that are currently undeveloped. The plan will benefit current and future residents of the City by improving water quality, planning for growth, and providing for scheduled improvements with an equitable distribution of improvement costs.

1.5 SCOPE OF WORK

The scope of work for this project is to update the City's previous master plan with respect to existing and future needs, identifying improvements and associated costs necessary to meet those needs, and providing the City with a planning document to guide future water system expansion. This plan accomplishes the following specific objectives:

- Establish water system design and planning criteria
- Describe existing and anticipated federal and state drinking water regulatory requirements
- Provide an inventory of the existing water system infrastructure
- Establish water demand projections based on historic and anticipated population
- Evaluate water supply quality and adequacy
- Evaluate the need for modifications to the water treatment facility
- Develop and calibrate a computerized hydraulic model of the City's water distribution system
- Evaluate the existing distribution system to determine required improvements
- Evaluate existing storage reservoirs and perform a system-wide storage analysis
- Evaluate the existing instrumentation and control system
- Develop recommendations for system-wide improvements to enhance reliability
- Develop recommendations for a prioritized Capital Improvement Plan (based on the above evaluations) to correct existing deficiencies and to serve future growth.
- Provide the City with a water system master plan that addresses the concerns of both the City and regulating agencies.

The updated water master plan can be used to develop specific recommendations to the community and City Council for action. This report does not include a wetland inventory or delineation(s), topographic or aerial surveys, on-site environmental investigations or geotechnical investigations.

1.6 PLANNING REGULATORY COMPLIANCE

1.6.1 Master Plan Requirements

The Oregon Drinking Water Services (DWS) requires community water systems with 300 or more service connections to maintain a current water master plan. This plan has been prepared to satisfy the requirements of the DWS as stipulated in OAR 333-061-0060(5).

1.6.2 Future Master Plan Updates

It should be recognized that projections into the future are subject to many variables and assumptions, some of which may prove inaccurate. Accordingly, it is recommended the City review its water system and this master plan at ten-year intervals and update the report as appropriate.

1.7 PREVIOUS STUDIES AND REPORTS

The following reports and studies were referenced in the preparation of this study:

- *Comprehensive Land Use Plan*, City of Yachats, Yachats Oregon, February, 2019
- *Comprehensive Storm Drainage Plan*, Yachats Oregon, HGE Engineers and Planners, May 1993
- *Water Master Plan*. The Dyer Partnership, Engineers and Planners, Inc. June 2001.
- *Construction Drawings, Water System Improvements*, Yachats Oregon, HGE Engineers, December 1990

CHAPTER 2

STUDY AREA AND PLANNING CONSIDERATIONS

Chapter Outline

- 2.1 Study Area
- 2.2 Study Period
- 2.3 Physical Environment
 - 2.3.1 Climate and Rainfall Patterns
 - 2.3.2 Topography
 - 2.3.3 Soils
 - 2.3.4 Water Resources
 - 2.3.5 Geologic Hazards
 - 2.3.6 Public Health Hazards
 - 2.3.7 Environmentally Sensitive Areas
- 2.4 Flora and Fauna
- 2.5 Energy Production & Consumption
- 2.6 Socio-Economic Environment
 - 2.6.1 Economic Conditions and Trends
 - 2.6.2 Population & Growth Projections
 - 2.6.3 Land Use

2.1 STUDY AREA

The City of Yachats is located near the southwest corner of Lincoln County on the Oregon Coast. The City's downtown is at the mouth of the Yachats River. Most of the city is located north of the river. Major road transportation is provided to the City by U.S. Highway 101 which runs north to south. East-west transportation to and from the Willamette Valley is either provided by Highway 126 to Eugene or Highway 34 to Corvallis. Figure 2-2 is a vicinity map that depicts these features.

Incorporated in 1967, the population within the urban growth boundary (UGB) has grown to approximately 760. The City's Comprehensive Plan was adopted in 2008 and was updated in 2019. The UGB encompasses approximately 600 acres. The City Limits and UGB encompass the same area.

Being located on the rugged Oregon Coast, Yachats has developed a relatively stable economy with a strong tourism sector. Yachats is a tourist and vacation destination with shops, restaurants, and several lodging amenities like bed & breakfasts. In the summer months, the City experiences an influx of tourist traffic and seasonal residents.

The improvements recommended in this plan are based on the development of land within the UGB, as well as the existing land use zoning for these areas. It is assumed that no significant development will occur within the study area that will require major changes to the existing zoning, and that there will be no significant expansions of the UGB within the study period. Changes in any of these assumptions could change the recommendations contained in this master plan. Should significant changes in any of the above occur, this plan should be updated accordingly.

2.2 STUDY PERIOD

Choosing a "reasonable" design period for which a utility system should be designed is a somewhat arbitrary decision. If the design period is too short, the public faces the prospect of demands exceeding capacity, requiring the system to be continually upgraded or replaced. On the other hand, choosing a design period that is too long can lead to facilities with excess capacity that may never be needed if population growth does not occur at the projected rates. Such facilities can place an economic burden on the present population and may become obsolete before being fully utilized.

The Oregon Health Authority, Drinking Water Services (DWS) has established 20 years as a proper planning period for water system improvements. This report will evaluate the anticipated water supply, treatment, distribution and storage needs for the 20 year planning period. Most waterline pipes are by their nature unsuited for incremental expansion without extensive capital outlays. For this reason, these facilities will be designed for the ultimate development of land within the UGB based on current land use designations. For other facilities such as treatment and storage facilities, a staged approach to expansion may be acceptable. The planning period used in this report ends in the year 2041.

It should be recognized that projections into the future are subject to many variables and assumptions, some of which may prove inaccurate. Accordingly, it is recommended that the City review its water system at five-year intervals and update this report at 10-year maximum intervals (or more frequently if necessary).

2.3 PHYSICAL ENVIRONMENT

2.3.1 Climate and Rainfall Patterns

Since there is no National Weather Service station in Yachats, rainfall and temperature data were examined from Newport, a coastal city 24 miles north of Yachats. While the data from this weather station is not specifically for Yachats, these values are generally believed to be representative for the immediate area around the City.

The climate in Yachats is similar to much of the Oregon coast with moderate temperatures year-round, little precipitation during summer months, and heavy precipitation between late fall and early spring. Average high temperatures range from the high 40's to mid 50's in the winter months and are in the 60's in the summer. Average low temperatures run in the mid 30's to low 40's in the winter, and are in the high 40's to low 50's in the summer. Days with a maximum temperature above 70°F occur only 20 times per year on average, and days with minimum temperatures below 32°F occur only 20 times per year on average.

The study area receives an average of approximately 68 inches of precipitation annually, with the heaviest rainfall in the winter months. Precipitation extremes are somewhat difficult to verify because rainfall records are not always complete. There are relatively complete records for Newport from 1940 through 2004. Since 1940, the wettest year for the study area was 1968 resulting in an estimated 111 inches of rainfall. The driest year was 1944 when the total rainfall in Newport was approximately 43 inches. Approximately 3/4 of the annual precipitation occurs between November 1 and April 30. July is typically the driest month with an average rainfall for the month of approximately one inch. Snow rarely falls in the area. In the 65 year historical record, snow fell once every 5 years on average. Though Yachats usually experiences high annual rainfalls, drought conditions are possible and do occur. Low stream flows resulting from drought conditions can have serious consequences for the City.

2.3.2 Topography

Yachats is located at the Yachats River estuary near the Coast Range foothills. The City's core commercial area is situated on a relatively flat area on the north side of the estuary and west of Highway 101. A similar flat area located on the south side of the estuary and west of Highway 101 includes a number of residential properties. The elevation of these areas varies between about 30 and 60 feet. Moving east from Highway 101, the ground becomes steeper as the study area progresses up the coast range foothills. The highest areas on the east side of the study area are at elevations of 500 to 600 feet. Across the entire study area, the ground generally slopes from the east to the west and several drainages cross the study area from the east to the west. The most significant of these is the Yachats River which divides the study area into areas that can be referred to as North Yachats and South Yachats.

2.3.3 Soils

The soils along the Yachats River are generally alluvial bottomland deposits that are composed of silts, sand, and gravel with some local areas of peat. The soils in the relatively flat areas of the City along Highway 101 are generally marine terrace deposits. These deposits are typically fine to medium grain friable sandstone of beach origin with thin interbeds of siltstone. The thickness of these deposits may be up to 75 feet. In upper elevations along the east side of the study area, the soils are generally rocky basaltic formations.

None of the soil types outright preclude the construction of typical water system infrastructure from a foundation stability point of view. The construction of significant structures (e.g., buildings, pump stations, storage tanks, etc.) recommended in this report will require detailed geotechnical investigations during the design phase of each project.

This discussion of soil types is based on the information included in the Soil Survey of Lincoln County, Oregon prepared by the Natural Resource Conservation Service in July 1997. This document shows the approximate location

of the soil types in the study area. The reader is referred to the Lincoln County Soil Survey for more detailed definitions and descriptions of the individual soil designations.

2.3.4 Water Resources

Only surface water resources are analyzed in this study. Due to the area's underlying geology groundwater is generally not available in quantities sufficient to supply a municipal water system. The City does not own or operate any wells at this time and few wells of significant magnitude are located within the study area.

The Oregon Department of Water Resources regulates the use of both surface and groundwater resources. The City holds certificated water rights that total 2.49 cfs from Reedy Creek and Cape Creek. The City holds an additional 4.0 cfs of permitted water rights with various conditions upon their use. More information is provided in Section 4.1.

2.3.5 Geologic Hazards

Known geologic hazards within the study area include localized steep slopes, flooding, seismic, and tsunami concerns.

2.3.5.1 Steep/ Unstable Slopes

Steep and unstable slopes are a concern for areas east of Highway 101. Steep slopes can have the potential for either mass movement or slope erosion. Mass movement results from shifting of rock or soil material in response to gravity, such as landslides and rock slides. These mass movements are often precipitated or aggravated by excessive groundwater. Slope erosion is the removal of soils or rock that occurs as a result of sheet flow, resulting in surface erosion or gully erosion. This is primarily caused by private land use practices (mainly land clearing and road construction) that can exacerbate slope erosion. In 1998, a landslide partially destroyed the City's Reedy Creek impoundment and intake structure. There may be potential for future landslides to affect the City's water intake facilities.

2.3.5.2 Flooding

The Yachats River is the primary stream within the study area. The City is located along the lower reaches of the river. The Yachats River has a streamflow pattern similar to other Coast Range streams. It is typified by high flows during the winter and low flows during the summer months.

The Federal Emergency Management Agency (FEMA) has established a 100-year floodplain designation and insurance ratings for the study area. While sometimes referred to as the "100 year flood", it is more accurate to consider it as the flood having a 1 percent chance of occurrence in any year, or a 10 percent chance of occurrence during any 10 year period.

During a FEMA defined 100-year flood, the Yachats River rises out of its normal channel creating a floodplain. The limits of this floodplain are defined by FEMA. Flood profiles and maps for the streams in and around the study area are included in the Flood Insurance Study prepared for Lincoln County and appear on Flood Insurance Rate Maps (FIRMs). It should be noted that the FEMA flood boundaries are based on flood elevations. Therefore, the actual inundation boundaries may vary due to localized topographical variations. Final determinations of whether a specific property is affected must be determined based on a topographic survey of the property in question.

A review of the existing flood boundary maps show that none of the City's existing treatment, pumping, or storage facilities are located within the 100 year floodplain boundary.

2.3.5.3 Seismic

The 2008 U.S. Geological Survey (USGS) National Seismic Hazard Maps display earthquake ground motions for various probability levels across the United States. These factors are applied in the seismic provisions of building codes, insurance rate structures, risk assessments, and other public policy. A review of these maps identifies Oregon as having a relatively high seismic risk. The Oregon Structural Specialty Code shares this assessment and has adopted similar ground motion data as the USGS. Seismic risk factors for structures are typically influenced by a combination of factors including the geographical location, specific building and structural configurations, and local soil types. The construction and rehabilitation of significant structures recommended by this report (buildings and storage reservoirs) will require detailed geotechnical reports and seismic evaluations.

In January of 2018, the State of Oregon implemented a new requirement that all water master plans for communities with more than 300 connections must include a seismic risk assessment and mitigation plan. The goal of the assessment is to identify critical infrastructure needed to supply water during an emergency resulting from a strong earthquake. The seismic risk assessment is presented in Chapter 11.

2.3.5.4 Tsunami

Undersea earthquakes can cause destructive tsunamis that strike the coast after the earthquake. The configuration of the Oregon and Washington continental shelf can produce tsunami waves that may appear to rise slowly but can build up to 30 feet or more in height as water surges inland. Tsunamis rarely come as single waves but arrive as multiple crests that may be hours apart. Often the first tsunami is not the largest or most destructive.

Oregon is vulnerable to two types of tsunamis: distant and local. Local tsunamis are generally associated with Cascadia subduction zone earthquakes. Tsunamis from distant undersea earthquakes can take place anywhere in the Pacific Rim and will take several hours to reach the Oregon coast. Because the Cascadia Subduction Zone is so close to the Oregon coast, tsunamis caused by earthquakes along this rift can strike the northern Oregon coast within 20-30 minutes of the earthquake. In many cases, the only tsunami warning will be the earthquake itself.

Since 1995, Oregon has placed restrictions on the construction of certain types of critical and essential facilities within tsunami inundation zones along the coast. In 2013, the Oregon Department of Geology and Mineral Industries (DOGAMI) published a study to define tsunami hazard and inundation zones for Yachats. This study included one inundation map each for distant and local earthquakes. Local source earthquakes (associated with the Cascadian Subduction Zone) generally present a greater threat to Oregon coast cities.

Based on the local source earthquake map and the accompanying report, the maximum tsunami run-up within the Yachats study area is 75 to 100 feet above sea level at the time of the tsunami. Similar to 100 year flood elevations, the tsunami run-up elevations are based on assumed worst case seismic events. The actual wave run-up will depend on the magnitude of the seismic event and any mitigating circumstances, such as concurrent submarine landslides. However, it is not economically feasible to design for higher magnitude events.

Tsunamis are a great concern in Yachats. Virtually all of the areas west of Highway 101 and some of the areas east of Highway 101 are within the Tsunami inundation zone. This includes most of the commercial and residential areas of the City. The City's water treatment plant and the Salmon Creek intake are located entirely within the Medium inundation zone. The storage reservoirs are all located well above the design tsunami inundation zones.

2.3.6 Public Health Hazards

Discussions with City staff have not revealed any known or documented chronic public health hazards within the study area.

2.3.7 Environmentally Sensitive Areas

The Yachats River, the estuary, the tidal areas, and the riparian areas along these waterways are considered to be environmentally sensitive. There are also likely to be other wetland areas located throughout the study area. The City has completed a local wetland inventory that identifies several wetland areas around the study area. Other wetland areas are likely to exist that are not shown on the City's wetland inventory. Most projects recommended in this plan will require some sort of wetland and environmental investigations as part of the early design work.

2.4 FLORA AND FAUNA

The vegetation in the Yachats area is typical of the Oregon coast. Forestlands lie east of the City; the Pacific Ocean lies to the west. Forestlands consist of Douglas Fir, western Hemlock, Sitka Spruce, Red Alder, and Western Red Cedar. Other plants common to the area include Pacific Rhododendron, Vine and Big Leaf Maple, Red Elderberry, Hairy Manzanita, Kinnikinnick, Salal, Salmonberry, and Sword and Bracken Fern.

The tidal zone along the Pacific Coast and the Yachats River estuary are the habitat of marine bass, rockfish, and ocean perch. Other types of marine life include clams, mussels, chitons, limpets, crab, shrimp, starfish, sea anemone, and urchins. Sea mammals living off the coast of Yachats include harbor seal and sea lions. Other mammals that are native to the region include shrew, mole, raccoon, river otter, muskrat, beaver, skunk, squirrel, and blacktail deer.

Of particular environmental interest in the area are the Steelhead, Coho, and Chinook Salmon, and other anadromous fish that can be found at various times of the year in the Yachats River. As with other coastal streams, impacts due to low water levels, over fishing, and numerous other environmental issues have resulted in dwindling salmon and steelhead populations.

Fieldwork to identify the presence of threatened and endangered species habitat in the study area is beyond the scope of this study. However, several threatened and endangered species may inhabit the study area. Therefore, detailed investigations to determine if a particular project impacts threatened and endangered species should be performed early in the design phase for each project. The one exception to this is for locations of utilities that have previously been developed.

2.5 ENERGY PRODUCTION & CONSUMPTION

Electricity is provided to the community by the Central Lincoln PUD. Natural gas service is not available in the City. There are no known power generation facilities with the City. The major energy demand in a water system is from the electric motors that drive pumps and other equipment. It is recommended that these components be specified as having high efficiency motors and variable speed controls, which will reduce the energy costs over the life of the project. Depending on the current programs in place with the electric utility, there may be rebates available if high efficiency electrical motors and variable speed controls are specified, which will tend to offset the slightly higher capital construction cost.

2.6 SOCIO-ECONOMIC ENVIRONMENT

Growth within the study area will depend on socio-economic conditions within the City. The following section contains a general discussion of economic conditions, trends, population, land use, and public facilities relating to both the study area and the City.

2.6.1 Economic Conditions and Trends

Population growth and the resultant water demands within the study area are linked to the economic conditions and trends of the City.

Yachats does not have large commercial or industrial activities that would support large numbers of employees. Yachats is mainly a residential community with small or medium size commercial/industrial enterprises that mainly serve the local and tourist populations. Some of the attributes that make the City an attractive place to live are location, environmental and air quality, City services, recreational activities, and small-town atmosphere. One of the more active areas of commerce in the City is the recreation industry. By virtue of the coastal location and proximity to popular areas of the central Oregon coast, Yachats offers good recreational opportunities. Many homes in area are vacation rentals or second homes. The City also has a high number of hotel rooms relative to the overall population. The City hosts a large number of part time residents as well as a significant tourist population during the peak tourist season. These economic conditions and trends are expected to continue through the planning period.

2.6.2 Population & Growth Projections

Based on data provided by the Portland State University Population Research Center, the population in Yachats in 2020 is about 760. Based on United States census data, the population was 533 in 1990, 617 in 2000, and 690 in 2010. Therefore, the historic data shows a steady population increase over the last 30 years. 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.

A more in-depth discussion of population projections is presented in Section 5 - Present and Future Water Demands.

2.6.3 Land Use

All of the land within the planning area is within City's UGB. The City's water sources and water treatment plant are outside the UGB. The City's Comprehensive Plan was initially adopted in 2008 and was most recently revised in 2019. The plan is available at the City's website.

A majority of land use zoning in the City is comprised of residential uses. The location of the UGB and city limits are shown in Figure 2-2. This figure also shows the land use zoning designations within the City. The total areas contained under each zoning designation are listed in Table 2-1 and illustrated in Figure 2-2.

Table 2-1| Approximate Areas by Land Use Zone

Land Use Zone	Approximate Area (Acres)
Single Family Residential (R-1)	282.9
Single Family & Duplex Residential (R-2)	31.2
Single, Duplex, Multi-family Residential (R-3)	60.5
Single, Duplex, Multi-family, & Motel (R-4)	51.2
Commercial (C-1)	20.6
Public Facilities (P-F)	9.4
State Parks (S-P) & Estuary Natural (E-N)	30.6
Total Area Inside City Limits & UGB	±486 ⁽¹⁾

Notes:

(1) Total does not include road right of ways and other similar non-zoned areas

Figure 2-1 | Ranked Land Uses

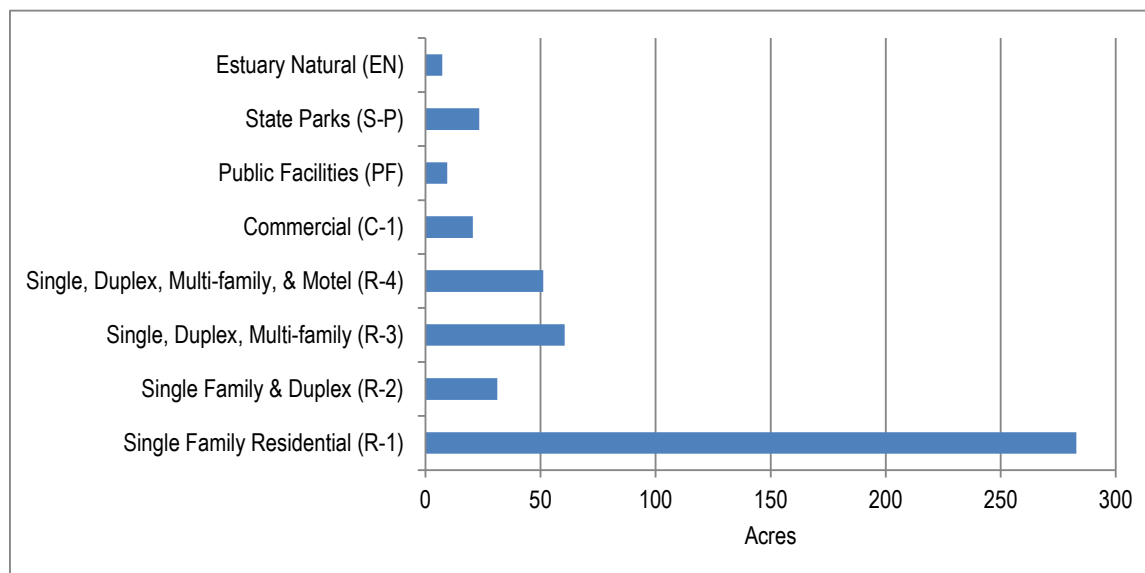


Figure 2-2] Study Area Vicinity Map

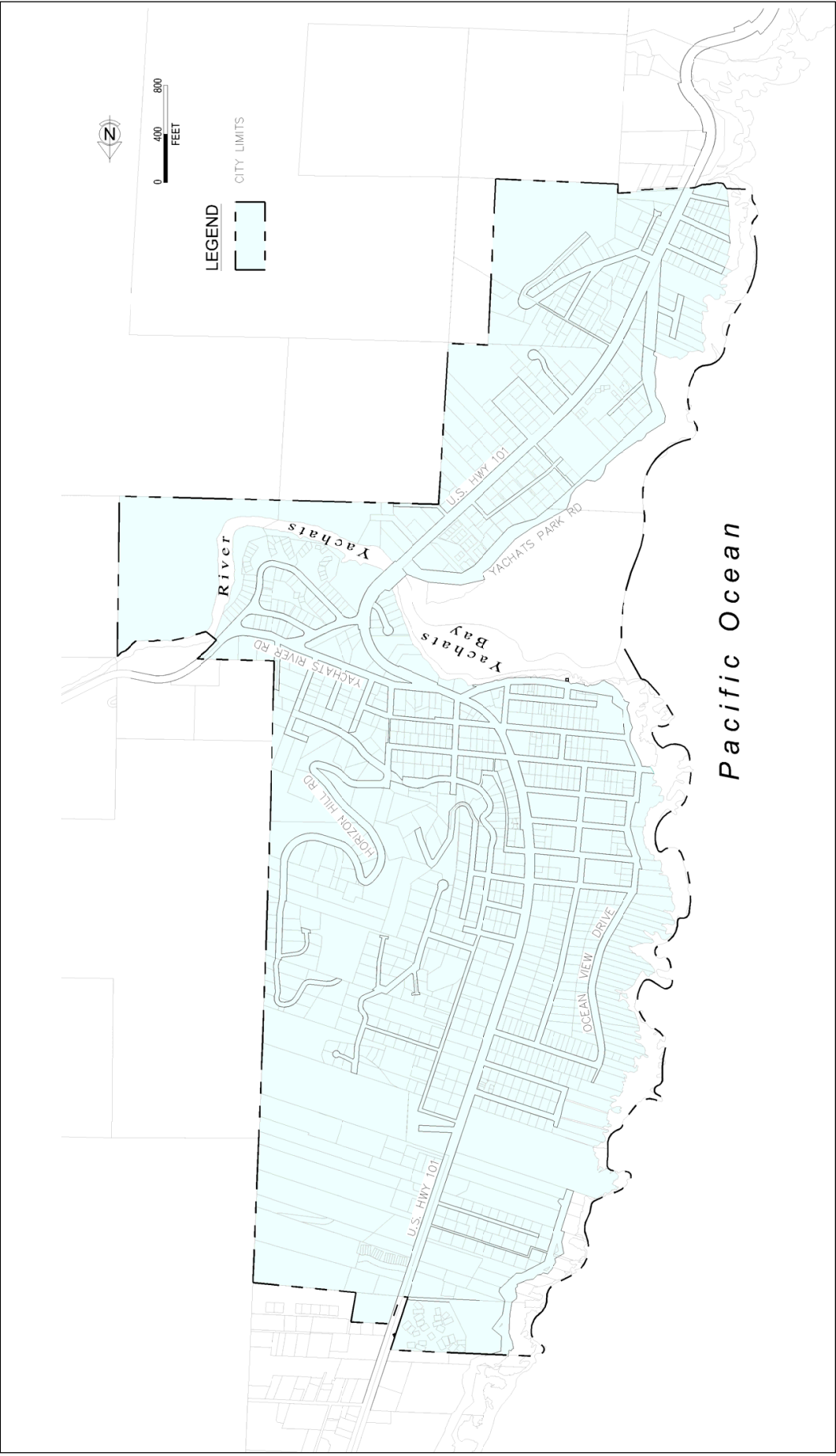
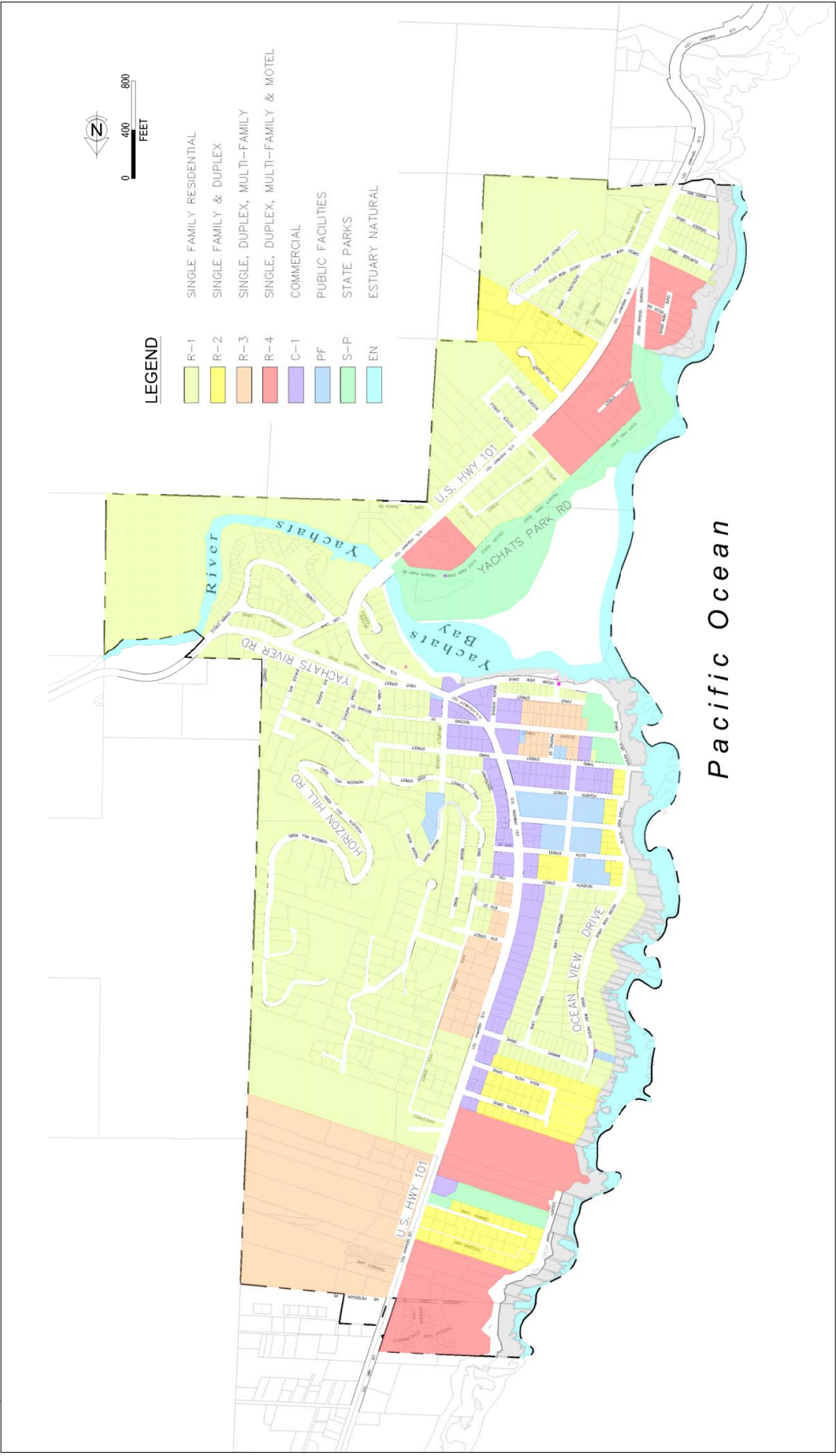


Figure 2-3 | Comprehensive Plan Designations



CHAPTER 3

REGULATORY REQUIREMENTS

Chapter Outline

- 3.1 Introduction
- 3.2 Regulating Agencies
- 3.3 Existing Water Quality Regulations
 - 3.3.1 Microbial Contaminants
 - 3.3.2 Total Coliform Rule
 - 3.3.3 Revised Total Coliform Rule
 - 3.3.4 Long Term 2 Enhanced Surface Water Treatment Rule
 - 3.3.5 Disinfectants and Disinfection Byproducts Rule
 - 3.3.6 Lead and Copper Rule
 - 3.3.7 Inorganic Contaminants
 - 3.3.8 Organic Contaminants
 - 3.3.9 Radiologic Contaminants
 - 3.3.10 Arsenic Rule
 - 3.3.11 Secondary Contaminants
 - 3.3.12 Groundwater Rule
 - 3.3.13 Filter Backwash Recycling Rule
- 3.4 Consumer Confidence Report Rule
- 3.5 Cross-Connection Control Program
- 3.6 Sanitary Survey
- 3.7 Future Water Quality Regulations
 - 3.7.1 Vulnerability Assessment
 - 3.7.2 Unregulated Contaminant Monitoring Rule
 - 3.7.3 Radon
- 3.8 Water Use Regulations (Water Rights)
- 3.9 Water Management And Conservation Plan

3.1 INTRODUCTION

This chapter provides a summary of the key regulatory requirements and standards that govern the operation of the City's water system, and which form the basis of the master planning effort. These regulations include both water quality and water use standards. This overview is for general reference only and may not include all requirements.

3.2 REGULATING AGENCIES

The State of Oregon Health Authority, Drinking Water Program (DWS) is the primary regulating agency for water quality standards related to public drinking water systems. Rules relating to public water systems are contained in the Oregon Administrative Rules (OAR 333-061).

Water rights and water use regulations are administered by the Oregon Water Resources Department (OWRD).

3.3 EXISTING WATER QUALITY REGULATIONS

Congress passed the original Title XIV of the Public Health Service Act, commonly known as the Safe Drinking Water Act (SDWA), in 1974. The SDWA and subsequent amendments are federal water quality regulations affecting all public water purveyors. Regulations under the SDWA at the federal level are promulgated by the US Environmental Protection Agency (EPA). The requirements of the SDWA and amendments are implemented by the State of Oregon under the Oregon Drinking Water Quality Act of 1981 (ORS 448 as amended). This legislation allowed the State to gain primacy for enforcing the federal rule requirements and the responsibility of maintaining and enforcing a drinking water program.

The Oregon DWS currently enforces drinking water standards for 83 primary and 16 secondary contaminants (OAR 333-061-0030/0031). Primary standards regulate contaminants that pose a serious risk to public health whereas secondary standards cover aesthetic considerations. Public water systems must sample for primary contaminants routinely to ensure that standards are met, and report results of that sampling to the regulating agency.

Primary contaminants can be grouped into the following general groups. A discussion of each will be presented in this section.

- Microbial contaminants
- Disinfectants and disinfection byproducts
- Inorganic chemicals
- Organic chemicals
- Radiologic contaminants
- Control of each contaminant is administered through a prescribed list of standards or limits that take several forms.
- *Maximum Contaminant Level Goal (MCLG)* — The level of a contaminant in drinking water below which there is no known or expected risk to health, allowing for a margin of safety. All regulated contaminants have an MCLG, although the MCLG is not enforceable.

- *Maximum Contaminant Level (MCL)* — The highest level of a contaminant allowed in drinking water, set as close to the MCLG as feasible using the best available treatment technologies.
- *Treatment Technique (TT)* — A required treatment process intended to reduce the level of a contaminant in drinking water. Contaminants for which testing or monitoring is not economically or technically feasible are regulated by the establishment of a treatment technique. Treatment techniques represent a requirement to install and operate a treatment process that has a proven efficacy for contaminant reduction. Performance standards (PS) are used to determine whether or not a water system is meeting a specific treatment technique requirement and consist of measurements of water quality parameters such as turbidity, disinfectant residual, pH, or alkalinity.
- *Action Level (AL)* — The concentration of a contaminant, which when exceeded, triggers treatment or other requirements that a water supplier must follow.

Water systems that use groundwater sources are governed by a different set of water quality regulations than those that use surface water sources. A third category of source water, regulated under the same standards as surface water, is groundwater under the direct influence of surface water (GWUDI). The DWS defines GWUDI as “any water beneath the surface of the ground with significant occurrences of insects or other macro-organisms, algae or other large-diameter pathogens such as *Giardia lamblia* or *Cryptosporidium*, or significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity or pH which closely correlate to climatological or surface water conditions”. An evaluation of surface water influence can involve geological assessments or water quality analysis, depending on the determination of the DWS. Such investigations or re-evaluations can be made at any time based on changing conditions. If sources that are determined to be potentially GWUDI cannot be upgraded to preclude surface water influence, those sources will be regulated by GWUDI water quality standards.

3.3.1 Microbial Contaminants

Pathogenic microorganisms in drinking water can be divided into three groups: bacteria, protozoa, and viruses. Pathogenic microorganisms have a number of specific properties which distinguish them from chemical contaminants; they are living organisms and are not dissolved in water, although they will coagulate or attach to colloids and solids in water.

Regulatory inactivation or removal of these three groups of microorganisms is predominantly determined by the nature of the water source. In general, municipalities using surface water or GWUDI sources are required to inactivate or remove all three sources, while those using groundwater are required to provide for inactivation of viruses.

- *Bacteria*

Coliforms are a broad class of bacteria which live in the digestive tracts of humans and many animals. Although many types of coliform bacteria are harmless, some cause gastroenteritis, a general category of health problems that includes diarrhea, cramps, nausea, and vomiting. Gastroenteritis is not usually serious for a healthy person, but can cause serious problems for people with weakened immune systems such as the very young, elderly, or immune-compromised. Outside the colon, coliforms only survive for approximately 48 hours. Common bacteriological pathogens responsible for waterborne disease include *Escherichia coli* (*E. coli*), *Legionella*, *Salmonella typhi*, *Shigella*, and *Vibrio cholerae*.

- *Protozoa*

Protozoa are single-cell organisms. They have a complex metabolism and feed on solid nutrients, algae, and bacteria present in multiple-cell organisms, such as humans and animals. To survive harsh environmental conditions, some species can secrete a protective covering and form a resting stage called a cyst, a condition that can protect some

protozoa from conventional chlorine disinfection. Common examples of parasitic protozoa are *Giardia lamblia* and *Cryptosporidium*.

- **Viruses**

Unlike bacteria and parasitic protozoa, viruses can only replicate in living host cells and are inactive for periods outside of the host organism. Due to their small size, viruses can pass through conventional filtration processes and are accordingly typically inactivated with chlorine. Common examples of waterborne viruses include hepatitis A, rotavirus and Norwalk virus.

3.3.1.1 Microbial Contaminant Regulations

Several regulations have been promulgated over the years to prevent microbial contamination of drinking water supplies. These include the Total Coliform Rule (TCR), the surface water treatment rule (SWTR), the Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR), and the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR).

3.3.2 Total Coliform Rule

Initially published in 1989 the Total Coliform Rule (TCR) applies to all public water systems and establishes health goals—in the form of maximum contaminant level goals (MCLGs), and legal limits—in the form of maximum contaminant levels (MCLs) for total coliform levels in drinking water. The goal of the TCR is to maintain microbial quality in finished and distributed drinking water supplies. Therefore, it primarily applies to the distribution system. It requires systems to sample for coliform bacteria which are used as an indicator of whether a water system is vulnerable to pathogens. Coliforms were also selected because they are easily detected in water.

In promulgating the TCR, the EPA set the maximum contaminant health goal (MCLG) for total coliforms at zero. The ODWP stipulates the total number of water samples a PWS must test each month and limits the number of “coliform-present” samples within this routine collection set. The number of routine samples is dependent on population.

The City is required to collect one (1) monthly sample. Samples must be taken from an approved set of locations throughout the distribution grid, and the number of “coliform-present” results is limited to a single sample.

If a sample tests positive for coliforms, the system must collect a set of repeat samples within 24 hours. A “coliform-present” test result on either a routine or repeat sample constitutes a non-acute violation and requires additional testing for fecal coliforms and *E. coli*. A positive result for either fecal coliform or *E. coli* constitutes an acute MCL violation. Public notification is conducted in accordance with OAR 333-061-0042, which outlines a tiered approach commensurate with the prescribed risk level of a given violation.

Compliance for the TCR is based on a monthly cycle measured on two levels: submitting the prescribed number of samples, as well as successful test results for the absence of total coliforms in a given test cycle.

For this study, the last 10 years of coliform data was reviewed. In that time, one of the samples collected by the City has been “coliform-present.” Four repeat samples were taken and reported that all were negative for coliform.

3.3.3 Revised Total Coliform Rule

The Total Coliform Rule (TCR) was initially published in 1989 and was revised in February, 2013. The Revised Total Coliform Rule (RTCR) applies to all public water systems and establishes health goals- in the form of maximum contaminant level goals (MCLGs), and legal limits- in the form of maximum contaminant levels (MCLs) for *E. coli* in drinking water. The goal of the RTCR is to maintain microbial quality in finished and distributed drinking water supplies. Therefore, it primarily applies to the distribution system. It requires systems to sample for *E. coli* bacteria which are used as an indicator of whether a water system is vulnerable to pathogens.

In promulgating the RTCR, the USEPA set the MCLG and MCL for *E. coli* at zero (0), and eliminated the MCLG and MCL of zero for total coliform, replacing it with a treatment technique for coliform that requires assessment and corrective action. *E. coli* is a more specific indicator of fecal contamination and potential harmful pathogens than total coliform (many of the organisms detected by total coliform methods are not of fecal origin and do not have any direct public health implications).

Under the newly adopted treatment technique for coliform, total coliform serves as an indicator of a potential pathway of contamination into the distribution system. A public water system that exceeds a specified frequency of total coliform occurrence must conduct an assessment to determine if any sanitary defects exist and, if found, correct them. In addition, a water system that incurs an *E. coli* MCL must conduct an assessment and correct any sanitary defects found.

3.3.3.1 Surface Water Treatment Rule

The SWTR was promulgated in 1989. It applies to all public water systems using surface water or GWUDI. Yachats utilizes surface waters. The primary purpose of the SWTR is to provide public health protection from microbial contaminants including bacteria, protozoa, and viruses. Specific provisions of the SWTR include the following.

- All systems that use surface water or GWUDI must disinfect water before discharging into the distribution system.
- All systems that use surface water or GWUDI must filter unless avoidance criteria can be met.
- All systems that use surface water or GWUDI must reliably achieve 3-log (99.9%) removal and/or inactivation of *Giardia lamblia*.
- All systems that use surface water or GWUDI must reliably achieve 4-log (99.99%) removal and/or inactivation of viruses.
- Establishes turbidity performance standards for combined filter effluent.
- Establishes a minimum disinfectant residual of 0.2 mg/L at the entry point to the distribution and requires that minimum detectable levels of disinfectant must be maintained at all locations in the distribution system.

Since it is not practical to measure concentrations of *Giardia lamblia* and viruses on a regular basis, the SWTR established performance standards to ensure the removal requirements for these contaminants are achieved. Different treatment technologies are assigned a log removal credit for *Giardia lamblia*.

For Yachats' treatment plant, a 2.5-log removal credit is granted for the conventional filtration system for removal of *Giardia lamblia*. As noted above, the SWTR requires a 3-log removal credit. Therefore, Yachats' disinfection system is operated to provide a 0.5-log removal credit to meet the total 3-log removal credit for *Giardia lamblia*.

Pathogen deactivation of a disinfectant is measured based on CT values, which is the disinfectant's concentration multiplied by the time the disinfectant is in contact with the water. The EPA published tables of minimum CT required to achieve various log removal credits. Water treatment systems like Yachats' are required to compare the CT required from the tables to the CT provided on a daily basis to ensure compliance with the SWTR. The EPA also has published tables of CT required to provide 4-log removal of viruses. The CT times for 4-log virus removal are all lower than the CT times for the 1-log removal of *Giardia lamblia*. Therefore, as long as the City operates the disinfection system to provide 1-log inactivation of *Giardia lamblia*, the 4-log virus removal requirement will also be met.

For systems like Yachats' the SWTR also required that effluent turbidity from the filters did not exceed 0.5 nephelometric turbidity unit (NTU) in 95% of the samples collected with no single result greater than 5 NTU. Stricter limitations for filter performance have been adopted as part of subsequent rules discussed below.

3.3.3.2 Long Term 1 Enhanced Surface Water Treatment Rule

The Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR) was promulgated in 2002. This rule builds on the SWTR by providing improved public health protection against *Cryptosporidium*, while addressing risk tradeoffs with disinfection by-products. The LT1ESWTR applies to systems like Yachats' that use surface water. Specific provisions of the LT1ESWTR include the following.

- Maximum contaminant level goal (MCLG) of zero for *Cryptosporidium*
- 2-log (99%) *Cryptosporidium* removal requirement for systems that use filters.
- Strengthened combined filter effluent turbidity performance standards for systems using conventional and direct filtration.
- Individual filter turbidity monitoring provisions for systems using conventional and direct filtration

Treatment plants such as Yachats' that use conventional filtration (consisting of coagulation, sedimentation, and filtration) are assumed to meet the 99% *Cryptosporidium* removal requirement as long as they comply with the LT1ESWTR turbidity requirements and existing provisions of the Surface Water Treatment Rule. A system's combined filter effluent turbidity is required to be less than 0.3 NTU in at least 95% of the samples collected with no single result greater than 1 NTU in order to provide the required 2-log inactivation of *Cryptosporidium*. The City is currently able to meet the filter effluent turbidity requirement necessary to provide 2-log inactivation of *Cryptosporidium*.

3.3.4 Long Term 2 Enhanced Surface Water Treatment Rule

The Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) builds on the provisions of the LT1ESWTR for further protection of public health against risks posed by *Cryptosporidium* and other microbial pathogens. The LT2ESWTR applies to all public water systems that use surface water and GWUDI. The goal of the LT2ESWTR is to identify high risk systems and require additional treatment to remove *Cryptosporidium* in those systems. Existing drinking water regulations established in the LT1ESWTR require water systems such as Yachats' to provide at least 2-log removal of *Cryptosporidium*. New data on *Cryptosporidium* infectivity, occurrence, and treatment indicate that the current treatment requirements are adequate for the majority of systems. However, there is a subset of systems with higher vulnerability to *Cryptosporidium* where additional treatment is necessary.

All water systems that utilize surface water or GWUDI are required to monitor the source water for *Cryptosporidium*. These water systems will be classified into one of four risk bins based on the results of the source water monitoring. The LT2ESWTR specifies a range of treatment and management strategies, collectively termed the "microbial toolbox," that systems can select from to meet any additional treatment requirements that are required as a result of their bin classification.

To reduce monitoring costs, small filtered water systems like Yachats' are first required to monitor for *E. coli*—a bacterium that is less expensive to analyze than *Cryptosporidium*. These small water systems are required to monitor for *Cryptosporidium* only if their *E. coli* results exceed specified concentration levels.

The City of Yachats completed the most recent round of *E. coli* testing in 2018. The mean *E. coli* concentration was less than 10 *E. coli*/100mL. This value is less than the trigger level of 100 *E. coli*/100 mL specified for flowing stream sources. Water systems like Yachats' that serve less than 10,000 people and do not exceed the *E. coli* trigger level are assigned a bin 1 classification. This means that Yachats does not need to monitor the source water for *Cryptosporidium* and Yachats' water source is not considered a high risk system for *Cryptosporidium*. As such, no additional treatment or management strategies are required.

3.3.5 Disinfectants and Disinfection Byproducts Rule

Disinfection of drinking water can readily be identified as one of the major public health advances of the 20th century. While disinfectants are effective in controlling many microorganisms, they react with natural organic and inorganic matter in water to form disinfection byproducts (DBPs) which have been shown to be carcinogenic in laboratory animals. While it is important to strengthen protection against microbial contaminants, it is also important to reduce the potential health risks of DBPs.

The Federal Total Trihalomethane Rule was published in the Federal Register in November 1979 and established an MCL for total trihalomethanes (TTHMs) for community water systems serving 10,000 people or more. The Stage 1 Disinfectants and Disinfection Byproducts Rule (Stage 1 DBPR) promulgated in December of 1998 built on the TTHM Rule by lowering the existing MCL and widening the range of affected systems to include all public water systems that add a disinfectant to their drinking water. The rule specifically established:

- a maximum residual disinfectant level goal (MRDLG) for chlorine at 4.0 mg/L
- a maximum residual disinfectant level (MRDL) of 4.0 mg/L for chlorine
- a total trihalomethane MCL of 80 µg/L, regulating the sum of four trihalomethanes
- a haloacetic acid (HAA5) MCL of 40 µg/L, regulating the sum of five haloacetic acids

The rule also established removal limits of total organic carbon (TOC) as a DBP precursor.

The Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR) was finalized on January 4, 2006 and applies to water systems that use groundwater, GWUDI, and surface water. The rule retains the MCLs for TTHMs and HAA5s established in the Stage 1 DBPR and augments the rule by providing more consistent protection from DBPs across the entire distribution system and by focusing on the reduction of DBP peaks.

The Stage 2 DBPR requires community water systems to conduct initial distribution system evaluations (IDSEs) to identify and select new compliance monitoring sites that more accurately reflect sites representing high TTHM and HAA5 levels. These new 'worst-case' monitoring sites are selected based on the results of the Stage 1 DBPR compliance monitoring. The rule also redefines the method of calculating MCLs. Compliance with each MCL will be based on a locational running annual average (LRAA) instead of the running annual average (RAA) method used under the Stage 1 DBPR.

3.3.5.1 Regulatory Monitoring

Community water systems can fulfill the IDSE requirements by applying for 40/30 Certification, a process whereby a community water system certifies that all individual TTHM and HAA5 monitoring results for compliance with the Stage 1 DBPR are less than or equal to 40 µg/L for TTHM and 30 µg/L for HAA5 during a prescribed 2-year period. In addition the system must not have had any Stage 1 DBPR monitoring violations for TTHM and HAA5 during the same period. At the state's discretion, a system meeting all of the requirements for 40/30 certification may still be required to conduct standard monitoring. Systems that qualify for reduced monitoring may remain on reduced monitoring as long as their quarterly LRAAs for TTHMs and HAA5 remain no more than 40 µg/L and 30 µg/L, respectively (for systems with quarterly reduced monitoring) or their TTHM and HAA5 samples are no higher than 60 µg/L and 45µg/L, respectively (for systems with annual or less frequent monitoring).

3.3.5.2 Municipal Compliance

The City currently submits samples for DBP testing from one location. TTHM and HAA5 data reported to DWS for 2003 through May 2019 have all been much less than the MCLs. At the present time, the City has been granted the

40/30 certification and is currently on reduced monitoring. There is no indication that the City will have problems complying with the current MCLs and should continue to qualify for reduced monitoring.

3.3.6 Lead and Copper Rule

Lead or copper in Oregon tap water is primarily due to corrosion of plumbing system components within buildings. Consumers commonly describe the presence of copper as metallic, bitter or rusty. The ability to detect copper in tap water is thought to be controlled by individual sensitivity; however, water chemistry also plays a part since the flavor of copper is more noticeable at lower pH levels.

The control of lead and copper concentrations in drinking water began with the Oregon lead solder ban of 1985, which prohibited the use of lead pipe and set lead content limits for plumbing solder and brass fixtures. In 1991 the EPA promulgated the Lead and Copper Rule (LCR) to further regulate lead and copper concentrations in drinking water. The LCR was uniformly adopted by Oregon on December 7, 1992 and applies to community and non-transient, non-community public water systems. The rule is unique in that compliance is measured by water sampled from the consumer's tap instead of from sampling points at the water treatment plant or within the public distribution system. Failure to meet the regulatory limits requires the water utility to implement a corrosion control treatment process designed to reduce the corrosivity of the water.

3.3.6.1 Regulatory Monitoring

The LCR establishes action levels of 15 µg/L for lead and 1.3 mg/L for copper. It also sets a secondary maximum contaminate level (SMCL) for copper at 1 mg/L. The LCR stipulates that sampling be conducted at "high-risk" homes, further defined as homes constructed prior to 1985 that utilize copper piping and lead-based solder. One-liter samples of standing water (first draw after a minimum 6-hours of non-use) are collected from homes identified in the water system sampling plan. In each round of sampling 90% of the samples must have lead levels less than or equal to the action level. The number of samples is determined by the municipal population and equates to 10 initial samples for the City's system.

Water systems that cannot meet the action levels must install corrosion control treatment, and submit water sampling data to DWS at prescribed frequencies. In the event the lead action level cannot be met with these measures in place a public education program, adjustments to the corrosion control program and follow-up sampling is required.

3.3.6.2 Municipal Compliance

Three rounds of initial sampling were required and were collected (1994, 1996 & 1998). Subsequently, seven samples were required with a reduced sample set (10 samples). To date, none of the samples collected since 1996 have shown lead or copper concentrations above the action levels. Based on the City's successful compliance with corrosion control, the sampling frequency required by DWS is every three years.

3.3.7 Inorganic Contaminants

The USEPA regulates most chemical contaminants (inorganic and organic contaminants) through the rules known as Phase I, II, IIb, and V. The agency has issued the four rules over a five-year period after gathering, updating, and analyzing information on each contaminant's presence in drinking water supplies and its health effects.

Inorganic contaminants (IOCs) most commonly originate in the source of water supply, but can also enter the water from contact with materials used for pipes, plumbing fixtures and storage tanks. For most IOCs adverse health effects result after long-term (lifetime) exposure to the compounds. Water systems in Oregon rarely violate maximum levels for inorganic contaminants from source waters, but these contaminants are routinely detected in drinking water

systems at levels more than one-half the maximum level. The most commonly detected inorganics in Oregon drinking water systems are nitrate, arsenic, nitrite, cadmium, and mercury.

The Oregon Drinking Water Act currently regulates 16 inorganic compounds (Antimony, Arsenic, Asbestos, Barium, Beryllium, Cadmium, Chromium, Cyanide, Fluoride, Mercury, Nickel, Nitrate, Nitrite, Selenium, Sodium and Thallium). Oregon law recognizes the acute health effects of nitrate, particularly for young children, and accordingly requires more stringent testing for nitrate.

3.3.7.1 Regulatory Monitoring

Since 2002, the City has regularly tested for IOC's, including Antimony, Arsenic, Asbestos, Barium, Beryllium, Cadmium, Chromium, Cyanide, Fluoride, Mercury, Nickel, Nitrate, Nitrite, Selenium, Sodium, and Thallium. The Monitoring for IOC's is conventionally required once every three years and yearly for Nitrate. All of these test results were either no constituent detected or were well below the MCL. The City has qualified for a 9-year reduced monitoring cycle for IOC's with the exception of nitrate which is required annually.

3.3.7.2 Municipal Compliance

This City's water sources do periodically test positive for Nitrates, but the concentrations are well below the MCL. The City last tested for all other inorganic contaminants in 2011 and all resulted in "Not Detected". As such, the City is in compliance for IOC testing. Based on the City's compliance history, the sampling frequency required by DWS will likely remain once every nine years and there is no reason to suspect future compliance issues.

3.3.8 Organic Contaminants

Current drinking water standards regulate a total of 56 organic contaminants frequently classified into two sub-groups, Volatile Organic Chemicals (VOCs) and Synthetic Organic Chemicals (SOCs). Organic contaminants are man-made chemicals and commonly include industrial and commercial solvents and chemicals as well as herbicides and pesticides used in agriculture and landscaping.

3.3.8.1 Regulatory Monitoring

Public water systems are required to test for each contaminant from each water source during every 3-year compliance period. Public water systems with a population greater than 3,300 must test twice during each three-year compliance period for SOC's (this is not expected to apply to Yachats in the planning period). Public water systems using surface water or GWUDI must test for VOC's at the entry point annually. Quarterly follow up testing is required for any contaminants that are detected. The exceptions are dioxin and acrylamide/epichlorohydrin. Only those systems determined by DWS to be at risk of contamination must monitor for dioxin. Sampling may be reduced to a 6-year cycle if the system has a certified Drinking Water Protection Plan. Systems that cannot meet the MCL's must install or modify treatment systems or develop alternate sources.

3.3.8.2 Municipal Compliance

Yachats currently tests for SOC's and VOC's regularly. SOC and VOC data since January 2003 was reviewed for this study. During this time all results were either "not detected" or below MCL's.

3.3.9 Radiologic Contaminants

The purpose of this rule is to limit exposure to radioactive contaminants in drinking water. Most drinking water sources have very low levels of radioactive contaminants, most of which are naturally occurring as trace elements in rocks and soils. Most radioactive contaminants are at levels that are low enough to not be considered a public health concern. At higher levels, long-term exposure to radionuclides in drinking water may cause cancer. Radon, another decay product of radioactive material, is regulated independently under the Radon Rule later in this chapter.

3.3.9.1 Regulatory Monitoring

Initial testing required by this rule began in 2005 and required all public water systems to test each source quarterly for one year, with test results required for gross alpha, radium-226/228 and uranium.

3.3.9.2 Municipal Compliance

All radiologic test results have been in compliance. Based on this history, there is no reason to suspect that radiologic contaminants will become a problem in the future.

3.3.10 Arsenic Rule

On January 22, 2001 EPA adopted a new standard for arsenic in drinking water at 10 micrograms per liter ($\mu\text{g/L}$ or ppb), replacing the old standard of 50 $\mu\text{g/L}$. Oregon adopted the rule and the new limit went into effect on October 21, 2004.

Arsenic is a naturally occurring chemical found in the earth's crust, but can be dangerous to humans when released into drinking water supplies as rocks, minerals, and soils erode. Studies have linked long-term exposure to arsenic contamination with cancer and cardiovascular, pulmonary, immunological, neurological, and endocrine effects.

3.3.10.1 Regulatory Monitoring

Systems with surface water sources must sample annually whereas systems with groundwater sources sample every three years. Water systems that exceed the MCL must monitor quarterly and meet the MCL as a running annual average. Public water systems that cannot meet the MCL must either install water treatment systems or develop alternate sources of water.

3.3.10.2 Municipal Compliance

The City has tested for Arsenic regularly since 1986. Only in 1991 did the City detect Arsenic. This result in 1991 was below the MCL. Since 1992, the City has not detected any arsenic in any of the samples collected. Therefore, all arsenic test results have been in compliance. Based on this history, there is no reason to suspect that arsenic will become a problem in the future.

3.3.11 Secondary Contaminants

The EPA has established National Secondary Drinking Water Regulations that set non-mandatory secondary maximum contaminant level (SMCL) water quality standards for 15 contaminants. The EPA does not enforce these SMCLs as they are not considered to present a risk to human health at the listed levels. They are established only as guidelines to assist public water systems in managing their drinking water for aesthetic considerations. Table 3-1 lists these contaminants.

Table 3-1| Secondary Maximum Contaminant Levels

Contaminant	Secondary MCL	Noticeable Effects above the Secondary SMCL
Aluminum	0.05 – 2.0 mg/L	Colored water
Chloride	250 mg/L	Salty taste
Color	15 color units	Visible tint
Copper	1.0 mg/L	Metallic taste, blue-green staining
Corrosivity	Non-corrosive	Metallic taste, corroded pipes/fixture staining
Fluoride	2.0 mg/L	Tooth discoloration
Foaming Agents	0.5 mg/L	Frothy, cloudy, bitter taste, odor
Iron	0.3 mg/L	Rusty color; sediment, metallic taste, reddish or orange staining
Manganese	0.05 mg/L	Black to brown color, black staining, bitter metallic taste
Odor	3 TON ⁽¹⁾	Musty, “rotten-egg” or chemical smell
pH	6.5 – 8.5	Low pH: bitter metallic taste, corrosion High pH: slippery feel, soda taste, deposits
Silver	0.1 mg/L	Skin discoloration, graying of the white part of the eye
Sulfate	250 mg/L	Salty taste
Total Dissolved Solids	500 mg/L	Hardness, deposits, colored water, staining, salty taste
Zinc	5 mg/L	Metallic taste

¹ Threshold Odor Number

3.3.11.1 Regulatory Monitoring

Secondary maximum contaminant levels are non-mandatory regulations and therefore do not have a monitoring requirement.

3.3.12 Groundwater Rule

The City of Yachats does not source any of their water from groundwater. The following sections on the Groundwater Rule are included for reference.

On November 8, 2006 the USEPA promulgated the final Ground Water Rule (GWR) to reduce the risk of exposure to fecal contamination that may be present in public water systems that use groundwater sources. The GWR builds upon the Total Coliform Rule (TCR) and addresses bacterial and viral contamination at the source, as a complimentary approach to the distribution monitoring currently required by the TCR.

The GWR establishes a risk-targeted approach to identify groundwater systems that are susceptible to fecal contamination. Indications of risk may come from total coliform monitoring, hydrogeologic sensitivity analyses, or other system-specific data and information. The GWR specifically targets viral pathogens as a category of fecal contaminants.

The rule applies to all public water systems served by groundwater sources that are not treated to Surface Water Treatment Rule (SWTR) standards. Although federal guidance on key aspects of the rule is still in development it is clear that GWR implementation will be state-specific. Oregon has adopted the regulations and received interim primacy for the SWTR until full primacy is approved by EPA.

3.3.12.1 Regulatory Monitoring

For systems that elect to achieve 4-log (99.99%) inactivation of viruses by disinfection for all sources, compliance monitoring is required to ensure the reliability of the treatment process (i.e., compliance monitoring includes continuous monitoring of chlorine residual at the entry point to distribution system). This 4-log virus inactivation disinfection requirement is based on CT values between the water source(s) and the first water user. The concept of “CT” is used to verify the level of treatment or inactivation. CT is achieved by providing enough time for chlorine to inactivate potentially harmful organisms in drinking water before it is consumed. CT represents an abbreviation of chlorine Concentration (measured at the first user of the drinking water) multiplied by the contact Time (the water’s time of travel between the point of chlorine addition to the first user). The CT required for 4-log inactivation of viruses depends on the water temperature and the free chlorine residual concentration in the water. In general, the colder the water temperature (or the higher the pH), the less effective chlorine inactivation is, and greater the CT values that are required (i.e., longer contact time for a given chlorine concentration).

For systems that do not achieve 4-log (99.99%) inactivation of viruses by disinfection for all sources, the following requirements of the GWR apply:

- Triggered source water monitoring (effective December 1, 2009)
- Hydrogeologic sensitivity assessments for aquifers
- Assessment monitoring for all sources

The triggered source water monitoring provisions of the GWR are more detailed than any other provision of the final rule and can only be avoided by providing the required 4-log virus inactivation and/or removal prior the first customer.

For a groundwater system without 4-log virus treatment, a single positive routine Total Coliform Rule (TCR) compliance sample will initiate triggered monitoring. A single source water sample must be taken within 24 hours from each groundwater source in production at the time of the positive TCR sample. Testing is performed to detect the presence of *Escherichia coli* (*E.coli*). Systems with an initial positive source water sample must take five more source water samples. The rule anticipates the use of 100-mL samples from wells or springs. The switch from the current requirement of fecal coliform testing after identifying a total coliform sample to *E.coli* testing has been made because *E. coli* is currently understood to be a better indicator of the presence of pathogens.

A hydrogeologic sensitivity assessment (HSA) may be required for all groundwater systems that do not provide 4-log virus inactivation/removal. However, the rule does not require that the HSA provision be used on any system’s supply, nor does it specify what approach states should use to identify systems that should be targeted for HSAs. The GWR is not explicit on the consequences of an HSA that finds a source to be sensitive, but draft guidance reads, “*Source water assessment monitoring is recommended as necessary and wells located in sensitive aquifers should be targeted for assessment monitoring using a hydrogeologic sensitivity assessment*”.

Assessment monitoring occurs at the state’s discretion. The GWR suggests that assessment monitoring should include 12 groundwater source samples that represent each month the system provides groundwater to the public. The consequences of a positive sample from assessment monitoring are not specified in the GWR. There appears to be latitude for the state to determine that any positive sample obtained during assessment monitoring triggers the treatment technique provisions.

Under the existing Total Coliform Rule (TCR) sanitary surveys are to be performed on a 5-year interval. The GWR sanitary survey requirement has been structured to provide more frequent and complete sanitary surveys with more stringent penalties for non-compliance. Surveys are to be performed every 3-years with some discretion granted for water systems that have consistently demonstrated outstanding performance. Failure to correct deficiencies and

comply with the required corrective action plan or schedule will result in a treatment technique violation for the water system. States are required to conduct these surveys and identify significant deficiencies requiring corrective action by December 31, 2012 for community water systems with less than 4 log inactivation/removal and by December 31, 2014 for community water systems with 4-log inactivation/removal.

3.3.12.2 Municipal Compliance

As described in greater detail in Chapter 4, the City does not own wells nor are there plans to develop wells in the future. Therefore, as long as the City does not develop and use wells, they are exempt from the GWR.

3.3.13 Filter Backwash Recycling Rule

The Filter Backwash Recycling Rule (FBRR) was published in the Federal Register on April 10, 2000 and was adopted by the State of Oregon in June of 2004. The FBRR complements existing surface water and GWUDI treatment rules by reducing the potential for microbial pathogens, particularly *Cryptosporidium* oocysts, to pass through the filters into the finished water. The FBRR requires all recycled waste streams (e.g., spent filter backwash, thickener supernatant, or liquids from dewatering processes) to be returned to the head of the plant and passed through the entire treatment process, unless properly disposed of otherwise.

3.4 CONSUMER CONFIDENCE REPORT RULE

The EPA published the Consumer Confidence Report Rule in the Federal Register on August 19, 1998. The CCR Rule requires community water systems to provide an annual report to their customers detailing information on water quality delivered by the system and documenting water quality monitoring results.

The report must be distributed by July 1 of each year, must contain an explanation of data collected during or prior to the previous calendar year, and must provide the telephone number of the owner, operator or designee of the community water system as a source of additional information concerning the report. This information is typically sent out with water bills; however, systems must make a good faith effort to reach consumers who do not get water bills (typically renters). Water systems must certify to the DWS that the CCR was sent to customers and that the information it contained was correct and consistent with the compliance monitoring data previously submitted to the DWS. Complete details of the rule requirements can be found in OAR 333-061-0043.

The City provides its users with annual Consumer Confidence Reports.

3.5 CROSS-CONNECTION CONTROL PROGRAM

Plumbing cross-connections, defined as actual or potential connections between a potable and non-potable water supply, constitute a serious health hazard. There are numerous well documented cases where cross-connections have been responsible for the contamination of drinking water and have resulted in poisonings or the spread of disease.

Oregon Administrative Rules 333-061-0070 through 0074 detail the requirements for a cross-connection control program. The City is required to establish a cross-connection ordinance and must submit an annual report to OHA-DWS. Systems with more than 300 service connections are required to provide a certified tester.

The City's cross-connection control standards are contained in Chapter 8.12- Cross-Connections of the Yachats Municipal Code. The City currently employs one certified cross connection control specialist who is responsible for inspecting new devices and installations, monitoring annual inspections, terminating water service in cases of non-compliance and submitting the annual inspection report to DWS.

At the time of this writing, the City is preparing the annual cross connection summary report to be submitted to OHA-DWS. This is explained in more detail in the following section.

3.6 SANITARY SURVEY

The DWS conducts a sanitary survey of each public water system on a regular basis. Sanitary surveys are a critical component of the State's drinking water regulatory program. Under Oregon statute, sanitary survey is *"an on-site review of the source, facilities, equipment, operation and maintenance of a water system, including related land uses, for the purpose of evaluating the capability of that water system to produce and distribute safe drinking water."*

The sanitary survey (conducted by DWS or contract County health department staff) results in a report that includes, as a minimum, *"the following components of a water system: source of supply; treatment; distribution system; finished water storage; pumps, pump facilities and controls; monitoring, reporting and data verification; system management and operations; and operator certification compliance."* The sanitary survey report identifies any significant deficiency prescribed in OAR 333-061-0076, or any violation of drinking water regulations, discovered during the on-site visit.

Public water systems must have completed corrective action of any significant deficiencies within 120 days of receiving written notice, or be in compliance with a DWS approved "corrective action plan" within 120 days of receiving written notice of a significant deficiency.

The most recent sanitary survey for Yachats was completed September 30, 2020. The survey identified three deficiencies. A corrective action plan was submitted to OHA to correct the deficiencies, dated December 21, 2020.

One deficiency related to providing documentation that chlorine used at the water treatment plant is NSF certified. The City provided OHA with this documentation. This deficiency is understood to be resolved at this time.

The two other deficiencies related to the City's backflow prevention and cross-connection control program. The City has responded to these deficiencies by making improvements to the administration of the program and improving record keeping. At this time, the City is completing the required procedures and record keeping for this program within the time frame stated in the corrective action plan.

3.7 FUTURE WATER QUALITY REGULATIONS

The following include both existing regulations which may not apply to the City at present, but which it may become subject to in the future, as well as anticipated future rules that are currently in the regulatory pipeline.

The EPA is required to review existing national primary drinking water regulations every six years in order to identify current health risk assessments, changes in technology, and other factors that provide a health or technological basis to support regulatory revisions to maintain or improve public health protection.

3.7.1 Vulnerability Assessment

This is an existing regulation that the City may become subject to in the future. The events of Sept. 11, 2001, reinforced the need to enhance the security of the United States. Congress responded by passing the Public Health Security and Bioterrorism Preparedness and Response Act of 2002 (the Bioterrorism Act), which was signed into law June 12, 2002. The Act amends the Safe Drinking Water Act, requires every community water system that serves a population greater than 3,300 persons to conduct a vulnerability assessment, and specifies actions that community water systems and the USEPA must take to improve the security of the nation's drinking water infrastructure.

Complete details of the requirements for Oregon water systems can be found in OAR 333-061-0064.

The City will likely never reach the population threshold that triggers this rule, especially within the planning period.

3.7.2 Unregulated Contaminant Monitoring Rule

This is an existing regulation that the City may become subject to in the future, if the population limits in the rule are modified, or if the DWS decides to include the City in this program. The Unregulated Contaminant Monitoring Rule (UCMR) is used to collect data for contaminants suspected to be present in drinking water, but that do not have health-based standards set under the Safe Drinking Water Act. The UCMR is closely coordinated with EPA's Contaminant Candidate List. The EPA uses both of these programs to identify drinking water contaminants that are not currently regulated in order to identify future health risks and problems with drinking water.

To date, the program has been implemented in three stages, UCM Rounds 1 & 2, UCMR1 and UCMR2 on a 5-year cycle. The first stage was managed by the state primacy agencies and consisted of screening and assessment monitoring tests. The UCMR1 promulgated on September 17, 1999 utilized a tiered monitoring approach that required all large public water systems and a nationally representative sample of small public water systems serving less than 10,000 people to monitor for selected sets of contaminants. The UCMR2 promulgated on January 4, 2007, is being managed by the EPA and requires monitoring for a new set of unregulated contaminants. To date, the City has not been required to collect data for the UCMR, but may be required to in the future.

3.7.3 Radon

This is an anticipated new regulation. Radon is a naturally occurring gas formed from the decay of uranium-238. Radon in drinking water can contribute to indoor air radon levels from washing and showering. Inhalation or ingestion of radon can result in lung or stomach cancer. The USEPA has proposed preliminary guidelines for the regulation of radon; however, the final form of the rule has yet to be promulgated.

We are not aware of radon testing performed to date on any of the City source water. Since the City's primary water source is surface water and radon readily volatilizes from turbulent waters, it is very unlikely that radon exists in the City's water system.

3.8 WATER USE REGULATIONS (WATER RIGHTS)

The Oregon Water Resources Department (OWRD) regulates the use of both surface and groundwater throughout the state of Oregon. On February 24, 1909, the State of Oregon enacted the Water Rights Act, a comprehensive surface water code. This act made "prior appropriation" the sole method of acquiring water rights in Oregon. The system is basically one of first come, first served. Each water right includes a priority date. Prior appropriation utilizes the priority date of a water right to establish the order in which water rights are satisfied in times of shortage. A senior water right is entitled to full delivery of all water under their right before any junior rights are served. Oregon adopted a parallel groundwater code on August 3, 1955. Together, these codes establish a regulatory scheme under which the OWRD exercises jurisdiction over the right to use the State's waters.

In Oregon, all water is publicly owned. Landowners with water flowing past or under their property do not automatically have the right to divert the water without a permit. Over the years as greater demands are placed on limited water resources, OWRD has been exercising greater control over this water use. Water rights have long been used to control the withdrawal of surface or ground water for municipal or agricultural use. Water rights are issued only for beneficial use, without waste. Each water right includes a designated type of "use" and is limited to that purpose. General categories of beneficial use include, but are not limited to irrigation, municipal, industrial, commercial and domestic. Since 1987, the law has specifically included instream flow protection as a beneficial use. A water right holder is entitled to use as much water as is necessary, up to the maximum amount shown on the water

right, to accomplish the stated beneficial use. Water rights issued after the adoption of the 1955 groundwater code are issued in two stages: the issuance of an initial water right *permit*, and upon full development, the issuance of a final water right *certificate*.

The first stage is a water right permit, which serves as the initial authorization for a water user to develop the source and begin making beneficial use of the water. The permit typically describes the source, the source location, the priority date, the amount of water that can be used, and documents any water use conditions. Water right permits were typically issued for a five year period. If the water use had not been developed to the full intended extent within the five-year period, an extension could be requested. In evaluating extension requests, the OWRD considers whether or not the applicant has shown diligence in the development of the water right. Failure to develop a permitted source during the permit period could subject the permit to cancellation by the State.

Until several years ago, permit extensions were routinely granted by the OWRD, largely because there was little or no opposition to the extension requests. In the early 1990s, however, in the face of new Endangered Species Listings and growing attention by environmental groups, the State Attorney General advised the OWRD that the past practice of routine permit extensions was not legally sufficient. As a result, the OWRD made substantial changes to the permit extension process. The new rules require a more extensive analysis of the level of diligence shown by the permit holder in developing the water right, as well as consideration of other competing needs for the water. The process also includes a careful review of potential impacts on listed species, or flows necessary for Scenic Waterway purposes. If a permit extension is approved, new conditions may be added to address public interest concerns raised during the review process.

In 2005, House Bill 3038 was passed by the Oregon legislature. The Bill gives municipal water developers 20 years to develop their water rights and validates old extensions. Development of the water rights must proceed with a reasonable level of diligence. However, OWRD may order or allow an extension of time to complete construction or to perfect a water right beyond the time specified in the permit under the following conditions.

- If the holder shows good cause and if other governmental requirements relating to the project have significantly delayed completion of construction or perfection of a water right;
- The extension of time is conditioned to provide that the municipality may divert water beyond the maximum rate diverted for beneficial use before the extension only upon approval by OWRD of a water management and conservation plan; and
- For the first extension issued after the effective date of the Bill but prior to November 2, 1998, undeveloped portions of the permit is required to maintain the fish listed as sensitive, threatened or endangered, within the waterway affected by the permit.

The second stage involves the issuance of a water right certificate, issued after the source is fully developed and put to use. At such time a Certificate of Beneficial Use (COBU), prepared and submitted by the permit holder, is filed with OWRD. Approval of this document results in the issuance of a water right certificate. Once issued, the final certificate serves as evidence of a fully vested water right. At this stage the water right is treated as a property right held by the water user. A certificated right remains valid indefinitely unless it is unused for a period of five or more years, in which case the user may forfeit the water right. The forfeiture process is not automatic. Oregon law has historically protected municipal water supplies by preventing forfeiture for non-use.

3.9 WATER MANAGEMENT AND CONSERVATION PLAN

In addition to regulating water rights, the OWRD has regulatory authority over Water Management and Conservation Plans (WMCP) for public water systems. A WMCP is a plan developed by a water supplier that describes the water

system and its needs, identifies its sources of water, and explains how the water supplier will manage and conserve those supplies to meet present and future needs. The requirement for completing such plans is tied to the revised rules surrounding water right permit extensions as described under OAR 690-315. These rules call for all suppliers serving over 1,000 people to complete a WMCP in association with water permit extensions. OAR 690-086 details the requirements of WMCPs.

A current WMCP for the City of Yachats is being produced in conjunction with this Master Plan. Once completed, State statutes require WMCP's be updated at 5-year intervals. To assist the City's planning efforts for this expense, a recurring program is listed in the recommended capital improvement plan presented in Chapter 12 (Pgm-3). The recommended annual budget for this program is \$5,000 per year. It is envisioned that the City will save these funds on an annual basis (similar to a reserve) in order to prepare the required WMCP updates at 5-year interval.

CHAPTER 4

EXISTING WATER SYSTEM

Chapter Outline

- 4.1 Introduction
- 4.2 Water System Flow Schematic & Maps
- 4.1 Water Supply
- 4.2 Raw Water Storage
- 4.3 Water Treatment
- 4.4 Water Storage
- 4.5 Pump Stations
- 4.6 Distribution System
- 4.7 SCADA & Telemetry System
- 4.8 Existing Water System Funding Mechanisms

4.1 INTRODUCTION

The City of Yachats owns and operates the public drinking water system that serves the entire municipal population. The City also has an interconnection with the Southwest Lincoln County Water People's Utility District (SWLCWPUD), which is intended to supply the Yachats distribution system during a water shortage. The City currently sources water from Reedy Creek and Salmon Creek, which are tributaries to the Yachats River. The City also has water rights to the Yachats River and Cape Creek. The City does not have any groundwater sources.

The City operates multiple pressure zones to supply water to users. The City's system is classified as a "community" water system and has been assigned Public Water System (PWS) Identification Number OR41 00966 by DWS and EPA.

This chapter provides an inventory of the existing water system components, including sources of supply, water treatment, distribution system, storage reservoirs, and instrumentation & control. The evaluation of these specific systems and the specific recommendations for improvements are contained in subsequent chapters.

4.2 WATER SYSTEM FLOW SCHEMATIC & MAPS

A schematic representation of the major water system components is presented in Figure 4-2. Detailed maps of the distribution system are included in Appendix A.

4.1 WATER SUPPLY

Yachats has water rights to Reedy Creek, Salmon Creek, Yachats River, and Cape Creek. Reedy Creek is the primary, year-around, source. Salmon Creek is used as a secondary supply only when flows in Reedy Creek are not adequate to supply the City's demands. Cape Creek and the Yachats River are currently held in reserve as future water sources. The following subsections provide additional details on each source.

4.1.1 Current Water Rights

Table 4-1 is a summary of current water rights held by the City of Yachats.

Table 4-1 | Water Rights Summary (listed by priority date)

Source Name	Priority Date	Permit Rate cfs (gpm)	Appl #	Pemit #	Cert. #	Authorized Completion Date	Comments
Reedy Creek	7/9/1945	2.0 (898)	S-20951	S-17333	22933	-	City's primary water source
Salmon Creek	8/22/1963 for 1.0 cfs 6/26/1963 for 1.0 cfs	2.0 (898)	S-38383	S-29018	-	10/1/1997	Limited to making up a deficiency in supply from Certificate 22933 (Reedy Creek)
Cape Creek	7/31/1934	0.49 (220)	S-15440	S-11586	14104	-	Currently held in reserve
Yachats River	3/20/1989	2.0 ⁽¹⁾ (898)	S-69856	S-53471	-	10/1/2043	Permit Amendment T-7967 changed the point of diversion of POD 1. Currently held in reserve

¹ 1.0 cfs of the 2.0 cfs is not subject to the instream water right Certificate 59608 or minimum stream flows with a date of priority of March 26, 1974, measured at the point of diversion from the source.

4.1.2 Reedy Creek Water Supply

Yachats has a certificated water right to divert 2.0 cfs (1.3 mgd) from Reedy Creek. Figure 4-1 shows the Reedy Creek intake, which is approximately one-half mile upstream from the Yachats River. The City originally built an intake and impoundment at this location in the 1940s. The original impoundment and intake was destroyed in a landslide in 1998. The intake was reconstructed, but the impoundment was not. The intake consists of an infiltration gallery with 10" perforated pipe under four feet of gravel within the streambed. This structure acts to pre-filter the raw water. An undesirable effect of this is that the intake accumulates sediment that impedes capacity. Public works has to annually remove sediment as a part of their regular maintenance activities.



Figure 4-1 | Reedy Creek Intake

Raw water is conveyed by an asbestos concrete (AC) pipe from the header approximately 1,500 feet. Water is then conveyed by a high-density polyethylene (HDPE) pipe approximately 6,900 feet by gravity to the raw water storage tank. Based on discussions with operations staff, the City is maximizing the amount of water that can be removed from Reedy Creek during the dry weather months. Therefore, Reedy Creek is unlikely to be able to provide additional water on a year around basis to meet increased demands due to growth in the City.

Figure 4-2| Existing Water System Flow Schematic

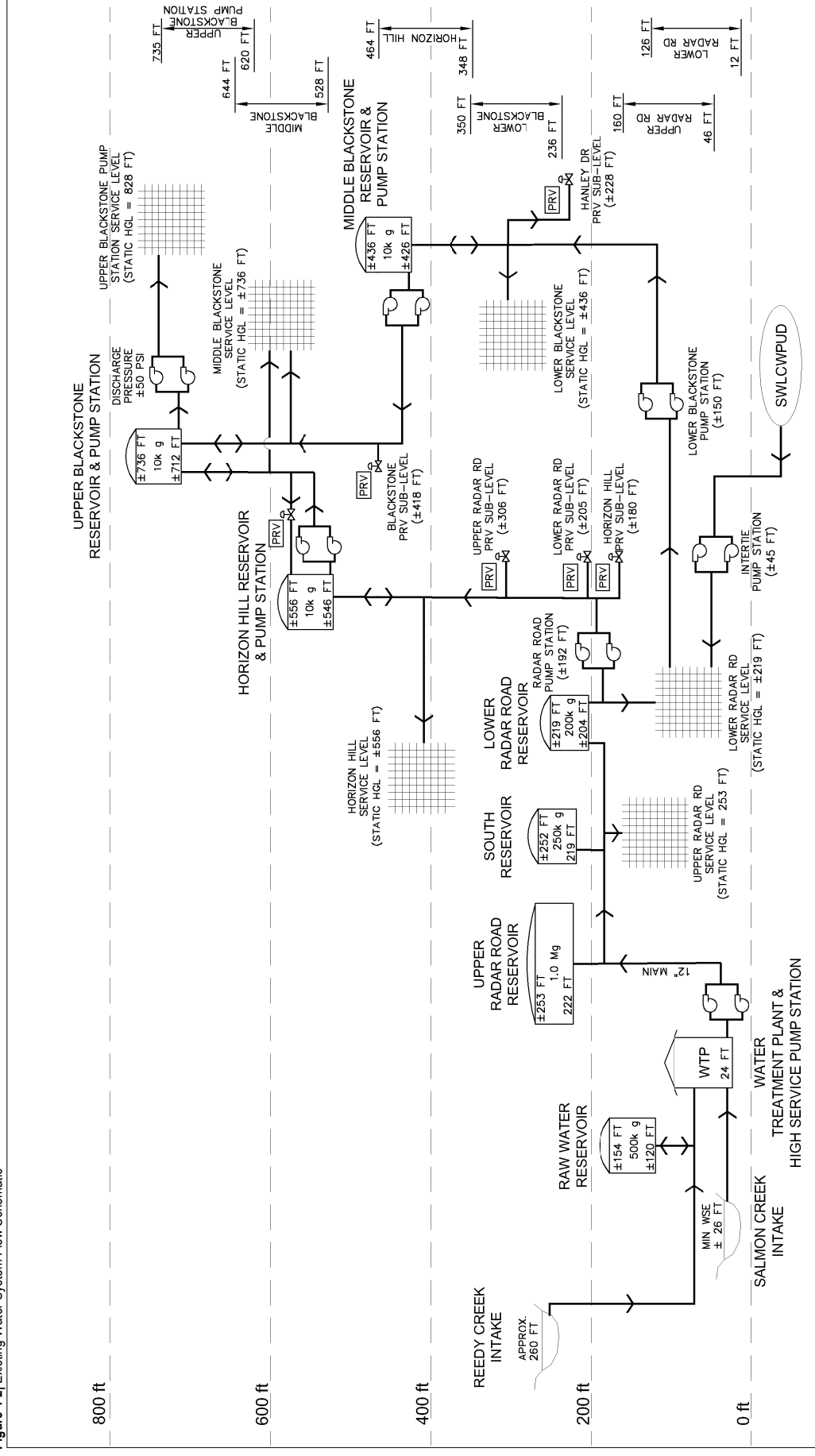
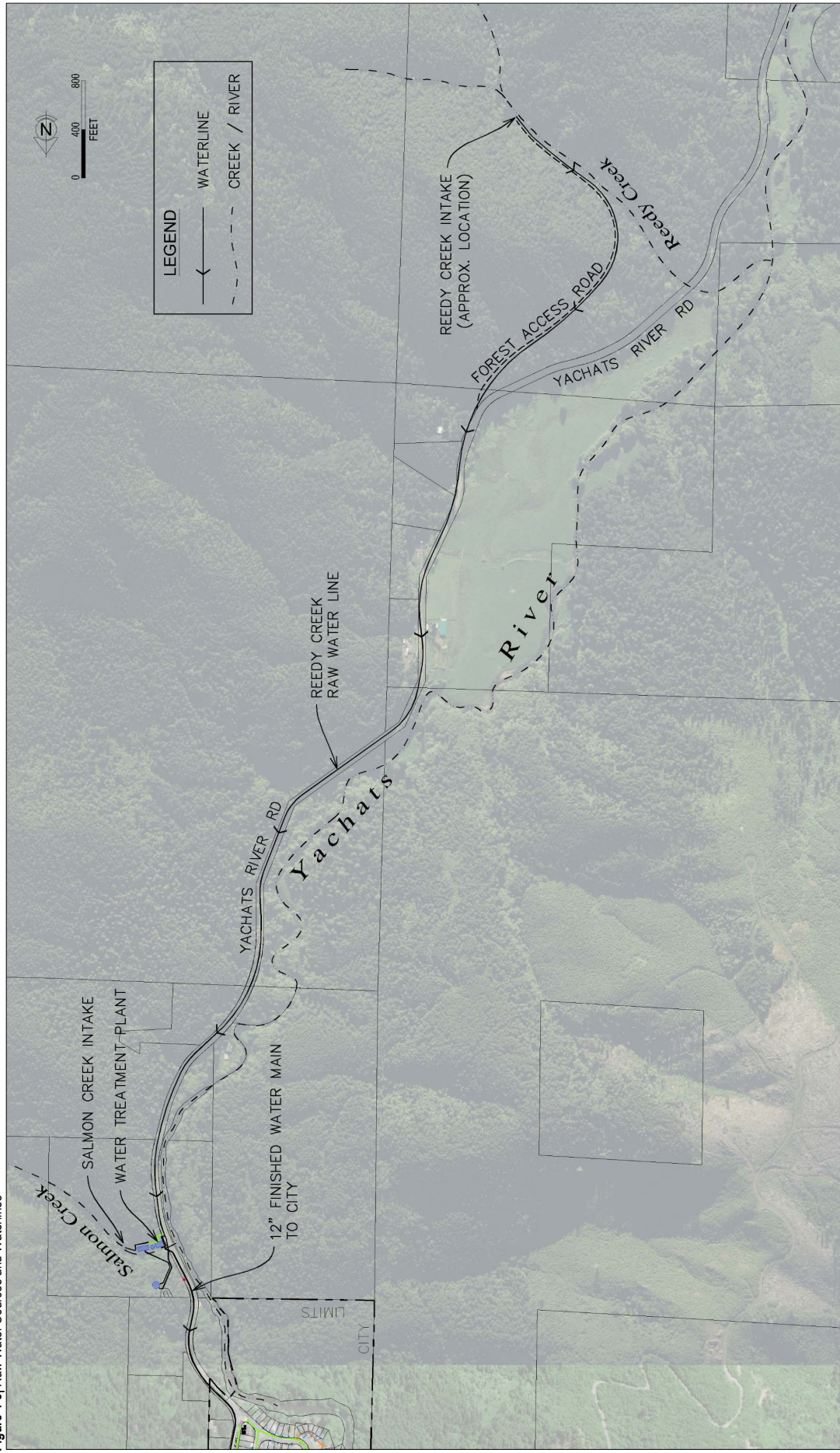


Figure 4-3] Raw Water Sources and Waterlines



4.1.3 Salmon Creek Water Supply

Yachats has a water right permit to divert 2.0 cfs (1.3 mgd) from Salmon Creek. The permit has not been certificated and work needs to be done to improve the position of this water right. The recommended work is discussed in Chapter 6. The City's intake on Salmon Creek is about 100 yards from the treatment plant, which is shown in Figure 4-4. The intake lies within an impoundment and consists of an 18" slotted stainless steel intake pipe. Water flows by gravity from the intake to the treatment plant through a six-inch diameter PVC pipe. Based on discussions with the



Figure 4-4| Salmon Creek Intake

operations staff, the City is maximizing the amount of water that can be removed from Salmon Creek during the dry weather months. Therefore, Salmon Creek is unlikely to be able to provide additional water to meet increased demands due to growth in the City.

4.1.4 Cape Creek Water Supply

Cape Creek in the Cape Perpetua area is approximately 2 miles south of the City's UGB. Cape Creek was historically the City's water source, but has not been used for many years. The City has a certificated water right to Cape Creek for 0.49 cfs (219 gpm). No infrastructure exists for this water source. In September 2020, Westech Engineering measured the stream flow rate of Cape Creek at 0.39 cfs (170 gpm). At that time, the area had received a rain storm. It is expected that the minimum stream flow is less than the measured flow rate during the summer months. Cape Creek is a potential long-term source for the City. However, due to the distance from the City, the development costs are likely to be high and amount of water available during dry weather conditions is likely to be low when water demands are highest.

4.1.5 Yachats River Water Supply

The City currently holds 2.0 cfs of water rights from the Yachats River. However, the rights are severely limited by several conditions. The City cannot use 1.0 cfs of these rights during low streamflow conditions because the rights are junior to instream rights owned by the State of Oregon. During dry weather conditions, the flow in the Yachats River routinely decreases below values listed in the in-stream rights. Therefore, the 1.0 cfs that is junior to the in-stream rights is not a reliable source during the dry weather months. The remaining 1.0 cfs of the City's water rights are not subject to the in-stream rights. However, the City is only allowed to access these rights when population growth results in demands that exceed the City's other water sources and only if water losses in the distribution system are below 15%. Finally, the 1.0 cfs of water rights that is not subject to the in-stream rights is divided into two points of diversion. One point of diversion is located near the water treatment plant and the maximum rate of withdrawal from this point is 0.5 cfs. The water at this location is brackish and not suitable for treatment using the City's existing plant. The second point of diversion is located a significant distance upstream where the water is fresh, but the maximum withdrawal rate from this point is limited to 0.5 cfs. Therefore, of the 2 cfs of total water rights, only the 0.5 cfs that can be diverted from the upstream point of diversion is reliably available. The remaining 0.5 cfs of the portion of the water right that is not subject to the instream rights must be diverted from a location with

brackish water which would require a very significant change to the treatment plant. The remaining 1.0 cfs that is junior to the instream rights is only available during the winter and higher flow periods in the spring, summer, fall.

4.1.6 Intertie Between City of Yachats and The Southwest Lincoln County Water People's Utility District

Yachats has a water system intertie with the Southwest Lincoln County Water People's Utility District (SWLCWPUD). The City operates the intertie under an agreement with the SWLCWPUD. The City could not provide the agreement for this planning effort, but the authors of this report understand that the intertie can only be used for emergency purposes. The intertie is not intended to be used on a regular basis as supplemental water source. As such, the intertie is not a source that the City can rely on to address increase demands due to growth during the planning period. The intertie has a pump station with control building and underground vaults with piping (Figure 4-5).



Due to the differences in the hydraulic grade lines, this connection can be used to convey water by gravity from Yachats to the SWLCWPUD. The intertie also includes a pump station that can be used to deliver water south from the District to the City of Yachats.

The pump station and intertie piping are described in more detail in section 4.5.7.

Figure 4-5 | Intertie Pump Station Building on Highway 101

4.2 RAW WATER STORAGE

In 2000, the City constructed a 500,000 gallon raw water storage reservoir. The reservoir is constructed of cor-ten, welded steel. The tank does not have seismic anchors. The tank is 35 feet high and 50 feet in diameter. The high water level is 34-1/2 feet above the base. Figure 4-6 shows the raw water storage tank.

The reservoir was constructed to allow the treatment plant to operate at a more consistent rate during the summer months. Low stream flows previously caused the plant to operate less efficiently. The storage reservoir is drawn down while the plant operates during low flows. When the treatment plant is producing less water than is supplied by Reedy Creek, the reservoir refills.

The City regularly removes sediment that accumulates in the bottom of the tank.



Figure 4-6 | Raw Water Storage Tank

4.3 WATER TREATMENT

In 1992, the existing water treatment plant (WTP) was put in service. The plant's rated capacity is 0.5 mgd (350 gpm). The plant consists of 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. The original plant was built in 1992 and has been operating consistently in its original configuration ever since.

Raw water is primarily diverted at the Reedy Creek intake, which is then conveyed by gravity to the raw water storage tank near the WTP. Raw water from the storage tank flows by gravity to the clarifier. The WTP also receives raw water by gravity from Salmon Creek. Raw water from Salmon Creek is pumped to the clarifier.

Aluminum sulfate (Alum) as a coagulant and polymer as a filtration aid are added at the clarifier. The clarifier is a single chamber with baffles to separate reaction and clarification, which is shown in Figure 4-7. The clarifier is 35-feet in diameter with walls that are 14-feet, 6 inches tall and 1-foot thick. The clarifier's volume is approximately 104,000 gallons. Coagulants and filtration aids are introduced to the reaction well in the center of the clarifier. A turbine shaft rotates rakes, blades, and a sludge cone scraper. The floor of the clarifier is sloped to collect sludge in a sump. Precipitate is removed from the sump through a 6" desludge line, which drains to the backwash pond. The desludge effluent is controlled by a flow control valve located in a vault. Clarified water is taken off the top of the clarifier water column and is conveyed to the filters by gravity through a 10 inch ductile iron pipe.



Figure 4-7 | Clarifier

The plant is equipped with two mixed media filters. Figure 4-8 shows one of the filters. Each filter includes filter media, backwash supply and waste lines, a rotary surface washer, and 12" stainless steel underdrain header with 3" PVC underdrain laterals. Mixed media in each filter includes layers of anthracite coal, sand, and gravel. The filter



Figure 4-8 | Mixed-media Filters

units are approximately 12 feet long, 12 feet wide, and 8 feet 7 inches deep. The media filtration area is 12-feet by 12-feet and approximately 144 square feet per unit.

Chlorine is used to disinfect the filtered water. Sodium hypochlorite is dosed to the clearwell. Sodium hypochlorite is delivered to the plant in 50-gallon drums and a chemical metering pump is used for dosing.

The City previously used on-site generation to produce chlorine, but the system is in need of repairs and is not currently being used.

The sodium hypochlorite solution is added to the filtered water which passes into the clearwell located below the treatment plant floor. The clearwell's working volume between the floor and the high water level is approximately 41,000 gallons. Baffle walls result in a longer flow path and contact time.

Water is pumped from the clearwell into the City's distribution system by two vertical turbine high service pumps, (Figure 4-9). These are described in more detail in the following section on pump stations.

At the present time, the City is able to reliably operate the plant at approximately 475,000 gallons per day or about 330 gpm on average. The treatment plant is rated for a filtering capacity of 350 gpm (500,000 gallons per day).

The clarifier and filters were originally designed for a maximum capacity of 1.0 mgd (700 gpm).



Figure 4-9 | High Service Pumps

The existing filters are backwashed using backwash pumps that pump water from the clearwell to each filter. Backwash water as well as the filter to waste water is discharged to a backwash pond. The plant was originally designed to recycle backwash water from the pond. However, this system has not been used for many years. The City is currently working on a project to restore the backwash recycling system. This system is expected to be operational early in the planning period.

Design criteria for the WTP are presented in Table 4-2. The treatment plant has served the City well over the years and has been well maintained. However, many components of the plant are more than 25 years old and will likely reach the end of their useful life during the planning period. Examples include the electrical control systems and some of the mechanical equipment. A more thorough evaluation of the treatment plant is presented in Chapter 7.

Table 4-2| Water Treatment Design Criteria (Based on Site Visits and City Records)

Reedy Creek Raw Water Intake	
Intake Structure	Infiltration gallery, 10" perforated pipe under gravel
Estimated Minimum Stream Flow Rate	120 gpm
Type of Conveyance	Gravity
Salmon Creek Raw Water Intake & Pumps	
Intake Structure	18" Slotted stainless steel pipe
Estimated Minimum Stream Flow Rate	60 gpm
Type of Conveyance	Pumped
Pump Location	Water Treatment Plant
Type	Centrifugal end-suction
Number	2
Size & Speed	7.5 hp, 480 V, 3 phase
Rated Discharge Rate	±200 gpm
Water Treatment Plant	
Finished Floor Elevation	21 ft
Plant Type	Custom mixed media filtration with chemical coagulation and upflow clarification
Operational Capacity	500,000 gallons per day (347 gpm)
Number of Clarifiers	1
Number of Filter Units	2
Clarifier Area/Filter Area per Unit	±120 ft ² (10 ft x 12 ft)
Total Clearwell Volume	45,000 gallons
pH adjustment	Dry soda ash feed system with manual soda ash mixing (6% solution strength) and chemical metering pump
Coagulant Feed	Alum (Aluminum sulfate) feed system with chemical metering pump
Polymer Feed	Liquid fed directly with chemical metering pump
Filter Aid	Powder, manual mixed with water, chemical metering pump for solution feed
Disinfection System	
Disinfectant	12.5% Sodium hypochlorite solution delivered in 55 gal drums
Feed Solution Strength	Diluted to 1% for feeding with chemical metering pump
Disinfectant Storage Capacity	Two 160 gallon tanks
Contact Chambers	Clearwell 41,000 gallons

4.4 WATER STORAGE

Water storage reservoirs provide at least four important functions as follows:

- They provide a supply of water to draw upon during short-term peak system consumption.
- They provide a reserve supply of water to meet fire demands.
- They allow water sources to be taken out of service for repairs or maintenance.
- They help in keeping system pressures reasonably constant.

The City presently has six finished water storage reservoirs for a combined storage capacity of 1,590,000 gallons. Table 4-3 provides a summary of the City's storage reservoirs.

4.4.1 Upper Radar Road Reservoir

The Upper Radar Road Reservoir is located on the east side of Radar Road about 400 feet from the road's dead end. It was built in 1992 at the same time as the water treatment plant. This reservoir is the primary water storage structure in the City's water system. All water from the water treatment plant is directed to this reservoir; as a result, it is the source of water for the other reservoirs and pump stations. The water level in the reservoir determines the pressure provided to a large number of users in Yachats.



Figure 4-10 | Upper Radar Road Reservoir

The reservoir is the largest in the City and has a storage volume of 1.0 million gallons. A large portion of the storage volume is underground. The reservoir is primarily a rectangular reinforced-concrete cast-in-place structure. The roof is supported by precast concrete columns with cast-in place concrete beams. It has a metal roof with timber framing. The site has a perimeter chain-link fence and gate.

The reservoir has a maximum water surface elevation of 253.5 feet and a floor elevation of roughly 222 feet. The design overflow elevation is 254 feet. The structure is approximately 124 feet long and 49 feet wide. The maximum interior height is 38 feet. The minimum interior height is 16 feet.

The reservoir's level is monitored by the City's SCADA system and operators. The water treatment plant is controlled by plant operators as needed to maintain the water level in the tank.

Since the tank was constructed several decades ago, it is unlikely that it was designed to withstand seismic forces included in current building codes. As such, the City may want to consider a seismic retrofit project during the planning period. Specific recommendations for the tank are described in Chapter 9.

4.4.2 Lower Radar Road Reservoir

The Lower Radar Road Reservoir is located approximately 120 feet away from the Upper Radar Road Reservoir and about 50 feet lower in elevation. The structure was built in 1945. This reservoir provides water primarily to the northern part of the City.

Water flows by gravity from the Upper Radar Road Reservoir to the Lower Radar Road Reservoir through a 12-inch diameter pipe. A float valve located on the tank inlet line automatically closes when the Lower Radar Road Reservoir is full.



Figure 4-11 | Lower Radar Road Reservoir

A large number of users in the northern part of town are served by this reservoir. The water level in the reservoir controls the overall pressure in this zone of town. The reservoir delivers water directly to the Radar Road Pump Station and to the Lower Blackstone Pump Station. The reservoir's level is monitored by the City's SCADA system and operators.

The tank is a circular concrete cast-in-place structure that lies mostly below grade, as shown in Figure 4-11. The roof is aluminum and timber-framed. The site has a perimeter chain-link fence and gate.

The outer diameter of the reservoir is 50 feet. Assuming the walls are one-foot thick, the reservoir's normal water depth is estimated to be 14.75 feet. The reservoir's maximum water surface elevation is approximately 219 feet, assuming one-half feet of freeboard. The floor elevation is estimated to be 204 feet.

The tank was constructed in the 1940s. Therefore, it is unlikely that it was designed to withstand seismic forces included in current building codes. As such, a seismic retrofit project or complete replacement will likely be needed at some point. Due to the overall age of the tank, the City should consider complete replacement during the planning period. Specific recommendations for the tank are described in Chapter 9.

4.4.3 Horizon Hill Reservoir

The Horizon Hill Reservoir has a storage volume of 10,000 gallons and was built in 1964. The reservoir is located on Horizon Hill Road approximately one-half mile up the hill from Spruce Avenue. The reservoir is a rectangular reinforced-concrete cast-in-place structure. The structure is approximately 14 feet long, 14 feet wide, and 11 feet tall.

A pump station is located adjacent to the reservoir in a concrete masonry unit building. The pump station draws water directly from the concrete reservoir.



Figure 4-12 | 10,000 Gallon Horizon Hill Reservoir & Pump Station

Water is delivered to the reservoir primarily from the Radar Road Pump Station. A float valve maintains a maximum water level in the reservoir at all times. Water can also be delivered to the reservoir from the Upper Blackstone Reservoir; an altitude valve is used on this inlet to maintain a maximum water level in the reservoir without overflowing the reservoir. The reservoir's level is monitored by the City's SCADA system and operators.

Since the tank was constructed several decades ago, it is unlikely that it was designed to withstand seismic forces included in current building codes. Overall, the Horizon Hill Reservoir and Pump Station are old facilities that will likely reach the end of their useful life in the coming years. These facilities are relatively small and could be maintained for the duration of the planning period from the City's existing operation and maintenance budgets. However, at some point, maintenance costs will increase to the point that replacement with modern facilities becomes a better option. The choice to maintain these facilities versus replacing them will ultimately come down to a management decision by the City. The recommended improvements described in Chapter 8 and Chapter 9 describe a complete replacement project. But, the City certainly has the option to continue maintaining the existing facilities and deferring replacement to the next planning period.

4.4.4 South Reservoir

The South Reservoir is located in the southern part of town at the end of Crestview Drive. It was constructed in 2018. The tank primarily serves users that are south of the Yachats River. The structure's storage volume is 250,000 gallons.

The reservoir's level is maintained by the level in the Upper Radar Road Reservoir. The reservoir's base and maximum water surface elevation are roughly 2 feet lower than the Upper Radar Road tank. As such, a valve on the inlet is used to prevent the tank from overflowing. The reservoir's level is monitored by the City's SCADA system and operators.

The tank is a bolted steel construction with a glass-fused coating system. It has a designed maximum water surface elevation of 252 feet and an overflow level of 252.83. The nominal base elevation is 219 feet. The structure is 36 feet in diameter and has walls approximately 37 feet tall. Figure 4-13 shows the reservoir. The site has a perimeter chain-link fence and gate.

Since the tank is relatively new, it was likely designed in accordance with current seismic codes and should serve the City well for the remainder of the planning period. The tank outlet is equipped with a control valve that is designed to close when the water level in the tank drops to about five feet. The City is in the process of installing a seismic monitor and solenoid control system that will close the control valve any time there is a seismic event. The purpose of this system is to prevent the tank from draining completely if a seismic event causes a major waterline rupture in the downstream distribution piping. This system should be installed early in the planning period.



Figure 4-13 | 250,000 Gallon South Reservoir

4.4.5 Middle Blackstone Reservoir

The Middle Blackstone Reservoir was constructed in 2007. It is located adjacent to a utility access road between Gimlet Lane and Horizon Hill Road. Figure 4-14 shows the reservoir and pump station.

The reservoir's levels are maintained by the Lower Blackstone Pump Station based on water level readings. Telemetry allows the two facilities to communicate. The reservoir's level is monitored by the City's SCADA system and operators.

The reservoir has a storage volume of approximately 10,000 gallons. The structure is 10 feet in diameter and has walls that are 18 feet tall. The base elevation is approximately 426 feet. The reservoir has a maximum water surface elevation of approximately 443.

The reservoir is a welded stainless-steel construction and is installed on a concrete slab. Anchor bolts secure the reservoir to the concrete slab. Overall the reservoir appears to be in good condition and should serve the City well for the remainder of the planning period.



Figure 4-14 | 10,000 Gallon Middle Blackstone Reservoir & Pump Station

4.4.6 Upper Blackstone Reservoir

The Upper Blackstone Reservoir was constructed in 2007 as a part of the Blackstone development and is located at the top of Horizon Hill Drive. The reservoir is a cast in place concrete structure.

The structure is 31.5 feet in diameter and is 25 tall from the base to the rim. The reservoir has an estimated storage volume of 120,000 gallons, assuming the walls & roof are one-foot thick and 6 inches of free board inside the structure. The floor elevation is approximately 712 feet. It has an estimated maximum water surface elevation of 736 feet. Figure 4-15 shows the reservoir and adjacent pump station.



Figure 4-15 | 120,000 Gallon Upper Blackstone Reservoir and Pump Station

The Middle Blackstone Pump Station and the Horizon Hill Pump Station are used to maintain the reservoir's water levels. The reservoir control system calls for water automatically from the Middle Blackstone Pump Station based on level readings. The Horizon Hill Pump Station is monitored remotely and operated manually to fill the reservoir. The reservoir's level is monitored by the City's SCADA system and operators. There is no telemetry between the Horizon Hill Pump Station and the Upper Blackstone Reservoir.

The reservoir was constructed relatively recently and appears to be in good overall condition. Therefore, it should serve the City well for the remainder of the planning period.

Table 4-3 | Existing Reservoir Inventory¹

<i>Reservoir Name</i>	<i>Nearest Street Address</i>	<i>Year Constructed</i>	<i>Storage Volume (gallons)</i>	<i>Approximate Floor Elevation (ft)</i>	<i>Approximate Max. Water Surface Elevation (ft)</i>	<i>Primary Material</i>
Upper Radar Road	628 Radar Rd.	1992	1,000,000	222	253.5	Cast-in place concrete
Lower Radar Road	395 Radar Rd.	1945	200,000	204 ²	219 ²	Cast-in place concrete
Horizon Hill	841 Horizon Hill Rd	1964	10,000 ⁴	546 ²	556 ^{2,4}	Cast-in place concrete
South	125 Crestview Dr.	2018	250,000	219.0	252.8	Bolted-steel
Middle Blackstone	1040 Hanley Dr.	2007 ³	10,000 ⁴	426 ²	443 ^{2,4}	Welded stainless steel
Upper Blackstone	1000 Horizon Hill Rd.	2007 ³	120,000 ⁴	712 ²	736 ^{2,4}	Cast-in place concrete
TOTAL	-	-	1,590,000	-	-	-

¹ Reservoir inventory only includes reservoirs used for finished water, ie. raw water storage is not included in the total reservoir volume.

² Value based on elevations referenced from OR State DOGAMI LiDAR data.

³ Estimated year of construction

⁴ Estimated from field measurements.

4.5 PUMP STATIONS

The City has several pump stations which serve to move water to the various water service levels in the distribution system. Table 4-4 contains a summary of some of the important characteristics of each of the pump stations. A more detailed description of each of the stations is presented in the following sections.

4.5.1 Water Treatment Plant

Once water is finished being treated at the plant, high service pumps lift the water from the clearwell and deliver it to the Upper Radar Road Reservoir. These two 20 horsepower vertical turbine pumps are located on the floor of the water treatment plant (Figure 4-9). These pumps are fitted with air vents, check valves, and isolation valves. These pumps sit on concrete equipment pads. The pumps discharge from the plant to a 12-inch water main that runs from the plant in to town.

The pumps nominal capacity is approximately 350 gallons per minute at an estimated 250 feet of total dynamic head. The pumps are controlled with the plant's main control panel and operate at a constant speed.

Based on conversations with Public Works staff, the performance of these pumps has substantially diminished since they were installed, even with regular repair and maintenance. As such, they have reached the end of their useful life and will need to be replaced during the planning period in order to provide adequate flow rate and pressure. The recommended improvements are discussed on Chapter 7.

4.5.2 Radar Road Pump Station

The Radar Road Pump Station is located near the Lower Radar Road Reservoir. The pump station consists of a masonry building. The building has a concrete foundation and floor. This building houses the pump station's pumps, piping, and power & control equipment. The pump station does not have a fence. According to operators, the City's water facilities have been tampered with in the past. It is recommended that a fence be installed around the pump station for added security.

The pump station pumps water from the Lower Radar Road Reservoir to the Horizon Hill Road Reservoir. Water is delivered to the pump station via an 8-inch pipe and discharges from the pump station via an 8-inch pipe.



Figure 4-16 | Radar Road Pump Station

The station operates two pumps alternately under normal circumstances. These are Berkeley vertical multistage pumps. The pumps are installed in steel equipment stands anchored to the floor. The pumps are 7.5 and 8 horsepower. The nameplates on the pumps indicate that the pumps nominal capacity is 53 gallons per minute at 450 feet (194 psi) of total dynamic head.

The pumps draw suction from the Lower Radar Road tank with a maximum water surface elevation of about 219 feet. The pumps are used to maintain water levels in the Horizon Hill Reservoir at an elevation of roughly 556 feet. The static head between the pump suction and discharge is about 337 feet which is a relatively high head application.

The pump station piping has isolation gate valves on the inlet and discharge sides of each pump. There is a check valve on the discharge pipe common to both pumps.

The pumps are controlled with a control panel in an on/off fashion at a constant speed. The pump station has equipment for monitoring the reservoir level in the Horizon Hill Reservoir. Pumps are turned on and off in order to maintain water levels in the reservoir. The status of pumps can be monitored with the City's SCADA system.

Overall, the Radar Road Pump Station is an old facility that will likely reach the end of its useful life in the coming years. The station is relatively small and could be maintained for the duration of the planning period from the City's existing operation and maintenance budget. However, at some point, maintenance costs will increase to the point that replacement with modern facilities becomes a better option. The choice to maintain the pump station versus replacing it will ultimately come down to a management decision by the City. The recommended improvements described in Chapter 8 describe a complete replacement project. But, the City certainly has the option to continue maintaining the station and deferring replacement to the next planning period.

4.5.3 Horizon Hill Pump Station

The Horizon Hill Pump Station is located on Horizon Hill Road approximately one-half mile up the hill from Spruce Avenue. The pump station building is adjacent to the reservoir, as shown in Figure 4-17.

The pump station draws water from the Horizon Hill Reservoir. The pump station boosts water up Horizon Hill Road to the Upper Blackstone Reservoir. The pump station and its pumps were originally designed to be a "dead-end" or booster pump station that only served to increase pressure to users above the pump station. The pressure set point was 100 psi. The pump station is no longer operated in this fashion.



Figure 4-17 | Horizon Hill Pump Station

The mainline from the Horizon Hill Pump Station was connected to the Upper Blackstone Reservoir as a part of the Blackstone Development. The pump station is now operated manually to maintain levels in the Upper Blackstone Reservoir. City operators can remotely monitor the levels in the reservoir and run the pumps accordingly. Based on conversations with City operators, the pumps struggle to completely fill the reservoir indicating that they are somewhat undersized.

Water is delivered to and discharged from the pump station via 4-inch piping. The pump station has piping that allows the Horizon Hill Reservoir to be filled from the Upper Blackstone Reservoir. A pressure reducing valve is used to lower the pressure coming in to the tank. A float valve in the tank prevents the tank from overflowing.

The pumps, discharge piping, and controls are housed in concrete masonry unit building. The room is accessed from a roll up door. Overall, the building appears to be in fair condition.

The pump station has two 15-horsepower centrifugal pumps. A pressure tank is in the building that is no longer in use. The nominal capacity of the pumps is estimated to be approximately 160 gpm at 240 feet of head.

The pumps are controlled manually in an on/off fashion. They do not have provisions for controlling pump speed. The status of pumps can be monitored with the City's SCADA system.

As described above (Section 4.4.3), the Horizon Hill Reservoir and Pump Station are old facilities that will likely reach the end of their useful life in the coming years. These facilities are relatively small and could be maintained for the duration of the planning period from the City's existing operation and maintenance budgets. However, at some point, maintenance costs will increase to the point that replacement with modern facilities becomes a better option. The choice to maintain these facilities versus replacing them will ultimately come down to a management decision by the City. The recommended improvements described in Chapter 8 and Chapter 9 describe a complete replacement project. But, the City certainly has the option to continue maintaining the existing facilities and deferring replacement to the next planning period.

4.5.4 Lower Blackstone Pump Station

The Lower Blackstone Pump Station is located on the north side of Windsong Street about 275 feet uphill from King Street. The pump station was constructed as a part of the Blackstone development. The pump station pumps water from the Lower Radar Road Zone to the Middle Blackstone Reservoir. The City's Water Service Levels are described in detail in section 4.6.2. The inlet and outlet of the pump station are 8-inch pipes.

The pumps are housed in a prefabricated and insulated shelter with aluminum sheet exterior. The pumps and piping are attached to a steel stand, which is anchored to a concrete equipment pad.



Figure 4-18 | Lower Blackstone Pump Station

The pump station has a metal shelter with a roll up door. The pump station has a dedicated electrical transformer. These structures are shown in Figure 4-18.

The shelter used to house the pumps is not well suited to the Oregon coast environment and the needs of City operators. The station is accessed from removable panels instead of doors. These factors make it difficult for staff to conduct regular checks, maintenance, and repairs. The pumps in the shelter are heavy and are not easily moved in and out of the shelter. Additionally, the shelters do not entirely prevent weather and insects from intruding. The floor inside the shelter is continuously wet during the rainy season, because the slab does not shed water away and is not weather-proof. Despite the effort of operators, insect colonies have occupied and compromised the insulation. Moisture regularly entering the shelter is putting undue wear on electrical equipment, which is shortening its operating life. Additionally the shelter does not have a heater or thermostat. These are necessary during freezing temperatures to prevent failure and undue wear on the equipment.

The City may want to consider replacing the shelter during the planning period. It is recommended that it be replaced with a prefabricated fiberglass or wood framed structure. The pump station does not have a fence. According to operators, the City's water facilities have been tampered with in the past. It is recommended that a fence be installed around the pump station for added security. It is envisioned that the installation of a new shelter and fence will be

funded through the City's existing operation and maintenance budget. Therefore, a specific capital improvement project to address these issues is not described in this plan.

The pump station has two 20 horsepower vertical multistage Goulds pumps. Their nominal capacity is estimated to be approximately 210 gallons per minute at 250 feet of head. They are fitted with check valves, isolation valves, a pressure tank and pressure gauges. The piping and steel equipment stand appears to be coated in the field with a thin layer of spray paint. The paint on the stand is peeling, allowing the stand and pipe supports to rust.

The pumps are controlled with variable frequency drives, which allows their speed to be adjusted. They are controlled based on water level readings in the Middle Blackstone Tank and are integrated with the City's SCADA system.

4.5.5 Middle Blackstone Pump Station

The Middle Blackstone Pump Station is located on Gimlet Lane approximately 1,000 feet up the hill from the intersection of Gimlet Lane and Hanley Drive. The pump station site is accessed from a utility access road. The station pumps water from the Middle Blackstone Reservoir and boosts it uphill to the Upper Blackstone Reservoir and Pump Station. Water is delivered to the Middle Blackstone Pump Station via a 6-inch pipe.

The shelter is the same type of construction as the Lower and Upper Blackstone Pump Stations. Pumps are housed in a prefabricated and insulated shelter with aluminum sheet exterior. The shelter is anchored to a concrete pad. The station is shown in Figure 4-19.



Figure 4-19 | Middle Blackstone Pump Station & Reservoir

As previously discussed, these shelters are not well suited to the Oregon coast environment and the needs of City operators. As shown in the Figure, the shelter is not tall enough to walk in to and to stand inside. Also, the station is accessed from removable panels instead of doors. These factors make it difficult for staff to conduct regular checks, maintenance, and repairs. The pumps in the shelter are heavy and are not easily moved in and out of the shelter. Additionally, the shelter does not entirely prevent weather and insects from intruding. The floor inside the shelter is continuously wet during the rainy season, because the slab does not shed water away and the joint is not sealed at the slab. Despite the City's continued effort, ant colonies have occupied and compromised the insulation. Moisture regularly entering the shelter is putting undue wear on mechanical components and electrical equipment, which is shortening their operating life. Additionally, the shelter does not have a heater or thermostat. These are necessary during freezing temperatures to prevent failure and undue wear on the equipment.

The City may want to consider replacing the shelter during the planning period. It is recommended that it be replaced with a fiberglass or wood framed structure. The pump station does not have a fence. Even though the station is behind locked gates it is still susceptible to tampering and vandalism, which has been experienced by City staff. To improve security, the City may want to consider installing a fence around the pump station and reservoir site for added security. It is envisioned that the installation of a new shelter and fence will be funded through the City's

existing operation and maintenance budget. Therefore, a specific capital improvement project to address these issues is not described in this plan.

The pump station has two 10 horsepower vertical multistage Goulds pumps with a pressure tank. Their estimated nominal capacity is approximately 80 gallons per minute at 320 feet of head. They are fitted with check valves, isolation valves, and pressure gauges. The piping and steel equipment stand appears to be coated in the field with a thin layer of spray paint. The paint on the stand is peeling, allowing the stand to rust.

The pumps are controlled with variable frequency drives, which allows their speed to be adjusted. They are controlled based on water level readings in the Upper Blackstone Tank and are integrated with the City's SCADA system.

4.5.6 Upper Blackstone Pump Station

The Upper Blackstone Pump Station is located on Horizon Hill Drive approximately 1,500 feet up the hill from the Middle Blackstone Pump Station. The pump station receives water from the Upper Blackstone Reservoir. The purpose of the station is to boost pressure directly to several users in the upper elevations of the Horizon Hill area. Water is delivered to the pump station via a 6-inch pipe and discharges from the pump station via two 6-inch pipes.

The shelter for the Upper Blackstone Pump Station is the same type of construction as the Lower and Middle Blackstone Pump Stations. Pumps are housed in a prefabricated and insulated shelter with aluminum sheet exterior. The shelter is anchored to a concrete pad. The station is shown in Figure 4-20.



Figure 4-20 | Upper Blackstone Pump Station & Reservoir

The shelter is not well suited to the Oregon coast environment and the needs of City staff. As shown in the Figure, the shelter is not tall enough to walk in to and to stand inside. Also, the station is accessed from removable panels instead of doors. These factors make it difficult for staff to conduct regular checks, maintenance, and repairs. The pumps in the shelter are heavy and are not easily moved in and out of the shelter. Additionally, the shelter does not entirely prevent weather and insects from intruding. The floor inside the shelter is continuously wet during the rainy season, because the slab does not shed water away and the walls are not sealed at the floor. Despite the City's continued effort, ant colonies have occupied and compromised the insulation. Moisture regularly in the shelter is putting undue wear on mechanical components and electrical equipment, which is shortening their operating life. Additionally, the shelter does not have a heater or thermostat. These are necessary during freezing temperatures to prevent failure and undue wear on the equipment. The City may want to consider replacing the shelter during the planning period with a wood frame or fiberglass structure.

The pump station does not have a fence. It is susceptible to tampering and vandalism, which has been experienced by City staff at other facilities. It is recommended that a fence be installed around the pump station and reservoir site for added security.

It is envisioned that the installation of a new shelter and fence will be funded through the City's existing operation and maintenance budget. Therefore, a specific capital improvement project to address these issues is not described in this plan.

The pump station has two 1-1/2 horsepower end-suction centrifugal pumps and a pressure tank. Their estimated nominal capacity is approximately 30 gallons per minute at 140 feet of head. They are fitted with check valves, isolation valves, and pressure gauges. The pumps are mounted on a painted steel equipment stand. The piping and steel equipment stand appears to be coated in the field with a thin layer of spray paint. The paint on the stand is peeling, allowing the stand to rust.

The pumps are controlled with variable frequency drives, which allows their speed to be adjusted. Discharge pressure is monitored with a transducer. The pumps are controlled to maintain between 45 and 55 psi and are integrated with the City's SCADA system.

4.5.7 Intertie Pump Station

As previously discussed, Yachats has a water system intertie with the Southwest Lincoln County Water People's Utility District (SWLCWPUD). The purpose of the intertie is to provide an emergency water supply for the City or the SWLCWPUD if needed in response to an event that interrupts normal operation of the primary water sources. The intertie is not intended to be used on a regular basis as supplemental water source. The intertie has a pump station with control building and underground vaults with piping.

The intertie is located at the north edge of the City on the west side of Highway 101 near Ocean Wayside Lane. Due to the differences in the hydraulic grade lines, this connection can be used to convey water by gravity from Yachats to the SWLCWPUD.



Figure 4-21 | Intertie Pump Station on Highway 101

The intertie includes a pump station that can be used to pump water south from the District to the City of Yachats.

The control building is a wood-framed, uninsulated, structure (Figure 4-5). It houses two centrifugal booster pumps, piping, isolation & check valves, and pressure gauges. It also houses power and control equipment. The intertie is not monitored remotely by the City's SCADA system. According to operators, the intertie has never been used.

The connection consists of underground piping and will likely require some physical work to use should the need arise. As such, the existing intertie is not operator friendly, and may be somewhat challenging to use.

Table 4-4| Existing Pump Station Inventory

Pump Station Name	Number of Pumps	Pump Type	Power (nameplate horsepower)	Flow Rate (gpm) ¹	Total Dynamic Head (ft) ¹	Pump Station Elevation (ft) ⁵	Approx. Discharge Pressure (psi)	Motor Speed Control	Reservoir Served	Operational Scheme
Water Treatment Plant	2	Vertical Turbine	20	350 ³	250 ⁴	21.5 ³	110	On/off	Upper Radar Road & South Reservoir	Maintain reservoir level, manual
Radar Road	2	Vertical Multistage	7.5 / 8	53	450	192	200	On/off	Horizon Hill	Maintain reservoir level, automatic
Lower Blackstone	2	Vertical Multistage	20	210 ²	250 ⁴	150	110	Variable	Middle Blackstone	Maintain reservoir level, automatic
Middle Blackstone	2	Vertical Multistage	10	80 ²	320 ⁴	426	140	Variable	Upper Blackstone	Maintain reservoir level, automatic
Upper Blackstone	2	Centrifugal	1.5	30 ²	140 ⁴	712	50	On/off	N/A	Pressure set point
Horizon Hill	2	Centrifugal	15	160 ²	240 ⁴	546	105	On/off	Upper Blackstone	Maintain reservoir level, manual
Intertie	2	Centrifugal	5	150 ³	Unknown	45	Unknown	On/off	N/A	Manual On/Off

1- Capacity of single pump at nominal duty point.

2- Estimated based on nameplate power, TDH, and assumed efficiency of 65%.

3- Referenced from City records.

4- Estimated based on head conditions and assumed friction losses & service pressures.

5- Referenced from Oregon State DOGAMI Lidar elevation data, except as noted.

4.6 DISTRIBUTION SYSTEM

The City's distribution system consists of the pipes, fittings, valves, and hydrants that convey finished water from the water treatment plant and from reservoirs to end users. These components are not of a uniform age, size or material type. The City utilizes typical pipe sizes ranging from 3/4-inch water services up to 12-inch water mains. The system consists of asbestos cement (AC), ductile iron (DI), high density polyethylene (HDPE), and polyvinyl chloride (PVC) pipe. For the last several years the City has standardized around AWWA C-900 PVC water pipe. This subsection presents an inventory and description of the distribution system.

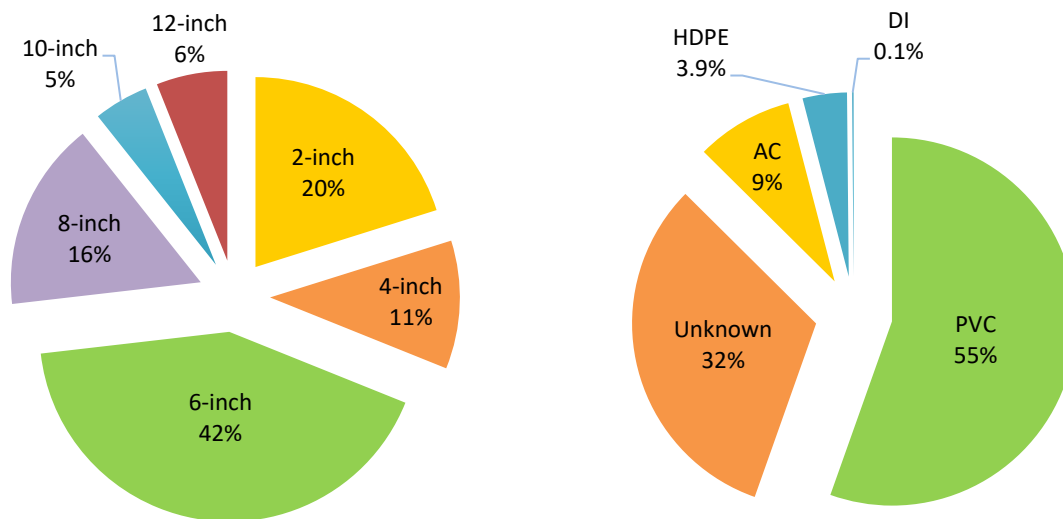
4.6.1 Pipe Network

The major components of the water distribution system are shown in the distribution maps included in the appendices. These maps are also available digitally in pdf format.

All public waterlines within the study area are owned by the City. In addition to the City, the Oregon Department of Transportation (ODOT) has jurisdictional oversight for facilities constructed within or along Highway 101.

The existing distribution system is predominantly PVC with some asbestos concrete, ductile iron, and HDPE pipe. Roughly a third of the distribution system's pipe material is unknown. The distribution system is comprised of approximately ±17.6 miles of mainline pipe, inventoried by pipe diameter and pipe material as shown in Figure 4-22.

Figure 4-22| Amount of Distribution Pipe by Diameter and Material



The layout of the existing water system appears to be adequate to deliver the required domestic flow rates to the community. However, some portions of the system do not have the capacity to deliver required fire flows while maintaining the obligatory 20 psi residual pressure at all service connections. This lack of capacity is the result of the configuration of the distribution system and the undersized pipes that lack conveyance capacity.

4.6.2 Water Service Levels

Water must be supplied to the customers at sufficiently high pressures to prevent contamination and to ensure that appliances operate correctly. Excessive pressures must also be avoided to prevent damage to the distribution

system and private plumbing fixtures. Common practice is to provide typical water pressures in the range of 40 to 90 psi. The City's infrastructure is setup in order to provide this pressure operating range to an area of the City. These areas are called service levels. Users in the City are in only one service level. Each service level is generally associated with one or more reservoirs that maintain the pressure in the service level. A service level can be separated in to sub-level by a pressure reducing valve (PRV). All of the pipe in the distribution network is within one service level or sub-level.

The City's water system consists of 6 main water service levels with 5 sub-levels (Figure 4-23). Table 4-5 lists the service levels and identifies the source of pressure for each level. A vast majority of the City's users are served by levels 1 & 2, the Upper & Lower Radar Road Service Levels. The other service levels are associated with pump stations that deliver water to users in levels higher than the two main levels. There are three service levels associated with the Blackstone Development. Five sub-levels are associated with PRVs.

Table 4-5| Service Level Inventory

	<i>Service Level</i>	<i>Reservoir Maintaining Pressure in Level(s)</i>	<i>Pump Station Maintaining Pressure in Level</i>	<i>Sub-level Name</i>
1	Lower Radar Road	Lower Radar Road Reservoir		
2	Upper Radar Road	Upper Radar Road Reservoir & South Reservoir		
3	Horizon Hill	Horizon Hill Reservoir		
	3.1			Horizon Hill PRV
	3.2			Lower Radar Road PRV
	3.3			Upper Radar Road PRV
4	Lower Blackstone	Middle Blackstone Reservoir		
	4.1			Hanley Drive PRV
5	Middle Blackstone	Upper Blackstone Reservoir		
	5.1			Blackstone PRV
6	Upper Blackstone		Upper Blackstone Pump Station	

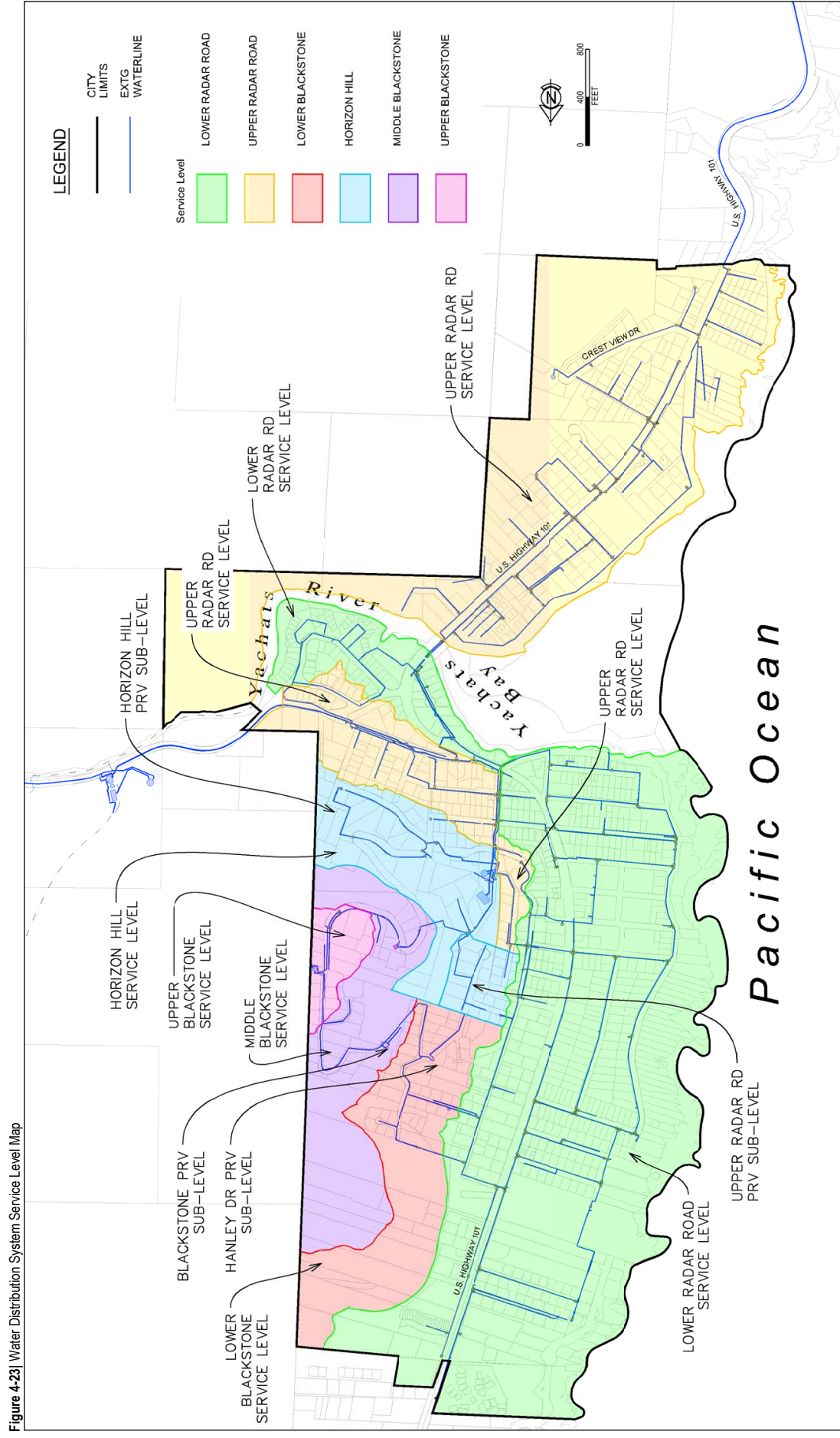


Table 4-6| Service Level Elevations

<i>Service Level</i>	<i>Max. Reservoir Water Surface Elevation (ft)¹</i>	<i>Elevation at 90 psi Static Pressure (ft)</i>	<i>Elevation at 40 psi Static Pressure (ft)</i>
1 Lower Radar Road	219	12	126
2 Upper Radar Road	253	46	160
3 Horizon Hill	556	348	464
4 Lower Blackstone	443	236	350
5 Middle Blackstone	736	528	644
6 Upper Blackstone	N/A ²	N/A ²	N/A ²

1- Reference Table 4-3 and Table 4-4 for more information.

2- Pressure in service level maintained by booster pump station.

4.6.2.1 Lower Radar Road Service Level

The Lower Radar Road Service Level encompasses a majority of the City's users on the north side of the Yachats River. Users at this level are in the relatively low elevations of town along Highway 101 that are north of the Yachats River. Historically this and the Upper Radar Road service level were the only service levels in the City. However, growth in the higher elevations in the hills above town required creation of separate service levels served by pump stations.

The Lower Radar Road Reservoir maintains pressure in this service level. This service level delivers water directly to the Radar Road Pump Station and the Lower Blackstone Pump Station. The intertie with the SWLCWPUD connects to this service level.

4.6.2.2 Upper Radar Road Service Level

The Upper Radar Road service level serves users in the low elevation parts of the City that are generally south of the Yachats River. Pressure in this level is maintained by the Upper Radar Road Reservoir and the South Reservoir. The water treatment plant high service pump station feeds directly in to this service level.

4.6.2.3 Horizon Hill Service Level

The Horizon Hill service level serves users along Horizon Hill Road by gravity from the Horizon Hill Reservoir. These users are between the Radar Road Pump Station and the Horizon Hill Reservoir. Pressure in this level is maintained by the water level in the Horizon Hill Reservoir. This service level typically sources water from the Lower Radar Road Service Level; however, it can also source water from the Middle Blackstone Level. The Horizon Hill Service Level also serves the Lower & Upper Radar Road PRV sub-levels and the Horizon Hill PRV sub-level.

4.6.2.3.1 Lower Blackstone Service Level

The Lower Blackstone service level serves users along Windsong Street, Elk Mountain Road, and Gimlet Lane by gravity from the Lower Blackstone Reservoir. This level extends from the Lower Blackstone Pump Station up to the Middle Blackstone Pump Station. Pressure in this level is maintained by the water level in the Middle Blackstone Reservoir. This level also serves the Hanley Drive PRV sub-level. This service level was created when the Blackstone Development was built in order to deliver water to users in higher water service levels. The water distribution system in the Blackstone Development was not designed to provide typical residential fire flow rates of 1,000 gallons per minute. In order to provide conventional fire flow rates, most of the distribution piping serving the

Blackstone Development would need to be replaced with larger piping. The costs for this would be high. Considering that the facilities serving the Blackstone Development are relatively new and the costs to replace the piping is relatively high, this plan does not included recommendations to improve the fire suppression capacity of the distribution system in the Blackstone Development.

4.6.2.3.2 Middle Blackstone Service Level

The Middle Blackstone service level serves users along Horizon Hill Road by gravity from the Upper Blackstone Reservoir. This level extends from the Middle Blackstone Pump Station up to the near the Upper Blackstone Reservoir and also downhill to the Horizon Hill Reservoir. Pressure in this level is maintained by the water level in the Upper Blackstone Reservoir. This level also serves the Blackstone PRV sub-level. As described above (Section 0), the distribution system in the Blackstone Development was not designed to provide conventional flow suppression and this plan does not include recommendations to improve the fire suppression capacity in this service level.

4.6.2.3.3 Upper Blackstone Service Level

The Upper Blackstone service level serves users along Horizon Hill Road that cannot be served by the Upper Blackstone Reservoir. Pressure in this level is maintained by the pumps at the Upper Blackstone Pump Station. Water for this level is sourced from the Upper Blackstone Reservoir. As described above (Section 0), the distribution system in the Blackstone Development was not designed to provide conventional flow suppression and this plan does not include recommendations to improve the fire suppression capacity in this service level.

4.6.3 Pressure Reducing Valves

There is a wide range of elevations within the City's distribution network that need to be served by relatively few reservoirs and pump stations. Oftentimes the pressure that a facility delivers is excessively high for household plumbing for certain areas of the network. In this situation, PRVs are used to reduce pressure.

Based on conversations with City operators, the PRV stations have been in service for a relatively long time and are in need of repair and maintenance. These valves are typically mechanical and operate automatically. As a result, these valves tend to need regular repair, maintenance and, eventually, replacement. It is recommended that all of the PRVs within the City's system be replaced during the planning period as a result of their current condition. A summary of the City's PRVs are in Table 4-7.

Table 4-7 Pressure Reducing Valve (PRV) Summary Table

PRV Name	Approximate Location	Pressure Source	Elevation (ft. approx.)	Max. Water Surface Elevation at Source (ft)	Upstream Static Pressure (psi approx.)
Horizon Hill	Adjacent to Radar Road Pump Station	Horizon Hill Reservoir	180	556	163
Lower Radar Road	Adjacent to Radar Road Pump Station	Horizon Hill Reservoir	200	556	154
Upper Radar Road	Between Radar Road and Hanley Drive	Horizon Hill Reservoir	306	556	108
Hanley Drive	Hanley Drive Near Gimlet Lane	Middle Blackstone Reservoir	228	443	93
Blackstone	Adjacent to Middle Blackstone Pump Station	Upper Blackstone Reservoir	418	736	137

4.6.4 Water Meters

Based on City records of the roughly 959 water meters currently in service. 8 connections are hotels. The City has a good water meter management system. About 10 years ago, the City started replacing meters on an annual basis and now replaced all but about 25 of the older meters. Therefore, the vast majority of the meters in the City are less than 10 years old. For planning and management purposes, the typical life of a meter is about 20 years. Therefore, the meters that now 10 years old will eventually need to be replaced. Therefore, the City should plan to continue the existing meter management program indefinitely. As long as funding for this program is maintained, no changes to the program should be needed during the planning period.

The City's meters are mostly Sensus SR2 meters. Some have touch read sensors and some have radio read sensors. The City has recently started to convert the entire system to radio read sensors that can be read from a radio receiver mounted in a service truck that is driven around the City. Based on discussions with City staff, there has been some discussion about installing a radio network around the City to create a real-time meter reading system that can be used by the City for billing purposes and by the customers to view their water usage patterns. These types of systems are referred to as Advanced Meter Infrastructure or AMI systems. These systems are discussed in greater detail in Chapter 8.

4.7 SCADA & TELEMETRY SYSTEM

The Yachats water system has a central supervisory control & data acquisition (SCADA) system at the water treatment plant. Operators can monitor many aspects of the water system from this system. The system allows operators to monitor the status of components, such as reservoir levels, pump status, and water pressures. The system also allows operators to control certain components, such as change reservoir level set points and turn pumps on and off. The pump stations and reservoirs communicate with the SCADA using radio and telephone-based telemetry.

4.8 EXISTING WATER SYSTEM FUNDING MECHANISMS

Funding for the City's existing water system comes from several sources including user fees, property taxes, system development charges (SDCs), and an urban renewal district.

4.8.1 Water User Fees

User fees are monthly charges to all residences, businesses, and other users that are connected to the water system. User fees are established by the city council and are typically the sole source of revenue to finance operation and maintenance. The City's water user fee system is established by Resolution 2015-12-01. For most residential and commercial connections (i.e., $\frac{5}{8}$ and $\frac{3}{4}$ inch meters), the City currently charges a flat fee of \$48.24 that includes up to 200 cubic feet of water per month. An additional charge of \$6.00 is assessed for each 100 cubic foot above the initial amount that is included in the base charge. The City does have some users with larger meters. These users are charged a special rate that is based on usage.

The anticipated revenue from water billings for the fiscal year 2020/2021 is budgeted to be approximately \$585,000. Including other various charges and interest earnings, the total water fund revenues, for the 2020/2021 fiscal year are budgeted to be approximately \$588,000. It should be noted that these budget amounts are less than the historic revenue from user rates. In the previous two fiscal years, the revenue from user rates was about \$650,000 and \$600,000. Due to the Covid 19 pandemic, the City anticipated less revenue for the 2020/2021 fiscal year.

The City's water fund must provide sufficient revenues to properly operate and maintain the water system and provide reserves for normally anticipated replacement of key system components such as pumps, motors, pump station control equipment, chemical feed equipment, fire hydrants and distribution piping repairs. Although the City relies exclusively on user fees for operation and maintenance costs, the water fund is typically not adequate to finance major capital improvements without outside funding sources.

4.8.2 Property Taxes

The City currently uses property tax revenue to service debt on a general obligation bond for the water system. The anticipated revenue from this source for the fiscal year 2020/2021 is budgeted to be approximately \$40,000.

4.8.3 System Development Charges

A system development charge (SDC) is a fee collected by the City as each piece of property is developed. SDCs are used to finance necessary capital improvements and municipal services required by the development. SDCs can be used to recover the capital costs of infrastructure required as a result of the development, but cannot be used to finance either operation and maintenance, or replacement costs.

The SDC fee system was most recently revised by Resolution Number 2007-01-01. The City charges different SDC fees based on the size of the water meter installed at each property. The current fee structure is listed in Table 4-8. Over the last three fiscal years, the City has collected an average of about \$50,000 in water system development charges.

Table 4-8 | Current Water SDC Fees

Meter Size	SDC Charge
¾ by ½ - Inch	\$3,133
¾ - Inch	\$4,700
1- Inch	\$7,833
1 ½ - Inch	\$15,665
2 - Inch	\$25,064
3- Inch	\$50,128
4- Inch	\$78,325
6- Inch	\$156,650

4.8.4 Urban Renewal District

The City collects revenues from an urban renewal district. Some of these funds are used to retire the debt associated with the construction of the South Tank Improvement Project. For the 2020/2021 fiscal year, the City planned to use approximately \$40,000 of urban renewal funds to service this debt.

4.8.5 Annual Water System Costs

Annual operations and maintenance costs are recurring costs typically funded through user rates. The City's budget for 2020/2021 fiscal year includes various expenditures as listed below (Table 4-9). The total expenditures for the fiscal year are approximately \$793,240.

Table 4-9 | Water Utility Fund Expenditures 2020/2021 Fiscal Year

Item	Budget
Personnel Services	\$ 345,000
Materials and Services	\$ 346,340
Capital Outlays	\$ 5,000
Debt Service	\$ 48,000
TOTAL EXPENDITURES	\$ 744,340

4.8.6 Debt Service

The City currently has three outstanding loans (Table 4-10). As of June of 2020, the total outstanding principal owed is approximately \$1,872,000 and the minimum debt service payments total approximately \$126,600 per year.

Table 4-10 | Water Utility Existing Debt

Loan Description	Loan Amount	Term (years)	Payoff Date	Interest Rate	Annual Payment	Outstanding Principal (6/2020)
Water Revenue Bond	\$512,000	15	2032	3.07%	±\$42,850	\$427,416
Water General Obligation Bond	\$533,000	15	2032	3.0%	±\$43,825	\$439,091
South Tank Business Oregon Loan	\$1,030,000	30	2049	1.0%	±\$39,911	\$1,005,500

4.8.7 Water Capital Reserve Fund

The City maintains a capital reserve fund used to make improvements to the water system. In recent years, the City has typically contributed an average of about \$90,000 from user fees to this fund. At the end of the 2020/2021 fiscal year, the ending balance in this fund is anticipated to be about \$325,000.

CHAPTER 5

PRESENT AND FUTURE WATER DEMANDS

Chapter Outline

- 5.1 Introduction
- 5.2 Terms and Definitions
 - 5.2.1 System Demand
 - 5.2.2 Demand Variations
- 5.3 Population
 - 5.3.1 Historical and Future Population
 - 5.3.2 Seasonal Occupancy of Service Population
 - 5.3.3 Current and Future Service Population
- 5.4 Historical Water Demand
 - 5.4.1 Water Production Records
 - 5.4.2 Water Loss
- 5.5 Projected Water Demand
 - 5.5.1 Projected Water Demand Summary
- 5.6 Fire Flow

5.1 INTRODUCTION

A primary measure of the size of a municipal water system is the total amount of water that it delivers to consumers. This capacity is the sum of water required for domestic, commercial, and industrial uses, water that is lost out of the system through leakage, in addition to water required for fire protection.

Future water demands have been prepared based on a number of variables including the following:

- Population projections
- Historical water demand
- Seasonal occupancy
- Projected fire flows

The demand characteristics developed in this chapter will serve as the basis for evaluating the City's existing water system infrastructure and for sizing supply, treatment, storage, and distribution infrastructure across the planning period.

5.2 TERMS AND DEFINITIONS

5.2.1 System Demand

The following terms are used to describe system demand:

- *Consumption* – Consumptive demand is finished water delivered to the system's users through service connections. Consumption is generally less than demand, the difference being system loss and unmetered uses. Consumption is measured by the consumer's meter and is accordingly the metered portion of demand.
- *Demand* – The total amount of finished water entering the transmission/distribution system from the water treatment plant to meet various user needs (excludes raw water that has not passed through the WTP). Demand equals consumption plus system loss and is usually measured by system master meters.
- *Fire Flow Demand* – Demand required for firefighting purposes. Fire flow demands vary by structure type and use and are prescribed by the City and/or fire code. Fire flow demand is considered to be met if the system can deliver the required flow rate while maintaining a minimum residual pressure in the distribution system of 20 psi.
- *System Loss* – System loss is water that cannot be accounted for. It is the difference between the total system demand and the total consumption. System loss is not necessarily the same as leakage. Although the majority of system losses are typically the result of leaks, losses can also be attributed to meter error, as well as unmetered uses such as street flushing, hydrant testing, filter backwashing, and similar activities, or from bypasses, overflows, etc.

5.2.2 Demand Variations

Water demands in municipal water systems vary widely across time. Seasonal, monthly, daily and hourly demand rates are utilized to evaluate and size various components of the overall water system. For the purposes of this report, the following demand classifications will be used. The definitions are generally listed in order of increasing magnitude.

- *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 be 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
<u>2017</u>	<u>773</u>
<u>2020</u>	<u>797</u>
<u>2030</u>	<u>929</u>
<u>2040</u>	<u>1,061</u>
<u>2041</u>	<u>1,070</u>

- 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

Year	Units by User Type			Population by User Type			Total Service Population
	Single Family Units	Multifamily Units	Hotel Rooms	Single Family Population	Multifamily Population	Hotel 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 4th, 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

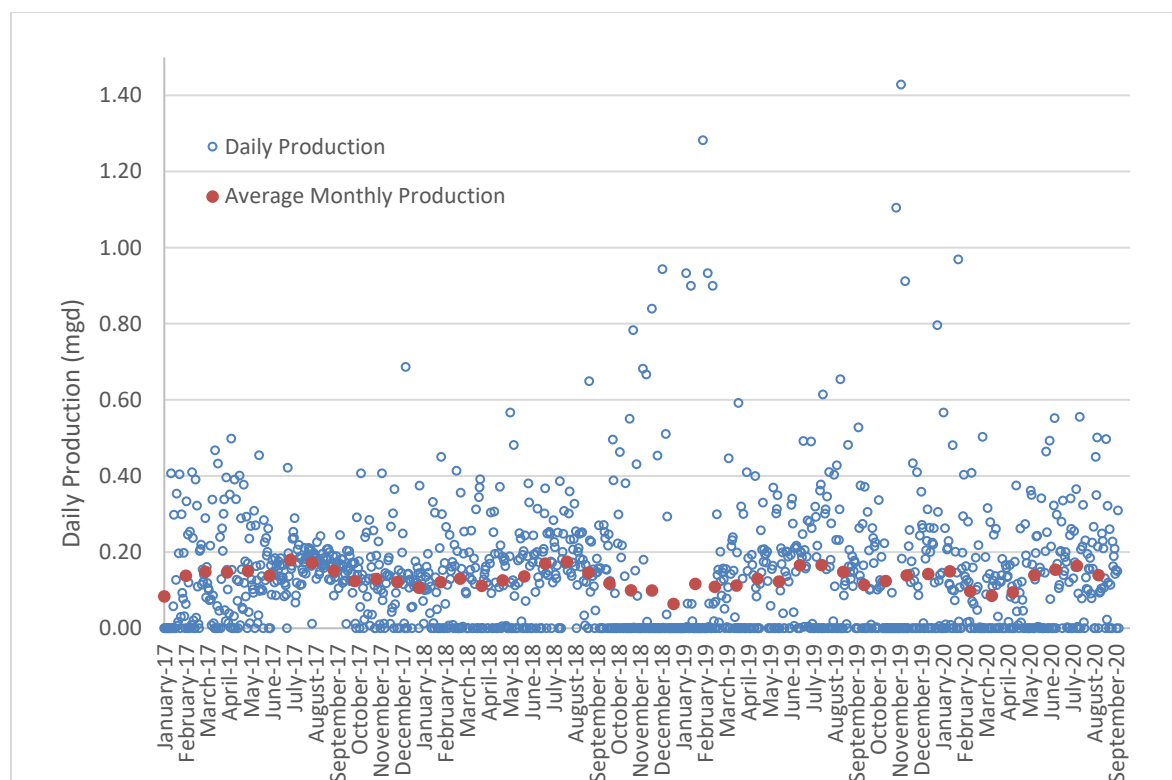


Table 5-6| Existing Water System Demands

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

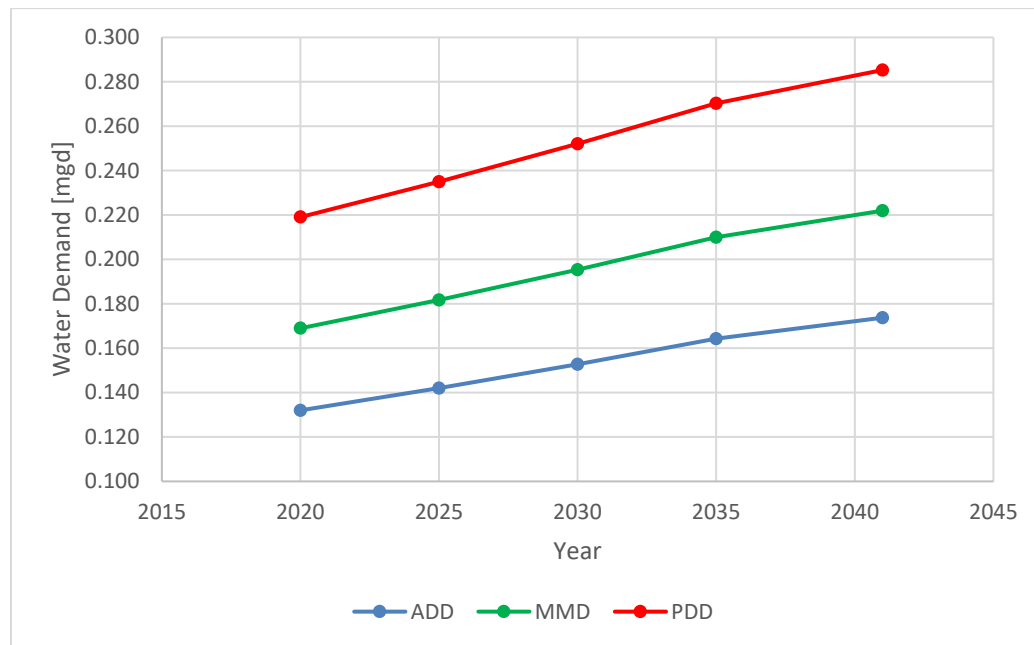
Projected water demand variations for the service population are calculated by multiplying the total service population in a given year (Table 5-4) by the corresponding unit demand per capita (Table 5-5) and the occupancy rate (Table 5-2). These results are summarized in Table 5-8 and illustrated in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

Figure 5-2| Projected Water Demands



5.6 FIRE FLOW

The water distribution system is a community's primary resource for fighting fires. Storage reservoirs and fire hydrants must be suitably sized and configured to reliably deliver the required fire flows to all areas within the city limits. Oregon Fire Code (OFC) provides guidelines to determine fire flows for various structures. Depending on the type of building construction and the size of the building, fire flow requirements can vary between a minimum of 1,000 gallons per minute (gpm) for a duration of one hour to 8,000 gallons per minute for a duration of four hours. The OFC also allows a 50% reduction in the fire flow requirement for buildings that are equipped with an automatic sprinkler system.

Yachats's water distribution system cannot deliver fire flows of 4,000 gpm or more without major upgrades. Even if these upgrades were made, it is unlikely that a developer would choose to site a structure requiring a fire flow of 4,000 gpm in Yachats as local market conditions favor smaller structures. For example, available fire flow of 4,000 gpm would allow construction of an approximately 130,000 square foot building that was constructed of fire-resistant materials. The fire flow requirement could be decreased by 50% if the structure was constructed with an automatic sprinkler system. This is a very large building, similar in size to a large retail facility like a Walmart or Fred Meyer. It is unlikely that a developer would seek to site a building of this nature in Yachats. As such, more modest fire flow goals are appropriate in Yachats. The sizing criteria used for this master plan are summarized below (Table 5-9). These criteria are considered reasonable for a small coastal community like Yachats and will allow the construction of a wide range of possible structures. For larger structures, automatic fire sprinkler systems will be required. However, automatic fire sprinkler systems are fairly common and are not likely to be a significant limiting factor for development of structures requiring them.

Table 5-9| Minimum Fire Flow Requirements

Location	Recommended Fire Flow (gpm)	Duration (hours)	Required Volume (gallons)
Residential Areas	1,000	2	120,000
Commercial/Industrial Areas	2,000	4	480,000

These fire flow values are for planning purposes only, and are not site or building specific. These values do not supersede or take the place of Oregon Fire Code (OFC) or building code fire flow requirements. Higher values may be necessary based on OFC, Fire Marshall or ISO requirements. Reductions may be allowed by the Fire Chief for buildings with fire sprinkler systems.

It should be noted that these minimum recommendations do not supersede fire flows required by the Oregon Fire Code or building codes.

Lastly, in addition to the required flow rates presented above, OAR 333-061-0025 requires that a minimum pressure of 20 psi be maintained in the distribution system at all times, inclusive of fire flow events. Evaluations of the distribution system (existing and future) to deliver the adopted fire flows are presented in Chapter 8 of this report.

CHAPTER 6

WATER SUPPLY EVALUATION

Chapter Outline

- 6.1 Evaluation Criteria
 - 6.1.1 Water Rights
 - 6.1.2 Reliability and Resiliency of Water Sources
- 6.2 Water Source Evaluation
 - 6.2.1 Water Rights Evaluation
 - 6.2.2 Water Supply Reliability
 - 6.2.3 Potential Future Water Sources
 - 6.2.4 Recommended 20-Year Water Supply Strategy
- 6.3 Recommended Improvements
 - 6.3.1 Water Loss Reduction
 - 6.3.2 Recommended Water Rights Actions
 - 6.3.3 Recommended Water Supply Improvements
 - 6.3.4 Water Source Recommendations Summary Table

This chapter builds on the inventory of the City's water supply infrastructure as presented in Chapter 4. It discusses the City's water sources, presents the regulatory framework for water rights, and details the water rights secured by the City to-date. It concludes with improvement recommendations to strengthen the City's water rights position and improve the overall water supplies for the City. An evaluation of water treatment facilities is included in Chapter 7.

6.1 EVALUATION CRITERIA

Factors used to evaluate the suitability of existing and planned water supplies include reliability, resiliency, and vulnerability. A short explanation of each of these evaluation criteria is presented below. The parameters presented in this section will be utilized in the analysis and recommendations of this chapter.

6.1.1 Water Rights

As previously noted, 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. A water right will not guarantee water for the appropriator. Under the prior appropriation doctrine, a water right authorizes diversions of water only to the extent water is available and does not impact a more senior water right. Water rights establish a hierarchy utilized by OWRD to adjudicate water in times of water shortages. Failure to comply with the requirements and conditions of the City's water rights permits and certificates may result in the restriction or loss of the affected water source. Accordingly, it is paramount that the City secure and maintain suitable water rights to meet long term municipal needs. The recommendations presented in this chapter are based on establishing a strong water rights position for an extended period of time.

6.1.2 Reliability and Resiliency of Water Sources

Interruptions to water production can occur due to problems with raw water quality. Contamination of surface water may be the result of a commercial or industrial accidents, forestry practices, and natural disasters. Changes in water quality can jeopardize water production and in the absence of suitable water treatment may require the WTP to be temporarily shut down.

Interruptions to water production can also occur due to a failure of the equipment used to deliver water from the raw water sources to the WTP.

The following standards are recommended to ensure a high level of reliability for the water system as a whole:

- Two or more sources of water supply should be developed with a total capacity to replenish depleted fire suppression storage within a 72-hour period while concurrently supplying PDD.
- When the largest single source is out of service, the remaining sources should be able to satisfy ADD (capacity with the largest single source out of service is referred to as firm capacity). Outages or maintenance periods caused by equipment failures may last from several days to several weeks. The remaining sources in the system should have the capacity to provide ADD. In the event of an extended outage, it is not uncommon to assume that a public notification process will be utilized to encourage or require water conservation.

6.2 WATER SOURCE EVALUATION

The City currently utilizes surface water diverted from Reedy and Salmon Creeks as its sole source of municipal water. The City has water rights to the Yachats River and Cape Creek, but these sources are not currently utilized by the City. The City also has an intertie with the Southwest Lincoln County Peoples Utility District that can be used as a water source on an emergency basis.

A detailed summary of these sources is presented in Chapter 4.

6.2.1 Water Rights Evaluation

Table 4-1 lists the permitted/certificated flow rates from each of the City's water sources. The City has active certificated water rights totaling 898 gpm (Reedy Creek) and permitted water rights totaling 1,795 gpm (Salmon Creek and Yachats River). In addition to these active certificated and permitted water rights, the City also has a non-active certificated water right of 220 gpm for Cape Creek. The City's total water right holding (sum of active certificates, permits, and non-active certificates) is 2,893 gpm for all available sources. This is far higher than the City's peak day demand. However, the rates of diversion allowed on paper are different than the rates at which the City can actually divert water. The City appears to have access to sufficient water under its water rights, but streamflows are less than the authorized rate of diversions during the summer months when the City needs to maximize its use of water rights.

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, the City should plan to 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.

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.

6.2.2 Water Supply Reliability

The City currently provides all municipal water from Salmon Creek and Reedy Creek. During wet weather months, the flows in either stream are sufficient to meet the City's needs. Therefore, the City has fairly good redundancy during the wet weather months. During dry weather conditions in the late summer and early fall, the City would be unable to meet demands with just one of the two sources. This is somewhat problematic. If a problem with either source was to occur during the dry weather conditions, the City would be unable to meet demands. Fortunately, the City has an intertie with the Southwest Lincoln County Water PUD (SWLCWPUD) that could be used under this scenario. Therefore, the intertie with the SWLCWPUD provides a redundant supply that improves the overall reliability of the system.

Two criteria for evaluating source reliability were introduced in Section 6.1.2, and each are addressed in this subsection.

Source Reliability Criterion #1

Two or more sources of water supply should be developed with a total capacity to replenish depleted fire suppression storage within a 72-hour period while concurrently supplying PDD.

As described above (section 6.1.1), the combined flow from Reedy and Salmon Creeks can drop below 200 gpm during dry weather conditions. The peak day demand at the end of the planning period is estimated to be about 200 gpm and the flow required to replenish fire suppression storage is about 110 gpm. Therefore, the total water supply need is about 310 gpm under this evaluation criteria. The City's existing system is not sufficient to meet this need without relying on the intertie with the SWLCWPUD. For this reason, this plan recommends constructing a new intake and pipeline to convey water from the upper Yachats River point of diversion to the treatment plant. Initially, this facility should be sized to divert 0.5 cfs or 224 gpm. Once completed, the City will have three sources that are capable of reliably producing a minimum of about 400 gpm even during the driest periods of the year.

Source Reliability Criterion 2:

When the largest single source is out of service, the remaining sources should be able to satisfy ADD (capacity with the largest single source out of service is referred to as firm capacity).

The largest single source of water is Reedy Creek. During the driest times of year, flows in Reedy Creek drop to as low as 120 gpm. During similar conditions flows in Salmon Creek can drop to as low as 60 gpm. Therefore, without Reedy Creek, the City would only be able to produce 60 gpm during dry weather conditions. This is significantly less than the average daily demand (ADD) at the end of the planning period which is about 120 gpm (Table 5-8). Therefore, the existing system is not capable of satisfying this criteria. As noted previously, this plan recommends the construction of a new water supply source from the Yachats River. This source should be able to supply a minimum flow of 224 gpm during dry weather conditions. Once constructed, the Yachats River intake will be the largest single source for the purposes of this evaluation criteria. During times when the Yachats River intake is unavailable due to mechanical issues or something similar, the City should still have Reedy Creek and Salmon Creek available with a reliable water supply of at least 180 gpm. Since this flow is greater than the ADD at the end of the planning period (i.e., 120 gpm), this evaluation criteria is satisfied by the construction of the Yachats River Intake.

6.2.3 Potential Future Water Sources

The appropriate planning horizon for water rights acquisition and water supply planning is much longer than the 20 year planning period used for most other elements of this plan. This is due to the fact that most of the surface water resources in the vicinity of Yachats are already maximized and new water rights are not likely to be available. The previous subsection shows that once the Yachats River diversion is constructed, the City's existing water supplies should be sufficient to meet the City's needs for many years. In fact, unless there are significant changes to the City's UGB or occupancy patterns, the additional water provided by the Yachats River diversion may be sufficient for the complete buildout of the UGB. That said, it is always wise for municipalities to be diligent about pursuing additional water supplies. Some available options are discussed below.

6.2.3.1 Ground Water

Groundwater resources on the Oregon Coast are poor due to the local geology. This leaves surface water as the only feasible option.

6.2.3.2 Cape Creek

The City has a certificate for 0.49 cfs of water from Cape Creek. However, as explained in Chapter 4 (subsection 4.1.4), no infrastructure exists to convey water from this source to the City and the flow measured in the summer of 2020 was 0.39 cfs. Based on this measurement, flows are anticipated to be too low in the summer to justify the

infrastructure investment needed to develop this source. For these reasons, Cape Creek is not considered a viable long-term source for the City.

6.2.3.3 Raw Water Storage Reservoir

A potential long-term water supply option would be to construct a raw water storage reservoir to store water during the winter months for use during the summer months. Ample surface water is available during the winter months. This water can be used to fill storage reservoirs. During the summer months, the stored water can be released into the stream and removed at a downstream location or the stored water can be used directly as a raw water source. This approach is relatively common. For example, the City of Newport uses two storage reservoirs on Big Creek for this purpose. Similar facilities are used by the cities of Seaside, Carlton, McMinnville, and Portland. To provide the required storage volume a relatively large impoundment would need to be constructed. Impoundments of this nature are typically made by constructing a dam. Though not impossible, dam construction in the current regulatory climate is challenging. A dam construction project must include mitigation for all wetland impacts as well as all impacts to aquatic species habitat. For example, if a dam is constructed without fish passage facilities, the project must also include mitigation to compensate for the stream reach that is made unavailable to aquatic species. The options for mitigation are limited and can be extremely costly. The specific mitigation requirements are determined through a negotiation with the resource agencies. Therefore, a significant amount of work is required to even quantify the costs of the mitigation efforts. That said, the costs for mitigation are likely to exceed the costs for the dam construction itself. Environmental permitting is just one of many challenges associated with a dam construction project. Other issues include finding a site where the topography is suitable, purchasing the land, and determining if the subsurface conditions at the site are suitable for dam construction. Finally, algae and other plant growth in the stagnant water within the impoundment can create taste and odor problems that require additional treatment beyond filtering. For example, the City of Newport utilizes water from impoundments, filters the water using membrane filtration technology, then runs the filtered water through carbon filters that remove objectionable taste and odor chemicals. Carbon filtration adds another unit process to the treatment facilities, increasing treatment cost and complexity.

The City owns a parcel of land on the south side of the Yachats River near the treatment plant. There have been discussions about using this land for a modestly-sized, off-channel, storage pond. The City could fill this pond during the winter months and use the water during low flow conditions. This is a slightly different facility than a storage reservoir of the type described in the previous paragraph. A storage pond at this site would be significantly smaller than a storage reservoir and would only serve as a supplemental source to meet demands during short-duration (i.e., 1-2 week) critical low-flow periods. This is always an option for the City and is something the City should keep in reserve. However, the stored water will likely have taste and odor issues as discussed above. Therefore, improvements to the treatment plant would be needed to use water from this pond.

6.2.3.4 Water Rights Purchases

Another option for obtaining water rights is to purchase them from water rights holders in the vicinity. The City could research surface water rights held on Beamer Creek, the Yachats River, and other nearby tributaries to determine the location of existing diversions and holders of existing water rights. It could then identify appropriate and available water rights, and approach the holders of those rights to discuss the potential purchase.

Once the City reaches an agreement to purchase water rights, the appropriate paperwork can be prepared, such as changing ownership of the water right to the City and submitting a transfer application to change the type of beneficial use to municipal and the point of diversion to the City's intake. It will be easier to obtain water rights upstream from the City's intake so that downstream-water users cannot claim the additional removal of water "causes damage" to

their water right. Also is it important to note that character of the beneficial use (e.g., irrigation, municipal, etc.) can only be changed for certificated water rights.

Some communities have chosen to purchase entire pieces of property for the sole purpose of obtaining a water right allotted to the property. Once the water provider owns the property, they are able to put the water right under their name, change the point of diversion to their intake, and resell the property if desired.

A review of the water rights in the Yachats River basin shows that the opportunity for purchasing water rights is somewhat limited. A cursory review of the existing water rights in the watershed shows that there are two water rights that pre-date the instream water rights. These are for 0.21 cfs and 0.13 cfs. These are relatively small, but would improve the City's water rights position if they could be obtained for a reasonable cost.

This approach will only benefit the City if the City has constructed in the Yachats River intake as recommended later in this plan. None of the upstream water rights in the area can be accessed using the City's existing intakes on Salmon and Reedy Creek. Only an intake on the Yachats River will support this approach.

6.2.3.5 Regional Water System

Another potential long-term water supply strategy is to pool the resources of the various communities in the mid-coast area by creating a regional water supply district. The water distribution systems from Newport in the north to Yachats in the south are almost entirely interconnected. One key missing section is crossing of the Highway 101 Bridge over the Alsea River. If this section were to be installed along with some other pumping and piping improvements, it would become possible to convey water from Newport to Yachats and vice versa. All of the communities in this area (e.g., Newport, Seal Rock, Waldport, Southwest Lincoln County PUD, Yachats, etc.) have individual water supply challenges. However, if these communities were to be combined into a single water district, the various water rights holdings could potentially be leveraged in a way that provides a net benefit to all the communities. The analysis of a regional water district is beyond the scope of this study, but if this concept gains popularity in the coming years, the City should encourage efforts to study the issue and provide funding assistance as appropriate.

In recent years, the City has participated in the Mid-Coast Water Planning Partnership which is a joint effort by the various mid-coast communities to develop a regional approach to addressing water supply issues. The City should continue to take part and contribute to this partnership.

6.2.3.6 Increase Reliance on SWLCWPUD

The City has an emergency intertie with the Southwest Lincoln County Water PUD (SWLCWPUD). The City operates the intertie under an agreement with the SWLCWPUD. The City could not locate the agreement for this planning effort, but the authors of this plan understand the agreement stipulates that the intertie is only for emergency use. Therefore, under the current agreement, the intertie cannot be considered a viable long-term source that the City can use to meet increased demands associated with growth. In the coming years, the City should consider approaching the SWLCWPUD about changing the use agreement. The goal would be to engage in discussions with the SWLCWPUD about what it would take for the SWLCWPUD to consider the City a "customer" of the SWLCWPUD rather than an "emergency user." This will require the negotiation of a new agreement between the two parties and will likely require a significant financial contribution from the City to the SWLCWPUD in addition to normal water user fees. It is very likely that the SWLCWPUD will require the City to fund major infrastructure improvements in order to increase the water production capacity of the SWLCWPUD's system. The costs for this cannot be estimated at the present time because there are too many unknowns. However, it is possible that the costs will be comparable to the costs for the Yachats River Intake recommended in this plan. Negotiations with SWLCWPU are beyond the scope of this master plan and it is unknown if the SWCLWPUD would even be willing to entertain the idea. However, in the

coming years, the City should consider engaging the SWLCWPUD to determine if this option has the potential to be a viable water source. It is possible that once the details of the use agreement are identified, this option may be a better choice for the City than developing the Yachats River. For this reason, this plan recommends that the City enter into discussions with the SWLCWPUD as soon as possible (see Project S-3) below.

6.2.3.7 Desalination

Desalination of seawater or brackish water is used throughout the world to provide municipal drinking water. Desalination minimizes problems with water rights and is a drought-proof water supply strategy. Desalination plants utilize various treatment technologies to remove salt from water. Common examples include distillation and reverse osmosis. The drawback of desalination is the high capital construction costs and high operation and maintenance costs. There are currently no desalination plants in Oregon. There are some small systems in Washington in the Puget Sound area where surface water supplies are limited. There are several larger systems in California. In response to recent drought conditions, the State of California has recently provided financial assistance to various communities to study the feasibility and construct desalination plants. For this master planning effort, desalination was not formally evaluated. Desalination is not considered a cost-effective option for the City during the current planning period. However, beyond the current planning period, this may change. As more desalination plants are constructed, the water supply industry in the United States will gain experience with the process. This combined with future technological advances may one day make desalination an attractive option for the City.

6.2.4 Recommended 20-Year Water Supply Strategy

Based on the previous discussions, Reedy Creek and Salmon Creek should continue to be sufficient to meet demands outside of the summer months, but will be insufficient to meet demands in the summer months as the City's population continues to grow during the 20-year planning period. Therefore, the City will need to develop additional water supplies. The two best options include, developing the upper Yachats River diversion, and increasing reliance on the Southwest Lincoln County Water PUD (SWLCWPUD). The City's current agreement with the SWLCWPUD is only for emergency use. Therefore, a new agreement must be negotiated in order for the City to use the water on a routine basis. Since the conditions of such an agreement are not known, it is not possible to quantify the costs at this time. Therefore, a cost comparison between the SWLCWPUD option and the Yachats River option cannot be made. As such, this plan recommends that the City plan to develop the upper Yachats River diversion during the planning period. But, before proceeding with this work, the City should enter into discussions with the SWLCWPUD to determine the costs and conditions required to purchase water on a routine basis. This information should be used to compare the SWLCWPUD option with the Yachats River option to determine which is the best long-term solution for the City. If this analysis shows that the SWLCWPUD option is the better choice for the City, then this master plan should be amended to reflect that change.

6.3 RECOMMENDED IMPROVEMENTS

6.3.1 Water Loss Reduction

Although a water loss ratio of zero is desirable in theory, it is probably not feasible given the complexity and practical realities associated with municipal distribution systems. A typical and reasonable water loss goal for small municipalities is a 10% to 15% loss rate.

As discussed in Section 5.4.2, the water loss experienced by the City's distribution system is likely to be between 11% and 16%. This is relatively good, but can be improved. In fact, in order to use water from the Yachats River as recommended in this plan, the City must maintain water loss below 15% (see section 4.1.5). This will require a

proactive maintenance and monitoring effort as well as improvements to older sections of the distribution system. Recommendations for distribution system improvements that will reduce water loss are included in Chapter 8.

6.3.2 Recommended Water Rights Actions

Recommended actions to strengthen the City's water rights position are described in the following paragraphs. These recommendations are general goals and the City will need to work carefully with a water rights examiner to fine tune these recommendations.

▪ **Permit number S-29018 Extension Application (Project S-1)**

The permit for Salmon Creek has not been certificated and the development deadline has expired. The City should immediately begin work to apply for an extension of the development deadline for this water right. This task should be given a highest priority of any of the projected listed in this report. The City will need to work with qualified consultants to prepare and submit the applications. A total budget of \$15,000 is recommended for this work.

▪ **Yachats River Development Planning Work (Project S-2)**

Prior to developing water under the City permit for the Yachats River, a significant planning effort will be needed to address regulatory issues and acquire the land or an easement for the new intake. The upper Yachats point of diversion is believed to be located on land owned by the Siuslaw National Forest. The City should anticipate a complex work effort to obtain an easement from the USDA Forest Service that will be needed for the project. In addition to easement acquisition, the City should also anticipate a complex work effort to obtain the required regulatory approvals to develop the water right.

The City entered into an agreement with the Oregon Water Resources Department regarding use of water from the Yachats River. This agreement requires the City to demonstrate compliance with several stipulations prior to accessing water from the Yachats River. These include the following.

- The City must demonstrate that water losses are below 15%.
- The City must prepare demand projections based on the 85% efficiency and upon the best practicable estimate of population and occupancy figures and seasonal average water use.
- The City must provide a schedule for water audits (likely annual).
- The City must demonstrate cooperation in efforts to develop a regional water supply.
- The City must prepare 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.
- The City must prepare 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 rights.
- The City must develop a curtailment plan with triggers for curtailment based on stream flows
- The City must maintain a current Water Management and Conservation Plan.

Some of the requirements listed above will be satisfied by the City's water management and conservation plan (WMCP). However, it is likely that the City will need to retain the services of a team of consultants including a water rights consultant to provide the analysis and documentation required to show compliance with the requirements that are not addressed in the WMCP. A total budget of \$50,000 is recommended for the easement acquisition and regulatory compliance work that will be required prior to developing the Yachats River water right.

6.3.3 Recommended Water Supply Improvements

Recommended improvements to improve the City's water supply infrastructure follow.

- **Evaluate Using SWLCWPUD as a Long-Term Source (Project S-3)**

A potential alternative to the Yachats River is to purchase water from the Southwest Lincoln County Water PUD (SWLCWPUD or PUD) on a routine basis. The City's current agreement with the SWLCWPUD is for emergency use only. Therefore, the City cannot currently consider the PUD as a viable, long-term, water supply source. However, it may be possible to renegotiate the agreement to allow daily usage as needed by the City. The goal would be for the City to be considered a regular customer of the PUD. As described above (Section 6.2.3.6), it is likely that the PUD will require the City to fund major capital improvements to the PUD's system as a condition of a new agreement. The purpose of this project is to identify these costs and evaluate them against the costs of the Yachats River option to determine which option is the best long-term source for the City. The exact details of the work effort are difficult to identify at this time. A negotiation between the two parties will be needed. This will likely be performed by City staff with assistance from a consulting team. Once the details of the new agreement are identified, a formal evaluation can be performed to compare the PUD option against the Yachats River option. If the PUD option is determined to be a better long-term choice for the City, this master plan can be amended accordingly. The amendments will likely include dropping projects S-2 (see above) and S-4 (see below) in favor of a new project related to the PUD. The City will likely need the assistance of the City's engineer of record and legal council at a minimum. Other consultants may also be needed. The recommended budget for this work is \$75,000. To some degree, this value is a "placeholder" and the actual costs of this effort may be substantially different depending on how the work proceeds.

- **Yachats River Intake and Raw Water Pipeline (Project S-4)**

This project includes the actual design and construction of the intake structure and the pipeline to convey water from the upper Yachats River point of diversion to the City's raw water transmission pipeline. This project will include the construction of a new intake structure in the River which will require in-water work and the associated permitting. The intake should consist of a fish screen in accordance with ODFW requirements and pumping equipment. The project should include a new 8-inch HDPE pipeline along Yachats River Road that will connect to the existing pipeline from Reedy Creek. The total estimated pipeline length is approximately 9,600 feet. The total recommended budget for this project is \$2,893,000. A detailed breakdown of this budget is included in Appendix B. Once this project is completed, the City's reliable water supplies will be increased to not only serve the City through the current planning period ending in 2041 but well into, and possibly through, the next planning period ending in 2061. Ultimately, this will depend on future growth rates in the City.

- **Reedy Creek Raw Water Pipeline Improvements (Project S-5)**

This project is proposed to replace an aging pipeline that was constructed in 1945 and will likely reach the end of its useful life during the planning period. This is the section of pipe from the Reedy Creek diversion to Yachats River Road. It is anticipated that the pipeline will be constructed in the existing gravel road that is used to access the Reedy Creek intake. The section pipeline in Yachats River Road to the treatment plant has recently been replaced with HDPE pipe, so this section is in good condition and should serve the City well for the remainder of the planning period and beyond. The total estimated budget for this project is \$208,000. A detailed breakdown of this budget is included in Appendix B.

6.3.4 Water Source Recommendations Summary Table

The following table is a brief summary of the various water source improvement recommendations developed in this Chapter. For more details on particular projects, refer to the above discussions. These projects are assigned a priority ranking in Chapter 12.

Table 6-1| Recommended Water Supply Improvements & Projects

Project Code	Project	Recommended Budget
S-1	Permit S-29018 Partial Perfection and Extension Application	\$15,000
S-2	Yachats River Water Rights Planning Work	\$50,000
S-3	Evaluate Using SWLCWPUD as a Long-Term Source	\$75,000
S-4	Yachats River Intake and Raw Water Pipeline	\$2,893,000
S-5	Reedy Creek Raw Water Pipeline Improvements	\$208,000

CHAPTER 7

WATER TREATMENT EVALUATION

Chapter Outline

- 7.1 Introduction and General Evaluation Criteria
- 7.2 Existing Deficiencies
- 7.3 Improvement Alternatives
- 7.4 Recommended Treatment Plant Improvements
- 7.5 Summary of Recommended Treatment System Improvements

7.1 INTRODUCTION AND GENERAL EVALUATION CRITERIA

This chapter develops and evaluates alternatives to adequately meet the City's water treatment system needs. The alternatives discussed in the following sections were developed by considering the population projections and drinking water demands, the condition and performance of the existing facilities, regulatory requirements, and City of Yachats objectives.

7.2 EXISTING DEFICIENCIES

The City's existing water treatment plant was constructed in the early 1990s and has served the City well. The existing treatment plant can reliably produce about 500,000 gallons of water per day. This is significantly more than the estimated peak day demand at the end of the planning period (Table 5-8). Therefore, the treatment plant is adequately sized to meet the projected demands and an expansion project to increase the treatment capacity is not needed. However, most of the mechanical and electrical components of the plant are the original equipment that is not about 30 years old and would be about 50 years old at the end of the planning period. This is far beyond the design life for mechanical and electrical equipment such as control panels, pumps, chemical feed equipment, and some of the internal components of the clarifier and filters. Therefore, the City should plan to make significant upgrades to the mechanical and electrical systems during the planning period. In addition to capacity and age issues, the existing treatment plant building does not meet current seismic building codes and improvements to the building structure would be beneficial.

This section includes a discussion of the various alternatives considered to address the existing shortcomings and describes the recommended improvements.

7.3 IMPROVEMENT ALTERNATIVES

The treatment plant building is in good condition and should continue to serve the City for many years. Upgrades are needed to improve the seismic resiliency of the building, but the overall structure is in good condition. The main treatment components (i.e., clarifier, filters, and clear well) are concrete structures that are in good condition and should be sufficient for the remainder of the planning period. Overall, the "backbone" of the treatment plant is sound and no major upgrades are needed. Most of the existing shortcomings are related to mechanical and electrical equipment that can be replaced while retaining the major structural elements of the plant. For this reason, the recommended improvement scheme includes retaining much of the existing treatment infrastructure and continuing to utilize the same treatment technology that is currently in place. As an alternative to this approach, the City could choose to construct an entirely new plant and evaluate other treatment technologies such as membrane filtration. However, this would require abandoning much of the existing infrastructure and would be significantly more costly. The costs for constructing a new treatment plant using different treatment technologies were not evaluated in detail for this study, but are likely to be many times more expensive than the recommended improvements.

7.4 RECOMMENDED TREATMENT PLANT IMPROVEMENTS

The recommended treatment system improvements include several different projects targeted at various elements of the treatment plant. The improvements are listed as separate projects, but some could easily be combined into

larger projects which would likely reduce soft costs in some cases. The following bullet points describe each of the recommended project in greater detail. Detailed cost estimates are included in Appendix B.

▪ **Water Treatment Plant Electrical and Control System Upgrades (Project T-1)**

The main electrical service entrance equipment, the motor control centers, and the main control panel are the original equipment that was installed in early 1990s. There have been some minor upgrades over the years, but most of the components are original. This is far beyond the design life for electrical equipment of this nature. Many of the components are no longer available and failures would cause a major problem for the City. All of these systems should be upgraded early in the planning period. This is probably the most significant need at the treatment plant because there are multiple components for which replacement parts are no longer available. A failure of any of these could lead to an emergency operation scenario for the City. The recommended improvements include a new power service that is larger and can accommodate additional electrical loads in the future, a new backup power generator and automatic transfer switch, a new master control system for the treatment plant and a new motor control center. In order to keep the existing treatment plant operational during the installation of the new electrical and control equipment, it is envisioned that the existing cabinetry on the south wall of the lab room will be removed and the new electrical gear will be installed along the south wall. Once the new electrical gear is operational, the old gear on the north wall of the lab room will be removed and a new laboratory sink and cabinetry will be installed in its place. It is envisioned that the new generator will be installed on the exterior of the building near the building entrance in a sound attenuation enclosure supplied by the generator manufacturer. The total recommended budget for this project is \$814,000. A detailed breakdown of this budget is included in Appendix B.

▪ **Water Treatment Plant Clarifier Rehabilitation (Project T-2)**

The clarifier is used to remove suspended solids prior to filtration. The clarifier is a concrete tank with internal flocculation chamber, launders, and a solids rake arm. The rake arm is powered by a motor located on the walkway over the clarifier. The concrete tank is in good condition and should serve the City well for the remainder of the planning period. The internal components are the original equipment that was installed in early 1990s. Most the internal components are constructed of mild steel and are corroded and are likely to reach the end of their useful life during the planning period. Therefore, the City should plan to replace the equipment at some point during the planning period. The existing clarifier is not equipped with any plate or tube settlers. This is an older approach and replacement of the internal equipment in the clarifier presents an opportunity to install more modern equipment like plate settlers. This will improve the performance of the clarifier and make it easier to operate. The recommended improvements include removing all of the equipment inside the clarifier and replacing with a system of partitions that divide the tank into a flocculation chamber followed by a settling chamber that is augmented with plate or tube settlers. Several equipment manufacturers are capable of providing this type of equipment package. It is envisioned that the designers of the improvements will work with a particular manufacturer to select an equipment package that is suitable for installation in the existing tank. The total recommended budget for this project is \$641,000. A detailed breakdown of this budget is included in Appendix B.

▪ **Water Treatment Plant Mixed Media Filter Rehabilitation (Project T-3)**

The mixed media filters are the primary treatment process in the plant. The filters are located in concrete tanks inside the treatment plant building. The tanks and access walkways are in good condition and will serve the City well for the remainder of the planning period. Most of the filter media, internal piping, and mechanical systems inside the filter tanks are the original equipment that was installed in the early 1990s. It will likely be necessary to reconstruct the internal components of the filters at some point during the planning period. For the purposes of master planning, the proposed improvements are assumed to include removing all of the filter media and the underdrain piping, installing new underdrain piping, new filter media, and a new surface wash system. Obviously one filter will need to be rehabilitated while the other filter provides water treatment. Several equipment manufacturers are capable of

providing the materials and equipment needed to rehabilitate the filters. It is envisioned that the designers of the improvements will work with a particular manufacturer to select materials and equipment that is suitable for installation in the existing tanks. The total recommended budget for the rehabilitation of both filters is \$350,000. A detailed breakdown of this budget is included in Appendix B.

▪ **Water Treatment Plant Pump and Compressor Upgrades (T-4)**

Virtually all of the pumps and motors in the plant are the original equipment that was installed in the early 1990s. This includes the Salmon Creek intake pumps, the backwash pump, and the two high service pumps. The treatment plant also includes an air compressor that provides high pressure air for the pneumatic valves that are used to control the filtration process. Rotating machinery like pumps and compressors have a limited useful life due to normal wear and tear. For planning purposes, the City should assume that all of the pumps and the compressor will reach the end of their useful life during the planning period and will need to be replaced. The replacement process provides an opportunity to make some improvements to the plant. For example, the plant includes a single backwash pump. It is more conventional for a plant to have two backwash pumps to provide redundancy. Should the City's backwash pump fail, there would be no way to backwash the filters and the treatment plant would eventually cease to produce water. Therefore, a failure of the backwash pump would be an emergency situation for the City. A better system would be to have two backwash pumps so that there is always a backup if one fails. For this reason, the recommended improvements include the installation of a second backwash pump. This will require coring the building floor over the clearwell and constructing a pump pedestal next to the existing backwash pump. The recommended improvements include the installation of two air compressors rather than one to increase the overall redundancy of the plant. For budgeting purposes, it is assumed that the speed of the backwash pumps will be controlled using variable frequency drives. However, this particular detail will need to be finalized during the design phase of the project. The total recommended budget for the pump and compressor replacement project is \$402,000. A detailed breakdown of this budget is included in Appendix B.

▪ **Water Treatment Plant Instrumentation Upgrades (Project T-5)**

To monitor and control the treatment process, several instruments are used throughout the plant. These include three flow meters, five turbidimeters, a streaming current monitor, a chlorine residual analyzer, and a level transducer in the clearwell. Some, but not all, of these instruments were installed when the plant was constructed in the early 1990s. These types of instruments typically last about 20 years before they become obsolete or wear out. Therefore, the City should plan to upgrade the instrumentation at some point during the planning period. The proposed improvements include installing new modern instrumentation to replace the instruments noted above and electrical and controls work to integrate the instrumentation into the automatic control and monitoring system. The total recommended budget for this project is \$271,000. A detailed breakdown of this budget is included in Appendix B.

▪ **Water Treatment Plant Chemical Feed System Improvements (Project T-6)**

The treatment plant includes several chemical feed systems. These include a polymer feed system, a soda ash feed system, a filter aid feed system, and a chlorine feed system. As a whole, these systems are in fair to poor condition and need to be improved during the planning period. For example, the City has an onsite chlorine generation system that is not currently functional. The electrolyzer has failed and the City now uses liquid sodium hypochlorite as a "work around." Similar situations exist for the polymer feed and soda ash feed systems. The chemical room includes a large polymer storage tank that is no longer in use and needlessly consumes floor space. In short, the chemical feed systems need to be cleaned up and modernized. The recommended improvements include installing new polymer and filter aid blending and feed equipment to replace the existing equipment, installing new pump skids for the soda ash and chlorine feed systems, rehabilitating or replacing the onsite chlorine generation equipment, and replacing the chlorine distribution control panel. All of the new equipment should be integrated into the automatic

control and monitoring system. The total recommended budget for this project is \$205,000. A detailed breakdown of this budget is included in Appendix B.

▪ **Treatment Plant Building Seismic Retrofit (Project T-7)**

The water treatment plant building was constructed in the early 1990s and was not designed for current seismic codes. In the time since the building was designed, significant changes to building codes have been made with the goal of improving the structural response to large seismic events. In order to improve the overall seismic resilience of the City's water system, the City should consider making seismic upgrade to the treatment plant building. The specific details of these upgrades have not been identified. A detailed structural evaluation of the building is beyond the scope of this master planning effort. However, it is anticipated that some structural improvements will be needed to bring the building in compliance with current structural codes. Since the specific improvements are not known at this time, the budget for this project includes reasonable estimate of the costs for the seismic upgrades. However, this is a "placeholder" value that should be confirmed early in the design process. It is envisioned that the City will retain a structural engineer to inspect and evaluate the building structure prior to designing the needed improvements. At that time, the budget can be updated as needed. For the purposes of this plan, a budget of \$200,000 for construction and \$70,000 for soft costs are recommended. The total budget for this project is \$270,000.

7.5 SUMMARY OF RECOMMENDED TREATMENT SYSTEM IMPROVEMENTS

Several treatment system improvement projects have been identified above. These projects are summarized in the following table. These projects are assigned a priority ranking in Chapter 12.

Table 7-1| Recommended Treatment System Improvements

Project Code	Description	Recommended Budget
T-1	WTP Electrical and Control System Improvements	\$841,000
T-2	WTP Clarifier Rehabilitation	\$641,000
T-3	WTP Mixed Media Filter Rehabilitation	\$350,000
T-4	WTP Pump and Compressor Upgrades	\$402,000
T-5	WTP Instrumentation Upgrades	\$271,000
T-6	WTP Chemical Feed System Improvements	\$205,000
T-7	WTP Building Seismic Retrofit	\$270,000

CHAPTER 8

DISTRIBUTION SYSTEM EVALUATION

Chapter Outline

- 8.1 Introduction
- 8.2 Sizing and Capacity
 - 8.2.1 System Pressure
 - 8.2.2 Fire Protection
 - 8.2.3 Deficiency Categories
- 8.3 Hydraulic Model Development
 - 8.3.1 Model Methodology
 - 8.3.2 Model Development
 - 8.3.3 Model Scenarios
- 8.4 Distribution System Analysis
 - 8.4.1 Recommended Distribution System Improvements
 - 8.4.2 Recommended Water Loss Programs
- 8.5 Summary of Recommended Distribution Improvements

8.1 INTRODUCTION

The combination of piping, storage, pump stations, and supporting infrastructure is conventionally defined as a water distribution system. For the purposes of this chapter, the discussion of water storage is excluded. Evaluations and recommended improvements to the City's water storage facilities are presented in Chapter 9.

The evaluations of this chapter were derived from the creation and study of a PC-based hydraulic model designed to replicate the City's distribution network. This model was used to simulate various operational modes, fire flow scenarios, and failure states in order to verify improvement recommendations. These recommendations are presented at the end of this chapter. Capital costs and a prioritized ranking of the recommendations appear in Chapter 12.

8.2 SIZING AND CAPACITY

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

Distribution mains must satisfy both normal consumer domestic demands and fire flows, and thus experience a wide range of operating velocities. Distribution mains are evaluated on their ability to provide fire flow during PDD periods. Most Cities now require new waterlines to be a minimum of 8-inches diameter for single-family residential areas, and 10-inches or larger for industrial, commercial, and multi-family areas with fire flows above 1500 gpm.

The American Water Works Association (AWWA) recommends piping velocities below 10 feet per second for distribution mains. Maximum friction loss recommendations for distribution mains should also be less than 10 feet of pressure head per 1,000 feet of pipe length. Exceeding this headloss criteria may result in loss of hydraulic conductivity and increased energy costs.

The following standards are recommended to determine water distribution system adequacy.

- Peak hour demands for the entire system must be met with system pressures remaining above 20 psi.
- The system must be capable of delivering the required fire flows to all portions of the distribution system (in combination with the peak day demand) while maintaining a minimum residual pressure of 20 psi at all service connections.

8.2.1 System Pressure

Pressure is the primary metric for evaluating the ability of a distribution system to deliver water. There are several concepts relating to water system pressure that must be defined for purposes of this discussion.

Pressure and Head. Water pressure (sometimes called head pressure) is directly related to the height to which water will rise in a standpipe at that location. Each psi of water pressure equates to 2.31 feet of water column height in a standpipe (the standpipe can be real or hypothetical). Under conditions of no flow through the pipelines, the water level elevation (in real or imaginary standpipes) will be the same at all points in a pressurized distribution system (to visualize this concept, imagine a lake, where under no-flow conditions the water level elevation is the same at all points). As the elevation of the ground surface changes, the height of water column above that same point will

change proportionately, and the pressure will change (conceptually, as the lake bottom elevation goes up or down, the water depth (and water pressure on the bottom) at that point also changes).

- *Pressure Change with Elevation.* Based on the pressure/head concept noted above, water pressure (i.e., head pressure) will increase with decreasing ground elevation, and will decrease as the ground elevation increases.
- *Static Pressure.* As noted above, pressure in a pipeline is constant at all points in that pipeline ONLY when there is no flow through the pipeline, AND when the elevation remains the same at all points. As noted above, in a real distribution system, the static pressure increases or decreases with changing ground elevation.
- *Head Loss.* As water flows through a pipe, pressure decreases along the length of the pipe due to friction loss between the water and the pipe walls. Similar to dry friction, water friction and turbulence along a pipeline walls results in energy loss from the moving object (i.e., flowing water), with the energy loss being manifested as reduced pressure. When the flow stops, the friction loss also stops, and so the system returns to static pressure levels.
- *Dynamic Pressure.* The dynamic pressure (sometimes called residual pressure) is the pressure measured at a point in the distribution system under some defined flow condition. While the *static* pressure in the distribution system remains relatively constant at a given point, the *dynamic* pressure (i.e., the actual observed pressure) can change dramatically. Therefore, pressure at any given point in the distribution system generally decreases as demand for water (and flow velocity) increases.

Periods of heavy fire flow demand depress system pressures significantly. ODWP standards (OAR 333-061-0025) stipulates that water suppliers must maintain a minimum pressure of 20 psi to all service connections at all times, including times of peak fire flow demand. Fire flows are typically modeled concurrent with the peak day demand.

8.2.2 Fire Protection

Table 5-9 in Section 5.6 details the fire flow requirements used for this master plan. These standards will be utilized in the fire flow evaluations of this chapter to ensure that the distribution system is suitably sized and configured to reliably deliver the required fire flows.

8.2.3 Deficiency Categories

In general, distribution system deficiencies fall into several general categories. Many elements of the water system may be experiencing more than one of these problems at the same time. These categories will be used to identify the deficiencies associated with particular elements of the system in the discussions of this chapter.

- *Lack of Capacity.* Undersized pipes cannot deliver peak water demands or fire flows. Although the water system may have capacity to deliver domestic flows, it is often unable to convey larger flows that may be required in an emergency. Pipes in this category have excessive headloss and create flow restrictions. This problem should be addressed either by increasing the size of the existing waterline or constructing new waterlines.
- *Lack of Facility.* Problems in this category are caused by the absence of a waterline, valve or hydrant, or inadequate looping to provide redundancy or reliability. In such cases new components should be constructed in order to increase system reliability or to simplify system operations.
- *End of Useful Life.* This category of problems is the result of old, damaged, or worn out pipes. The most common examples of these problems are leaky pipes and broken valves or hydrants. Corrective measures require the replacement or reconstruction of the failing component(s).

8.3 HYDRAULIC MODEL DEVELOPMENT

8.3.1 Model Methodology

A computer-based numerical model was utilized for this master plan. Modeling of water distribution systems is a proven and effective method for simulating and analyzing the performance of a distribution system under a wide range of operational and hydraulic conditions. A properly constructed and calibrated model permits a robust evaluation of the distribution system and often allows the designer to replicate and evaluate hydraulic scenarios that are too difficult or costly to perform in the real world. Such scenarios are useful to determine the overall strength of a distribution system and to identify weaknesses that require remediation. The evaluation of future pipeline sizes and routing can also be economically performed to ensure that the expansion of the distribution system occurs in an optimized fashion.

The modeling software used for this project was WaterCAD, a commercial modeling software package developed by Bentley Systems Incorporated. This software was utilized to calculate the flow throughout the distribution network and to quantify flow rates, pressures, headlosses, reservoir levels, and pump operating points under various consumer demand patterns and fire flow scenarios.

The general methodology used in the modeling process was to examine the existing distribution grid during various demand and fire flow scenarios. Pressure, flow, or connectivity deficiencies were used to formulate improvement scenarios to remedy the problem. These scenarios were then evaluated to determine their efficacy.

8.3.2 Model Development

At the most basic level the hydraulic model consists of nodes and links. Nodes represent the various elements of the system including water sources, pumps, storage tanks and pipe intersections. Links predominantly represent pipes and define the relationship between each node. The creation of the model utilized information from a variety of sources. The City's existing distribution system maps were used as a base in the early building stage and this information was supplemented with information from record drawings, previous engineering studies, field reconnaissance, and discussions with City staff.

Model pipe elements were constructed based on the diameter, length and material type of each pipe. Hazen-Williams roughness factors were assigned to the pipes based on typical values for pipe materials. Model nodes were placed at pipeline intersections, near fire hydrant locations, and in various locations to simulate clustered water service connections. The model nodes were populated with topographic information to ensure that elevation differences across the planning area were properly accounted for.

Existing pumps were replicated to perform at the currently utilized levels and set points. Reservoirs were constructed with tanks to match the physical geometry and assigned elevations to match the existing facilities.

Due to the simplicity of the City's water system the model was not "skeletonized." Skeletonization is a process which simplifies the system by eliminating or combining short pipe segments, consolidating pipe junctions and eliminating small diameter pipes with insignificant connectivity. This process was not used as the systems simplicity allowed for all pipes to be modeled without the model becoming cumbersome and overly specific.

Once the distribution network was created, the water demands established in Chapter 5 were allocated to specific nodes across the system.

8.3.3 Model Scenarios

The model was used to investigate a number of hydraulic scenarios in the distribution system. These scenarios were evaluated using a combination of steady state and dynamic simulations. The simulations produced a snap-shot of hydraulic conditions at a fixed period in time.

In particular, the hydraulic scenarios investigated include the following under existing conditions.

- Existing peak hour demands.
- Fire flows to each model node in combination with the existing peak day demand (without WTP in operation).

The model was also used to simulate various improvements to the distribution system to identify the most cost-effective solutions to address the system deficiencies. Simulations with several combinations of the proposed improvements were analyzed.

The results from the computer simulations were used to develop a list of long-range improvements required to address system deficiencies and to serve the City through the planning period. Since pipelines are not well suited for incremental expansion, it is most cost effective to size the pipes for fully built-out conditions. Steady state simulations of the future system at buildout were performed to determine the required pipe sizes. The following simulations were performed.

- Peak hour demands at build-out.
- Fire flows to each model node in combination with the existing peak day demand at build-out.

8.4 DISTRIBUTION SYSTEM ANALYSIS

The evaluation of the existing distribution system was performed to identify system deficiencies and possible remedies for the existing distribution grid, as well as improvements to serve future growth-related needs. This section presents improvements for the distribution system broken into several separate projects comprised of distribution and fire flow improvements. Table 8-1 at the end of the chapter summarizes these improvements.

This section evaluates the adequacy of the distribution system to deliver domestic water to all service areas, as well as an evaluation of the adequacy of system looping. Additionally, this section evaluates the adequacy of the distribution system to deliver fire flows to the Upper and Lower Radar Road service levels. Looped distribution systems are desirable when combined with sufficient valves, as it allows flows to be routed around the failure of any single distribution pipe. This provides service redundancy and facilitates repair work while keeping outage areas as small as possible. A looped configuration also provides multiple water paths to any specific point in the system, which reduces velocities along any given flow path and increases the system's ability to provide high volume fire flows (assuming the looped lines are adequately sized). Also covered in this section is an evaluation of end of useful life. As existing pipes and valves near the end of their useful life, they should be replaced before failure occurs. It can be reasonably assumed that new waterlines (PVC or ductile iron) will have a 75-year service life.

Yachats's distribution system was found to provide sufficient level of service for domestic flows. There are, however, a number of pipelines that should be upsized to accommodate fire flow requirements (Table 5-9). As noted above, ODWP rules require public water suppliers maintain a minimum pressure of 20 psi at all service connections at all times, including during fire flow events. The current distribution system is incapable of delivering desired fire flows while maintaining 20 psi at all service connections.

The City's distribution grid in general provides an adequate level of looping. There are however, a few areas in town where looping is not present and should be improved.

8.4.1 Recommended Distribution System Improvements

The recommended distribution system improvements are described in the following paragraphs. Maps graphically showing these improvements are included at the end of this section (Figure 8-1 through Figure 8-3). The reader is encouraged to review these figures along with the following descriptions to aid in the understanding of the recommendations. These improvements described below are generally recommended for one of three reasons: improving fire flows, improving system redundancy, or replacing infrastructure that is likely to reach the end of its useful life during the planning period. A ranked prioritization of these projects into a comprehensive implementation plan is presented in Chapter 12.

- **Water System Design Standards (Project D-1)**

Over the years, the City's distribution grid has been extended using a wide range of piping materials and sizes. The distribution grid has significant amounts of 6-inch diameter water lines. These are typically too small to consistently deliver fire flows in accordance with current building codes and the Oregon Fire Code. For this reason, most cities require minimum pipeline sizes of 8-inch diameter. Many cities document these requirements by publishing design standards that can be provided to developers and other relevant parties. These standards not only clarify pipe sizing requirements, they also document the city's standards with respect to materials, water service installations, fire hydrants, valves, etc. The lack of such standards in Yachats is a shortcoming the City can easily address. We recommend the City budget approximately \$5,000 to retain an engineering firm to develop standards for future development of the water system.

- **Pressure Reducing Valve Maintenance and Coordination (Project D-2)**

The City's water distribution system is separated into multiple elevation service levels (Table 4-5). Most of the City is located inside the lowest two service levels, the Upper and Lower Radar Road Levels. Five pressure reducing valves control the flow of water into sub-levels. These valves are a critical component of the City's distribution system. As described above (Section 4.6.3), the existing valves have not been serviced in many years. This is a major shortcoming that should be addressed early in the planning period. The recommended project includes the following sequence: service the valves, survey the elevation of each valve, install connections for accurate pressure gauges, verify the pressure set points for each valve, collect new flow data, and check the hydraulic model. This plan recommends that the City inspect each valve and perform the manufacturer's recommended service work. In addition to mechanical issues, the pressure set points for each valve may not be correct. The valves should be set at the same hydraulic grade line (elevation plus pressure). Since the valves are located at different elevations, they will have different pressure set points. In order to ensure that each valve is properly adjusted, we recommend the City survey the elevation of each valve along with the elevations of three reservoirs, including Horizon Hill, Middle Blackstone, and Upper Blackstone. This data should be kept in the City's records for future reference. We also recommend that the City install connections for new pressure gauges on each side of all valves. The connections should allow the gauges to be removed. Gauges that are permanently mounted and left in service tend to be easily damaged and provide incorrect readings. Instead of permanently-mounted gauges, the City can keep well-maintained gauges on the shelf that can be temporarily installed when service is required. Once the valves have been serviced and accurate pressure readings on each side of each valve are available, the City can use the elevation data to adjust the setpoints on each valve. Once this is completed, fire flow tests should be performed throughout town and this data should be used to check the validity of the hydraulic model used in this report. The total recommended budget for this work is \$50,000. The City does not need to perform all of the work at once. The sequence identified above can be performed over a period of time as funds allow.

- **Windsong Street Service Reconnections (Project D-3)**

Over the years, the City has allowed residents to connect to the distribution system at locations with static pressure below 40 psi. This is generally bad practice and should be avoided in the future. Figure 4-23 shows the service level boundaries in the City. This figure is intended to serve as a tool that the City can use to determine the appropriate service level for new homes and developments. The upper limit of each service level is defined as the elevation where the static pressure is equal to 40 psi. This is the practical upper limit where services should be connected. When services are connected at locations where the static pressure is less than 40 psi, they tend to limit the amount of fire flow available in the system because the pressure at the service connections rapidly drops below 20 psi during a fire flow event. Projects D-3 through D-7 are all recommended to correct portions of the system with static pressures below 40 psi. Though these projects are presented separately, it may make sense to construct them as a single project.

Project D-3 is recommended to improve fire flows throughout the central and northern parts of the City. At least two residential meters are serviced from the upper elevations of a 6-inch water line on Windsong Street. These meters are above the nominal 40 psi service level of the Lower Radar Road Service Level. During fire flow modeling, these services limited the amount of fire flow available to the service level because the pressure at these services rapidly drops to 20 psi as fire flows are discharged from the distribution system. These services would be best serviced from the Lower Blackstone Service Level instead of the Lower Radar Road Service Level. Reconnecting these services to the higher level, above the Lower Blackstone Pump Station, would allow the distribution system to deliver larger fire flows while maintaining 20 psi at these services. The recommended budget for this work is \$11,000.

- **New PRV at 7th Street & Radar Road (Project D-4)**

This project is recommended to improve the fire flows to the central and northern parts of the City. Projects D-6 and D-7 including switching portions of the distribution system located at higher elevations from the Lower Radar Road Service Level to the Upper Radar Road Service Level. Once projects D-6 and D-7 are completed, the Upper Radar Road Service Level will be physically connected to the Lower Radar Road Service Level and a pressure reducing valve will be needed to regulate flow between the two levels. As described above for Project D-3, the City should consider constructing Projects D-3 through D-7 as a single larger project. The recommended budget for this project is \$101,000.

- **New PRV on King Street Between 7th and Prospect Ave (Project D-5)**

This project is similar to Project D-4 and is needed for the same reasons. As described above for Project D-3, the City should consider implementing Projects D-3 through D-7 as a single larger project. Projects D-3 through D-7 are all needed for the same general reason and it makes sense to construct them concurrently. Once projects D-6 and D-7 are completed, the Upper Radar Road Service Level will be physically connected to the Lower Radar Road Service Level and a pressure reducing valve will be needed to regulate flow between the two levels. The recommended budget for this project is \$101,000.

- **New 8" Water Main in Radar Road (Project D-6)**

This project is recommended to improve fire flows to the central and northern parts of the City. The pipe along Radar Road west of the Lower Radar Road Reservoir is currently fed from the Lower Radar Road Reservoir. This area of the City is above the service level for the Lower Radar Road Reservoir. As a result, this section of the system limits the amount of fire flow that can be discharged from much of the distribution system. The proposed project includes an 8-inch waterline that will feed this area from 12-inch pipe that is connected to the Upper Radar Road Reservoir. Once this project is completed, the Upper and Lower Radar Road Service Levels will be connected and a PRV (i.e., Project D-4) will be needed to regulate the flow through the service levels. As described above for Project D-3, the City should consider constructing Projects D-3 through D-7 as a single larger project. Projects D-3 through D-7 are all needed for the same general reason and it makes sense to construct them concurrently. As described in Chapter

10, this pipeline segment is a major backbone of the City's distribution grid. Therefore, the City should consider using earthquake resistant piping materials for this installation such as HDPE pipe or restrained joint ductile iron pipe. The estimated length of the pipe is 200 feet. The recommended budget for this project is \$57,000. A detailed breakdown of this budget is included in Appendix B.

▪ **New 8" Water Main in King Street West of Prospect Ave (Project D-7)**

This project is recommended to improve fire flows to the central and northern parts of the City. The pipe along King Street west of the intersection with Prospect Avenue is currently fed from the Lower Radar Road Reservoir. This area of the City is above the service level for the Lower Radar Road Reservoir. As a result, this section of the system limits the amount of fire flow that can be discharged from much of the distribution system. The proposed project includes an 8-inch waterline starting from the 12-inch pipe in Prospect Avenue that is connected to the Upper Radar Road Tank, west along King Street to an existing 6-inch pipe. Once this pipeline is completed it will connect the Upper Radar Road Reservoir to the Lower Radar Road Service Level. Therefore, a pressure reducing valve (i.e., Project D-5) will be needed to regulate the flow between the two service levels. At least four water services will have to be reconnected as a part of the project. The estimated length of the pipe is 250 feet. The recommended budget for this project is \$86,000. A detailed breakdown of this budget is included in Appendix B. As described above for Project D-3, the City should consider constructing Projects D-3 through D-7 as a single larger project. Projects D-3 through D-7 are all needed for the same general reason and it makes sense to construct them concurrently.

▪ **New 8" Water Main in Third Street (Project D-8)**

This project is recommended to improve fire flow to the central & northern parts of the City and to replace infrastructure reaching the end of its useful life during the planning period. The water main between Highway 101 and Prospect Avenue on 3rd Street is 4-inch diameter asbestos concrete (AC) pipe. This pipe is undersized and it is common to replace aging AC pipe to minimize the potential for pipe failures. The approximate length of pipe is 450 feet. Several water services are served by the existing water line. The recommended budget for this project is \$167,000. A detailed breakdown of this budget is included in Appendix B.

▪ **New 4" Water Main and PRV on Horizon Hill Road (Project D-9)**

This project is recommended to improve the reliability and redundancy for an area along Horizon Hill Road. The existing pipe in the "Horizon Hill Loop" is 2-inch thin-walled PVC. This pipe is fragile and susceptible to pipeline failure. It is recommended that this loop be replaced with 4-inch C-900 PVC. This project additionally recommends an additional waterline to connect to this loop from the water main near the Horizon Hill Pump Station. This additional water main will provide a loop to this area to improve redundancy of supply in the event the main supply line fails. A PRV will be required to be installed on this new line in order to reduce pressure to this area. The approximate length of pipe is 3,800 feet of 4-inch. The total recommended budget for the project is \$737,000. A detailed breakdown of this budget is included in Appendix B.

▪ **Retrofit Combs PRV (Project D-10)**

This project is recommended to improve fire flows to the Quiet Water Subdivision. The proposed project is to retrofit the existing PRV on Combs Circle. This PRV separates the Upper and Lower Radar Road Service Levels. It was taken out of service due to abnormal operating behavior. As previously discussed under Project D-2, the PRV elevation should be surveyed and the PRV hydraulically reconfigured to allow water to pass through it in the event of high demand, such as a fire flow. It is expected that the piping and vault can be salvaged, but the valve will need to be replaced and recalibrated. The total recommended budget for this project is \$40,000.

▪ **Yachats Ocean Road Service Reconnections (Project D-11)**

This project is recommended to simplify the distribution system by reconnecting at least two services on Yachats Ocean Road. Two services are served by a 2-inch waterline that is not in the right-of-way and runs along an odd alignment through private property. As such, this line is difficult to maintain. These services would be better served

from the 6-inch mainline in Ocean Hills Road. It is recommended that these services be reconnected to the 6-inch water main and to abandon the existing 2-inch water main. This may be a project that can be completed by City staff. The total recommended budget for this project is \$20,000.

- **New 8" Water Main in Green Hill Drive (Project D-12)**

This project is recommended to improve fire flows to the southern part of the City and the replace an undersized pipe. The proposed project includes replacing the 2-inch PVC water main in Green Hill Drive with an 8-inch water main. This water main would connect the 10-inch water main on Highway 101 to the relatively new 8-inch water main on Crest View Drive near the South Tank. This pipe is approximately 850 feet. This project will require coordination with ODOT, since the waterline would cross Highway 101. It is envisioned that the highway crossing will be by and auger bore. As described in Chapter 10, this pipeline segment is a major backbone of the City's distribution grid. Therefore, the City should consider using earthquake resistant piping materials for this installation such as HDPE pipe or restrained joint ductile iron pipe. The recommended budget for this project is \$412,000. A detailed breakdown of this budget is included in Appendix B.

- **Replace 4" AC with 8" PVC in 2nd Street from Prospect Ave to Yachats River Road (Project D-13)**

This project is recommended to improve fire flows to the central part of the City and to replace infrastructure reaching the end of its useful life during the planning period. The water main between Prospect Avenue and Yachats River Road on 2nd Street and Cedar Avenue is 4-inch diameter asbestos concrete (AC) pipe. This pipe is undersized and it is common to replace aging AC pipe to minimize the potential for pipe failures. The new pipe will connect to the existing 6-inch pipe that is not in use between Loma Avenue and Spruce Avenue. A short section of AC pipe near Spruce Avenue would also be replaced in order to connect the existing 6-inch pipe to the main serving the Quiet Water Subdivision. These improvements are depicted in Figure 8-2. The approximate length of new pipe is 1,300 feet. Approximately 24 water services are served by the existing water lines that would have to be reconnected. The recommended budget for this project is \$398,000. A detailed breakdown of this budget is included in Appendix B.

- **8" Water Main Highway 101 from 6th to Marine Dr. (Project D-14)**

This project is recommended to improve fire flows to the central and northern parts of the City, to replace a major portion of the City's aging infrastructure, and to fortify the backbone of the City's water distribution system. The proposed project includes replacing approximately 1,300 feet of 4-inch AC pipe and 300 feet of 2-inch pipe with 8-inch pipe along Highway 101. It is recommended that this new waterline connect to the 6-inch waterline at the intersection of 101 and 6th Street. This project will require substantial coordination work with ODOT. As described in Chapter 10, this pipeline segment is a major backbone of the City's distribution grid. Therefore, the City should consider using earthquake resistant piping materials for this installation such as HDPE pipe or restrained joint ductile iron pipe. The recommended budget for this project is \$583,000. A detailed breakdown of this budget is included in Appendix B.

- **Pontiac Street Waterline - 3rd to 4th (Project D-15)**

This project is recommended to improve fire flow and looping in the central part of the City. The proposed project is to connect the 6-inch water main on Fourth Street with the 4-inch water main on Third Street by adding an 8-inch water main on Pontiac Street. The approximate length of the pipe is 225 feet. The recommended budget for this project is \$88,000. A detailed breakdown of this budget is included in Appendix B.

- **Shell Street Waterline (Project D-16)**

This project is recommended to improve fire flow and looping in the southern part of the City. The proposed project is to connect the 6-inch water main on Yachats Park Road with the 6-inch water main on Shell Street by adding an 8-inch water main. This water main would replace the existing 2-inch pipe. The approximate length of the pipe is 225 feet. The recommended budget for this project is \$79,000. A detailed breakdown of this budget is included in Appendix B.

- **Gender Drive and Windy Way Waterlines (Project D-17)**

This project is recommended to improve the reliability and capacity of water lines on Gender Drive and Windy Way. The proposed project is to replace the existing 2-inch water lines on these streets with 8-inch water lines. The approximate length of pipe is 650 feet. An estimated 19 services would have to be reconnected as a part of the project. The recommended budget for this project is \$254,000. A detailed breakdown of this budget is included in Appendix B.

- **Pontiac Street Waterline - 2nd to 3rd (Project D-18)**

This project is recommended to improve fire flow and looping in the central part of the City. The proposed project is to connect the 4-inch water main on 3rd Street with the 6-inch water main on 2nd Street by adding an 8-inch water main on Pontiac Street. The approximate length of the pipe is 300 feet. The recommended budget for this project is \$105,000. A detailed breakdown of this budget is included in Appendix B.

- **Hanley Drive Waterline (Project D-19)**

This project is recommended to improve water line redundancy and looping along Hanley Drive. This would provide a looped system instead of a dead-ended system. The proposed project includes approximately 150 feet of 6-inch pipe. Two PRVs currently serve two separate sub-levels in this area, the Hanley Drive PRV and the Upper Radar Road PRV. The project would adjust these PRVs to deliver the same static pressure at their interconnection point and connect both ends of the systems served by the PRVs. As previously discussed under Project D-1, all of the City's PRV head conditions and set points are recommended to be coordinated and updated. This project only addresses the additional cost of the piped connection. The recommended budget for this project is \$47,000. A detailed breakdown of this budget is included in Appendix B.

- **Automated Water Meter Reading System (Project D-20)**

In recent years, the City has been replacing old meters with radio-read meters. These meters are currently read by City staff using a drive-by vehicle-based radio reading system. Rather than using a drive-by radio reading system, some municipalities install a radio network throughout the City that can be used to read the meters in real-time without using hand-held or vehicle-mounted equipment. These systems consist of a network of radio receiving stations installed around the City in strategic locations. These stations are typically used to read data from each meter on an hourly basis. The City would contract with a company to encrypt and securely host the data. The City can even set up a customer portal that can be used by residents to view water usage data in real-time. These systems are known as Advance Meter Infrastructure (AMI) systems. The nearby Seal Rock Water District has this type of system as do several other municipalities in Oregon. Later in the planning period when the City has a sufficient number of radio read meters, it may make sense for the City to install the AMI equipment. This will require working with a system manufacturer to perform a radio study of the City. The radio study will identify the number and location of radio-read stations required to cover the City. These same companies can also host the data and the customer portal. As this time, the total number of receiving stations that would be needed for an AMI system in Yachats is not known. But based on the relatively complex topography in the City, a higher-than-average number of receiving stations will likely be needed. Assuming three radio-reading stations are required, the total recommended budget for this project is \$327,000. A detailed breakdown of this budget estimate is included in Appendix B. This only includes the radio-receiving stations and associated software infrastructure. It does not include the cost of any additional meters needed by the City. It is also important to note that this is just the initial installation cost. The City will need to also budget for the annual costs associated with the third-party data hosting and customer portal management. These annual fees will likely be \$25,000 - \$50,000 depending on the hosting company and the desired level of service.

- **New Radar Road Pump Station (Project P-1)**

This project is recommended to replace the existing Radar Road Pump Station. The proposed project includes demolition of the existing station and construction of a new station in the same location. As discussed in more detail in Section 4.5.2, the Radar Road Pump Station has served the City for many decades and is expected to require relatively high repair & maintenance costs during the planning period due to its age. Rather than incur increased O&M costs, it may make for sense for the City to replace the station with more modern facilities. That said, the City can probably continue to maintain the system and delay replacement to the next planning period if desired. The Radar Road Pump Station delivers water to the Horizon Hill Reservoir. The Horizon Hill Reservoir can also receive water from the Upper Blackstone Reservoir. It is expected that this redundancy will allow the Radar Road Pump Station to be taken entirely off line during construction. The pump station does not currently have an auxiliary power generator. It is recommended that the new pump station include a generator in the event of a prolonged loss of line power. This will help ensure that service can be maintained to users higher in the distribution system. The recommended budget for this project is \$767,000. A detailed breakdown of this budget is included in Appendix B.

- **New Horizon Hill Pump Station & Reservoir (Project P-2)**

This project is recommended to replace the existing Horizon Hill Pump Station & Reservoir. The proposed project includes demolition of the existing station & reservoir and construction of a new pump station and reservoir in the same location with a relatively similar footprint. As discussed in more detail in Section 4.5.3, these facilities have served the City for many decades and are expected to require relatively high repair & maintenance costs during the planning period due to their age. Rather than incur increased O&M costs, it may make for sense for the City to replace the pump station and reservoir with more modern facilities. That said, the City can probably continue to maintain the system and delay replacement to the next planning period if desired. The Horizon Hill Pump Station delivers water to the Upper Blackstone Reservoir. The Upper Blackstone Reservoir can also receive water from the Middle Blackstone Pump Station. It is expected that this redundancy will allow the Horizon Hill Pump Station to be taken entirely off line during construction. The Horizon Hill Reservoir serves users in the Horizon Hill Service Level. The water supply to this service level will need to be maintained during construction of the new reservoir. This function can be provided from the Upper Blackstone Reservoir by installing an additional PRV. This would be installed near the Horizon Hill Pump Station to connect the Middle Blackstone Service Level to the Horizon Hill Service Level. This PRV would allow the City to take the Horizon Hill Pump Station off line in the future if need be. It is envisioned that this PRV would be installed prior to demolishing the pump station and reservoir. An existing PRV in the pump station may be able to be salvaged and installed for this purpose. This is the PRV that is used to fill the Horizon Hill Reservoir from the Upper Blackstone Reservoir. The recommended budget for this project is \$1,079,000. A detailed breakdown of this budget is included in Appendix B.

8.4.2 Recommended Water Loss Programs

A detailed evaluation of the amount of water losses from the distribution system is contained in Section 5.4.2. The data shows that approximately between 11% and 16% of the water produced is not currently accounted-for. Some of this water is being lost through leakage in the distribution system and some of the loss is likely attributed to authorized uses that are not being properly measured. The City should consider the reduction of unaccounted-for water as a major priority, as it will result in significant benefits to all four areas of the water system (i.e., source, treatment, distribution and storage). Minimizing water loss below 15% is critical for the City as it is required in order for the City to use the Yachats River as a water source. As explained in Chapter 6, this plan recommends the construction of a new Yachats River intake to augment the City's water supply system. The City's water rights for the Yachats River along with a subsequent settlement (see Section 4.1.5) require system losses below 15% before the City is permitted to access water from the Yachats River. Therefore, it is critical that the City implement the following

two programs. Over the years, the City may need to increase or may be able to decrease the recommended funding amounts for these programs depending on the effectiveness.

This plan recommends two strategies to reduce the amount of unaccounted-for water. The first is to implement a better data management and tracking system to track and records water production amounts, water consumption amounts, authorized and non-metered water use, such as fire flows, construction water, and water for flushing. The second recommendation is an aggressive leakage testing and repair program. Specific recommendations are discussed in the following paragraphs.

- *Non-Metered Water Use Tracking System (Pgm-1)*

As described in Section 5.4.2, a comparison of water production versus water sold shows several months where the water sold was greater than the water produced. This is very unlikely to be accurate and is probably the result of inaccurate accounting practices. The City should investigate the cause for this and develop a more accurate data management strategy to accurately track water production versus water sold. In addition to improving the City's data management, some of the unaccounted-for water is likely the result of authorized uses such as filter backwash, filter to waste, fire flow measurements, construction water use, street cleaning, etc.. In order to prepare accurate estimates of water loss, the City should develop strategies for tracking the quantities of water used for all legitimate unmetered uses. Where appropriate (e.g., filter backwash lines, filter to waste lines, etc.), the City should consider the installation of new flow meters. For uses where a meter cannot be installed quantities should be estimated and tracked on an annual basis in order to better estimate the actual amount of water that is lost to system leakage. This program is a relatively straight-forward record keeping exercise that public works staff should be able to implement at minimal cost. An annual budget of \$1,000 is recommended for this program. To some extent, the value is a "place-holder" and the City may find that the required tracking system can be folded into the normal day to day operations of the Public Works Department. An example of the type of work required includes coordination with the local fire department to estimate the amounts of water used for fire-fighting and hydrant flow measurements. Staff should also spend time identifying all legitimate non-metered use and develop procedures to estimate the quantities of water used along with implementing a record keeping system.

- *Leak Detection and Repair Program (Pgm-2)*

The City has been diligent about monitoring the system for leakage and has typically tested the entire system for leakage about every two to three years. Therefore, this program is simply a way to formalize the City's existing practices. Most small cities like Yachats retain an outside vendor to provide a leak detection survey. Several companies offer these services in Oregon. In most cases, they are able to pinpoint the location of a leak relatively accurately. Leak detection of the entire system could be performed in roughly 3-4 days at a total estimated cost of approximately \$6,000. We recommend that the City establish a goal for an annual budgetary line item of \$3,000 to perform leakage testing of the entire system once every three years. The costs for repairs are difficult to estimate in a planning document, but a reasonable amount to initially start with would be about \$27,000 per year. Therefore, the total recommended annual budget for this program is \$30,000. Leak detection and repair should be considered a normal part of water system operation and maintenance. As the distribution system continues to age, new leaks will likely develop, so, this program should be continued indefinitely. This program is also important from a water supply perspective. The recommended water supply strategy discussed in Chapter 6 includes the construction of new intake on the Yachats River. The City's water rights for the Yachats River include a condition that water loss must be less than 15%. Therefore, this program and Program-1 are important to achieve and maintain water loss levels low enough to show compliance with the City's water rights for the Yachats River.

8.5 SUMMARY OF RECOMMENDED DISTRIBUTION IMPROVEMENTS

Several improvement projects have been identified based on the hydraulic analyses presented in this chapter. Distribution projects have been suggested to improve a combination of capacity and age deficiencies. Other improvement projects are intended to strengthen fire flows, and system redundancy. These improvement recommendations are summarized in Table 8-1 and graphically depicted on Figure 8-1 through Figure 8-3.

Table 8-1 | Recommended Distribution Improvements

Project Code	Description/Location	Existing Size (inch)	Recommended Size (inch)	Length (feet)	Recommended Budget
D-1	Water System Design Standards	-	-	-	\$5,000
D-2	Pressure Reducing Valve Maintenance & Coordination	-	-	-	\$50,000
D-3	Windsong Street Service Reconnections	-	-	-	\$11,000
D-4	New PRV at 7th Street & Radar Road	-	-	-	\$101,000
D-5	New PRV on King Street Between 7th and Prospect Ave	-	-	-	\$101,000
D-6	New 8" Water Main in Radar Road	-	8	200	\$57,000
D-7	New 8" Water Main in King Street West of Prospect Ave	-	8	250	\$86,000
D-8	New 8" Water Main in Third Street	4	8	450	\$167,000
D-9	New 4" Water Main and PRV on Horizon Hill Road	4	4	3,800	\$737,000
D-10	Retrofit Combs PRV	-	-	-	\$40,000
D-11	Yachats Ocean Road Service Reconnections	-	-	-	\$20,000
D-12	New 8" Water Main in Green Hill Drive	2	8	850	\$412,000
D-13	Replace 4" AC with 8" from Prospect Ave to Yachats River Road	4	8	1,300	\$398,000
D-14	8" Water Main Highway 101 from 6th to Marine Dr.	4 / 2	8	1,600	\$583,000
D-15	Pontiac Street Waterline - 3rd to 4th	-	8	225	\$88,000
D-16	Shell Street Waterline	2	8	225	\$79,000
D-17	Gender Drive and Windy Way Waterlines	2	8	650	\$254,000
D-18	Pontiac Street Waterline - 2nd to 3rd	-	8	300	\$105,000
D-19	Hanley Drive Waterline	-	6	150	\$47,000
D-20	Automated Water Meter Reading System	-	-	-	\$318,000 ⁽¹⁾
P-1	New Radar Road Pump Station	-	-	-	\$767,000
P-2	New Horizon Hill Pump Station & Reservoir	-	-	-	\$1,079,000

Recurring Annual Programs

Pgm-1	Non-metered Water Use Tracking System	\$1,000 / year
Pgm-2	Leak Detection and Repair Program	\$30,000 / year

Notes:

(1) Annual costs for data hosting & customer portal management and meters are not included in costs.

Figure 8-2] Map of Recommended Distribution System Improvements

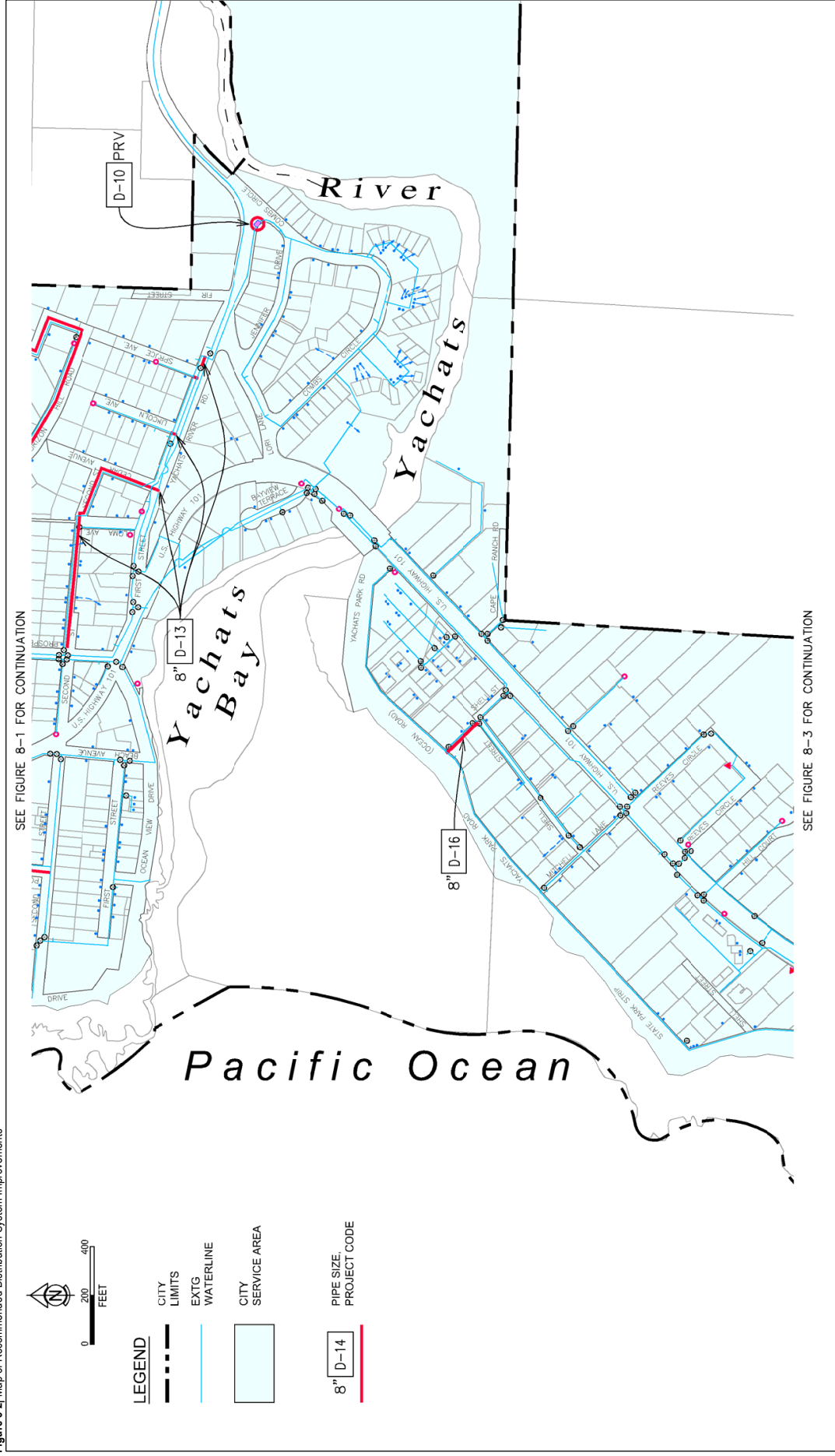
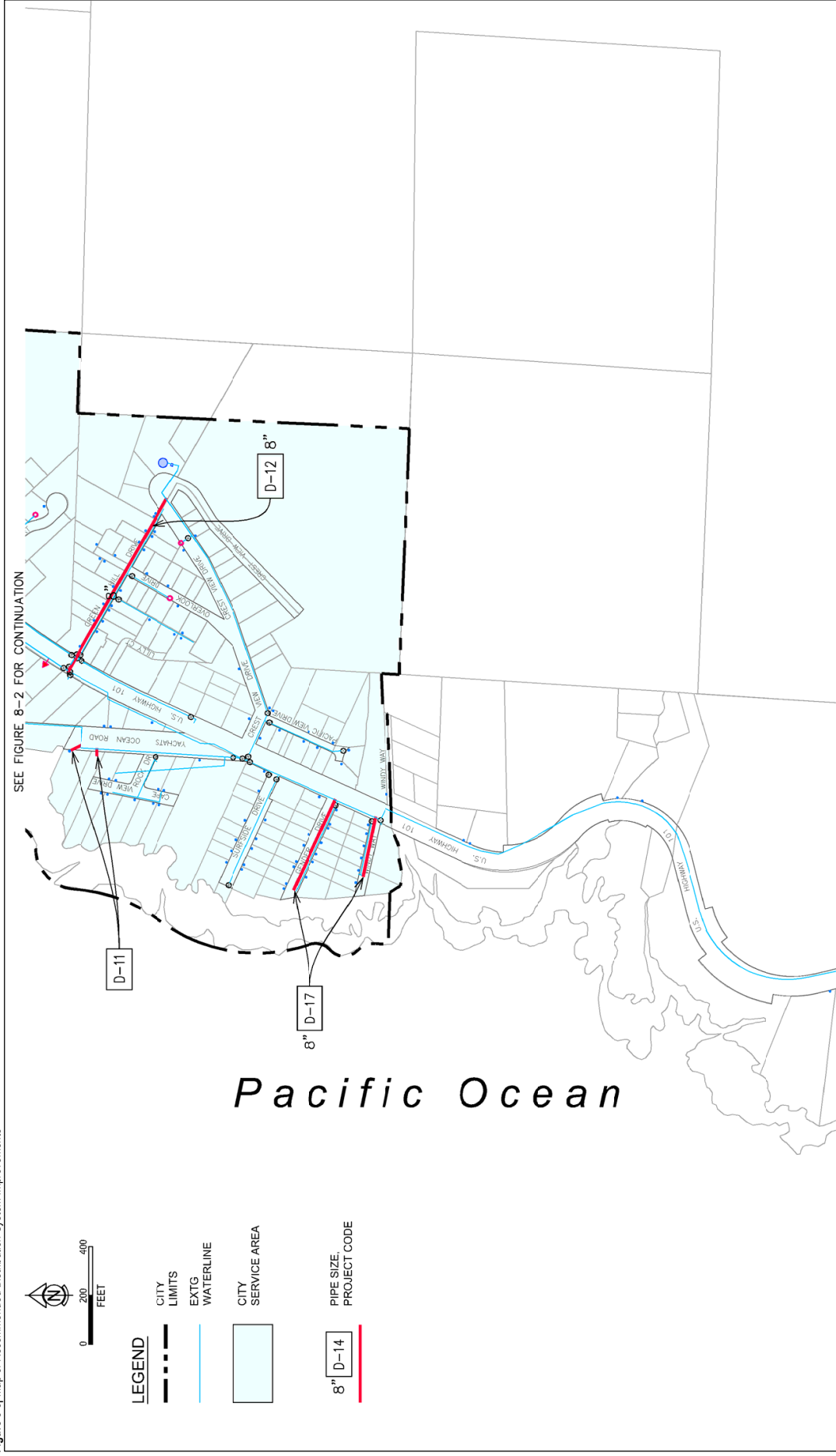


Figure 8-3 | Map of Recommended Distribution System Improvements



CHAPTER 9

WATER STORAGE EVALUATION

Chapter Outline

- 9.1 Introduction
- 9.2 Reservoir Evaluation & Design Criteria
 - 9.2.1 Storage Volume Categories
 - 9.2.2 System Pressure
 - 9.2.3 Water Quality
 - 9.2.4 Reliability of Pumped Sources & Pumped Storage
 - 9.2.5 Redundancy
- 9.3 Water Storage Analysis
 - 9.3.1 Storage Volume Assumptions & Estimates
 - 9.3.2 Storage Volume Evaluation
- 9.4 Evaluation of Existing Storage Tanks
 - 9.4.1 Upper Radar Road Reservoir
 - 9.4.2 Lower Radar Road Reservoir
 - 9.4.3 Horizon Hill Reservoir
 - 9.4.4 Middle Blackstone Reservoir
 - 9.4.5 Upper Blackstone Reservoir
 - 9.4.6 South Reservoir
- 9.5 Recommended Improvements
- 9.6 Summary of Recommended Storage Tank Improvements

9.1 INTRODUCTION

This chapter presents an analysis and recommendations for the City's water storage facilities. Although closely integrated with the overall water distribution system as discussed in Chapter 8, this report presents water storage as a separate discussion to focus on several key issues unique to this subset of the distribution system.

The City's existing storage reservoirs are described in greater detail in Chapter 4. The City has six finished water storage tanks and one raw water storage tank. For the purposes of this evaluation, the raw water storage tank is not considered in the storage analysis because raw water must be processed by the treatment plant before it is usable to the grid. Throughout this chapter, the terms "reservoir" and "tank" are used interchangeably.

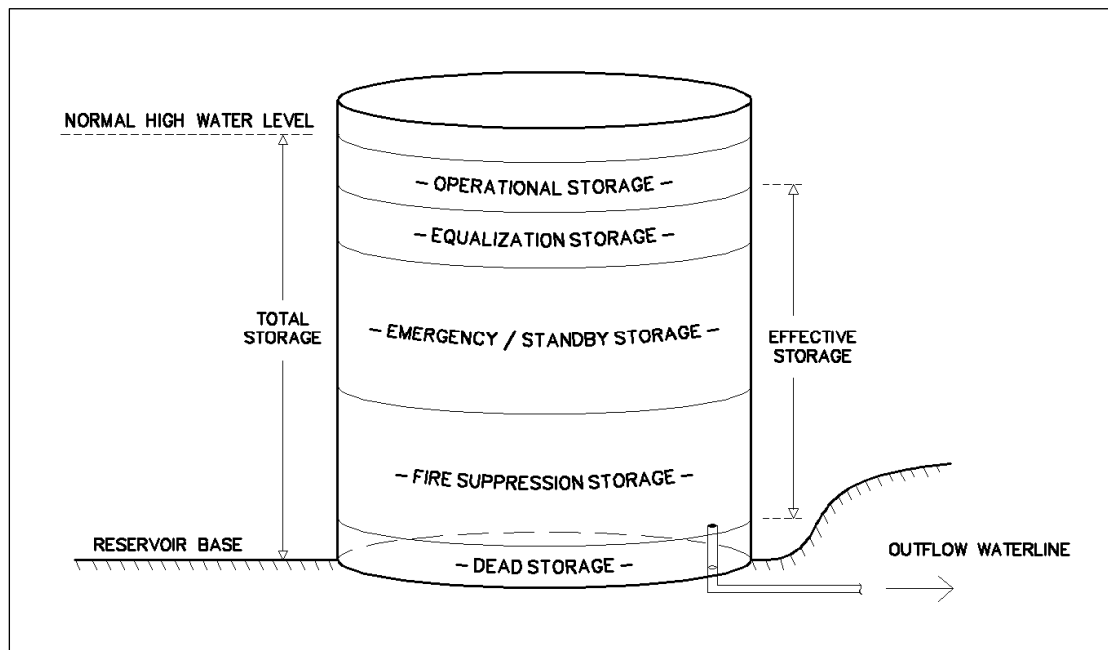
9.2 RESERVOIR EVALUATION & DESIGN CRITERIA

Per OHA-DWS rules, engineers are responsible for planning and designing stable and durable reservoirs that meet demands and protect the quality of stored water. Some of the evaluation criteria utilized in the analysis and recommendations of this chapter are discussed below.

9.2.1 Storage Volume Categories

The primary function of water storage is to provide a reserve of water to equalize daily variations between supply and consumer demand, to serve fire-fighting needs, and to meet system demands during an emergency interruption of supply. The overall storage within a system can be divided into several categories as depicted in Figure 9-1. The following sub-sections define these storage allocation categories. An evaluation of how these categories apply to the City's water system is discussed in Section 9.3.

Figure 9-1| Storage Volume Categories in a Typical Reservoir



9.2.1.1 Operational Storage

Storage volume within the upper elevation of a storage tank is used by the system operators to control the start and stop of the pumps or sources which fill the reservoir. The operational storage volume is not counted as part of the “effective storage” volume (discussed below), since emergency conditions are as likely to begin when the water level is at the bottom of the operational storage range as when it is at the top of the range. The overall elevation difference (storage volume) required by the pump control system is determined by the type of instrumentation, the number of pumps or sources that fill the reservoir, and operator preferences.

9.2.1.2 Equalization Storage

Equalization storage is storage that is utilized to meet short term consumer demands that exceed the production capacity of the supply sources. As previously discussed, water demands vary throughout the day based on the water use patterns of the community in addition to variations in use for multiday durations. Demand fluctuations are influenced by the relative mix of residential, commercial and industrial use, as well as by the weather. Commercial and light industrial use tend to be relatively constant through the normal daytime hours (with light to no use at night), while residential use fluctuates between relatively high flows in the morning, low flows during the day, higher flows in the evening, and minimal flows at night. The equalization storage volume required is typically determined as either a percentage of the peak day demand (PDD), generally 20 to 40%, or by determining the deficit between the peak hour demand (PHD) and the available supply for a determined duration—generally 2 to 4 hours.

9.2.1.3 Standby Storage (Emergency Storage)

Standby storage is storage required to meet demand during emergency situations such as power outages, supply pipeline failures or natural disasters (often termed as emergency storage). The amount of emergency storage provided can be highly variable depending upon *reliability and diversity of supply sources, an assessment of risk, and the desired degree of system reliability*.

Sources that are “continuously available to the system” means sources that comply with all of the following.

- (1) Source is either gravity feed to the storage reservoir, or is equipped with adequate and functional pumping equipment, and the source is provided with adequate and functional treatment equipment (if required).
- (2) The pumping and/or treatment equipment is regularly used (or is exercised regularly to ensure its integrity, if not regularly used).
- (3) Water is available from the source year-round. The capacity of the source is limited to the flow during the lowest flow period (dry-season limited).
- (4) The source activates automatically based on pre-set parameters (i.e., reservoir level, water system pressure, or other conditions).
- (5) Pumped source provided with on-site auxiliary backup power equipment (with an automatic transfer switch), or there is a separate dedicated mobile generator for each source which is equipped with a manual transfer switch.

Sources which do not comply with these requirements cannot be reasonably considered to be available during a major emergency, including a system wide power outage, particularly if sources are located in rural areas where restoration of power may take some time.

9.2.1.4 Fire Suppression Storage

Fire suppression storage is storage required to satisfy the largest design fire flow demand in the system. Fire storage volume is calculated by multiplying the design fire flow rate by its required duration. For this planning effort the design

fire flow volumes are identified in Section 5.6. As described in that section the largest fire flow requirement is for commercial/industrial areas and is 480,000 gallons.

9.2.1.5 Dead Storage

The volume of unusable water stored in a reservoir that either cannot be withdrawn, or which lies below the minimum recommended operating level of the reservoir (i.e., the minimum level required to maintain required suction pressure on pumps, etc). Dead storage that is not available without violating the recommended operating conditions of distribution or fire pumps cannot be counted for the purposes of water storage planning.

For Yachats, effectively all water flows by gravity from the storage tanks into the distribution system. A small amount is held in the tanks to accumulate sediment. Therefore, dead storage in the City's tanks is considered to be negligible.

9.2.1.6 Pumped Storage

Pumped storage is stored water that lies below the normal hydraulic head level of the distribution system (i.e., in ground storage tanks). This is water that must be pumped into the distribution system or into an elevated tank before it is available in the distribution system. If the pumps that move this stored water into the distribution system are not available during an emergency, the pumped storage water is also unavailable.

Yachats does not have any pumped storage and no pumped storage is recommended in this plan. All water flows by gravity from the storage tanks into the distribution system. Therefore, the reliability of pumped storage is not an issue for the City.

9.2.1.7 Effective Storage

As noted above, the total volume in a reservoir often does not equal the effective volume available to the water system. The effective storage volume is defined as the reservoir volume below the bottom of the operational storage level, minus any dead storage. Effective storage in Yachats is estimated in Table 9-1.

9.2.2 System Pressure

In most municipal distribution systems, the service pressure is determined by the elevation of the free water surface in the storage reservoirs serving the system. This is the case for the City's distribution system. Service pressures begin with available static pressure created by the Upper Radar Road Reservoir and are reduced en-route to other tanks or to the consumer by friction losses in the pipe network. In such systems supplied by tanks set above the service level (either elevated tanks or tanks set on a hill), the overflow elevation of the reservoir is a critical design factor, as it directly controls the static pressure of the system.

Service pressures in Yachats at the point of delivery typically range from 40 to 90 psi. Pressures below this range cause inaccuracies in customer meters and flow reductions during periods of high demand whereas pressures above this range can damage domestic plumbing systems. Service pressures above this range must be reduced with a pressure regulating valve. This plan recommends maintaining the existing operating pressure range in the City. Some of the lower elevation areas of the City have static pressures that exceed 90 psi. Services in these areas should be fitted with pressure reducing valves to protect the plumbing systems in the structures that are being served.

9.2.3 Water Quality

There are no specific regulatory requirements for water turnover rates in storage facilities, but industry sources suggest a complete water turnover be accomplished every 3 to 5 days. Experiences with reservoirs with cement-based internal surfaces suggest a slightly higher turnover rate of 5-7 days.

Historically water storage facilities are operated at near full levels to maintain system pressure and maximize storage volumes for emergencies; however, in times of non-emergency the large storage volumes reserved for firefighting can create water quality problems. Degraded water quality in storage facilities is frequently the result of under-utilization and poor mixing during filling cycles. As water ages, there is also a greater potential for disinfection by-product (DBP) formation.

Excessive water age can result in a diverse set of problems ranging from the loss of residual disinfectant, problems with bacterial proliferation or regrowth, increased formation of DBPs, taste and odor issues, as well as temperature and pH instabilities.

The City currently has approximately 1.6 million gallons of total storage. The existing average daily demand is approximately 0.132 mgd. Therefore, the theoretical turnover rate is about once every 12 days. This is somewhat higher than ideal conditions. However, the City does monitor the finish water quality in tanks with grab samples. Historically they have not had problems with finish water quality, including low residual chlorine and disinfection byproducts.

9.2.4 Reliability of Pumped Sources & Pumped Storage

The City has two sources of finished water, the Water Treatment Plant and the Intertie, both of which must be pumped to the City's distribution grid. As discussed in 4.1.6, the Intertie is not considered a reliable long-term source. As such, the analysis below is based on the assumption that the Intertie will not be available.

The other source of pumped drinking water can be from ground storage tanks. The City does not have any pumped ground storage tanks, so reliability of pumped storage is not an issue.

Clearly, the provision of emergency backup power and redundant pumping is critical for systems that rely heavily on pumped sources or pumped storage. The recommended water treatment plant improvements (see Chapter 7) include the installation of a backup power generator to operate the water treatment plant and the finished water pump station. Therefore, the analysis presented below is based on the assumption that the water treatment plant and the finished water pump station will be provide continuously available water by about 2025.

9.2.5 Redundancy

A lack of redundancy with regard to storage facilities is most frequently encountered when a reservoir must be taken off-line for cleaning, inspection or maintenance. While some of these procedures can be accomplished with a facility on-line, others (such as internal recoating) cannot. It is therefore recommended that the planning and construction of reservoir improvements provide the City operators with the flexibility to maintain these important facilities where feasible. For example, a seismic retrofit project is recommended for the Upper Radar Road Reservoir. This reservoir will most likely have to be taken out of service in order to complete these improvements. Redundant storage is needed in order for the City to maintain adequate fire flows during construction. Storage redundancy is also critical in the wake of natural disasters. As discussed in previous chapters, seismic events present the largest natural disaster threat to these structures.

Redundant storage is a problem in Yachats specifically for the Upper Radar Road Reservoir and for the Upper Blackstone Reservoir. As mentioned above, the Upper Radar Road Reservoir will likely need to be taken entirely

offline in order to complete seismic improvements. The water system does not have the ability to fight a major fire without this reservoir in operation. Therefore, taking the Upper Radar Road Reservoir out of service without making any other improvements would increase the fire risk to the community. The recommended improvements address this problem.

Based on the storage analysis below, it is estimated that by 2025 there will be at least an excess of 0.695 million gallons of effective storage capacity. If the Upper Radar Road Reservoir is taken off line, there will be a deficit in effective storage of 0.209 million gallons (i.e., 0.695 minus 0.904 million gallons Table 9-2 and Table 9-1). This plan recommends the construction of new a 250,000 gallon reservoir near the existing 200,000 gallon Lower Radar Road Reservoir. These reservoirs could be used in conjunction to provide redundant storage while the seismic retrofits are being completed.

The Upper Blackstone Reservoir is the only water source available to the Middle and Upper Blackstone Service Levels. If this reservoir must be taken off line, temporary storage will need to be put in place to meet the demand in these levels. However, no improvements to the reservoir are identified in this plan that would require the Upper Blackstone Reservoir to be taken out of service.

9.3 WATER STORAGE ANALYSIS

The total recommended storage volume in the system is the sum of the operational, equalization, fire, and emergency storage. For this analysis, dead storage is assumed to be zero, as previously discussed. Any storage tanks built during the planning period are assumed to be designed with zero dead storage. The discussion below summarizes the assumptions under each of the methods used to establish the total recommended storage volume.

9.3.1 Storage Volume Assumptions & Estimates

- Dead Storage Assumptions

As previously discussed, there is a negligible amount of dead storage in the City's system. Therefore, dead storage is assumed to be zero.

- Operational Storage Assumption

For the purposes of this report, the operational storage was estimated as shown in Table 9-1. Operational storage is estimated as the volume of water in the top 3 feet of each reservoir. This equates to approximately 179,000 gallons.

- Effective Storage Estimate

Since Dead Storage is negligible, effective storage is estimated as the Total Storage less the Operational Storage. Effective Storage equates to approximately 1,411,000 gallons as shown in Table 9-1.

- Equalization Storage Assumptions

The equalization storage volume required is typically determined as either a percentage of the peak day demand (typically 20 to 40%), or by determining the deficit between the peak hour demand and the available supply over a given time period. Hourly flow data is not readily available for Yachats. Therefore, it is difficult to determine the deficit between peak hour demands and supply. As such, the former method will be used to estimate the required equalization storage. Since Yachats is a relatively small community, the hourly fluctuations in water usage are likely to be higher than for larger communities. In larger communities, commercial and industrial users tend to dampen hourly variations. Whereas in smaller communities, hourly usage patterns are primarily influenced by residential users. Based on this reasoning, equalization storage in the amount of 40% of the peak day demand is recommended.

Table 9-1| Reservoir Operational and Effective Storage

<i>Reservoir</i>	<i>Total Storage Volume (gallons)</i>	<i>Max. Normal Water Height (ft)</i>	<i>Reservoir Draw-down (ft)</i>	<i>Operational Storage (gallons)</i>	<i>Effective Storage (gallons)</i>
Upper Radar Road	1,000,000	31.5	3.0	95,239	904,761
Lower Radar Road	200,000	14.75	3.0	40,678	159,322
Horizon Hill	10,000	10.0	3.0	3,000	7,000
South	250,000	32.5	3.0	23,077	226,923
Middle Blackstone	10,000	17.25	3.0	1,740	8,260
Upper Blackstone	120,000	23.5	3.0	15,320	104,680
TOTAL	1,590,000	-	-	179,054	1,410,946

▪ **Standby Storage Assumptions**

A common approach for determining the amount of standby storage required is to provide twice the average daily demand minus the production rate from sources that are considered to be “continuously available to the system.” This approach will be used for the storage analysis presented below. As discussed in the other chapters of this plan, the recommended improvements include improvements to the existing water treatment plant and finished water pump station. These improvements include a backup power generator as well as other mechanical improvements that will allow the plant to continue to produce and pump its nominal capacity of 0.5 mgd even during power outages. Therefore, this analysis is based on the assumption that the treatment plant improvements will be constructed early in the planning period and that the water treatment plant and associated pump station will meet all of the criteria identified above (see section 9.2.1.3) to be classified as “continuously available to the system.” In an effort to be conservative, it is assumed that the plant will be continuously producing only the average day demand on a regular basis by 2025.

▪ **Fire Suppression Storage Assumptions**

As discussed in Chapter 5, this report utilizes a design fire flow event of 2,000 gpm with a duration of 4 hours, which equates to a total fire flow volume of 480,000 gallons.

9.3.2 Storage Volume Evaluation

The total recommended storage in the system is the sum of operational, equalization, fire, and standby storage (while discounting any dead storage).

Based upon the criteria discussed above, the storage requirements were evaluated to determine the required storage volumes through the end of the planning period. Table 9-2 lists the required water storage that will be necessary for Yachats during the planning period in response to the increased demand associated with the anticipated population growth. The table is based on the assumption that the water treatment plant and finished water pump station improvements will be constructed prior to 2025.

Table 9-2 shows a significant storage excess currently and through the planning period. Therefore, no additional storage is needed from a capacity standpoint. Also, once the water treatment plant improvements are completed, the “continuously available water” supply further decreases the need for storage. As previously discussed, in regards to redundancy, the City could ramp up average daily production of water to meet demands as a way of buffering their

needs for excess storage. Additionally, this plan recommends replacing the Lower Radar Road Reservoir while the existing reservoir is in service. It is recommended that both the old and new reservoirs stay in operation temporarily while the Upper Radar Road Reservoir seismic improvements are completed.

It is important to note that the storage requirements shown in Table 9-2 are based on the assumption that at least the average day demand of water production is continuously available to the system by the year 2025. For this assumption to be valid, improvements to the water treatment plant and finished water pump station must be completed prior to 2025. Additionally, the water treatment plant must be equipped with auxiliary power to ensure that water can be produced during a power outage. For simplicity, Table 9-2 does not account for the increased volume of the recommended new Lower Radar Road Reservoir or the new Horizon Hill Reservoir. It is unknown when these projects would be constructed and their construction does not significantly affect the storage volume recommendations in this document.

Table 9-2| Water Storage Evaluation

Year	2020	2025	2030	2035	2041
Total Service Population	2,191	2,350	2,520	2,703	2,853
ADD (mgd)	0.132	0.142	0.153	0.164	0.174
PDD (mgd)	0.219	0.235	0.252	0.270	0.285
Continuously Available Daily Water Production (mgd)	0.000	0.142	0.153	0.164	0.174
Equalization Storage (mg)	0.088	0.094	0.101	0.108	0.114
Fire Suppression Storage (mg)	0.480	0.480	0.480	0.480	0.480
Standby Storage (mg)	0.264	0.142	0.153	0.164	0.174
Effective Storage Required (mg)	0.832	0.716	0.734	0.752	0.768
Existing Effective Storage (mg)	1.411	1.411	1.411	1.411	1.411
Storage Excess (mg)	0.579	0.695	0.677	0.659	0.643
Storage Deficit (mg)	None	None	None	None	None

9.4 EVALUATION OF EXISTING STORAGE TANKS

This section builds on the information presented in Chapter 4 and presents an overview of the existing issues with the City's storage tanks.

9.4.1 Upper Radar Road Reservoir

As described in Section 4.4.1, the existing Upper Radar Road Reservoir was constructed in the 1990's and the structural components of the tank are not likely to be sufficient to withstand seismic loads required by current building codes. The City should, therefore, consider structural upgrades to improve the seismic resiliency of the tank. A seismic evaluation of the tank is recommended. This may require the tank to be drained and taken out of service for a few days. The goal of the seismic evaluation should be to determine the scope and costs of any required structural improvements to bring the tank structure into compliance with current building codes.

9.4.2 Lower Radar Road Reservoir

As described in Section 4.4.2, the existing Lower Radar Road Reservoir was built in 1945 and is roughly 80 years old. Given its age it is very likely that this facility does not meet the requirements of current seismic codes and needs to be seismically retrofitted. The challenge with this is that good records do not exist that identify the critical structural elements of the tank (e.g., thickness of the tank walls, roof support structure, etc.), so, the tank would need to be

taken out of service and drained in order to perform a detailed structural inspection. Given its age and the substantial cost associated with seismic improvements, it is recommended that funds would be better allocated to installing a new tank that meets seismic codes. This tank would serve the needs of the City for many years to come. One of the advantages of replacing the tank with a new tank is that the new tank can be constructed next to the existing tank and both tanks can remain in service to provide fire suppression storage to the community while the seismic upgrades to the Upper Radar Road Reservoir are being completed. Once the improvements to the Upper Radar Road Reservoir are completed, the old 1945 tank can be decommissioned.

9.4.3 Horizon Hill Reservoir

The Horizon Hill Reservoir is integral to the Horizon Hill Pump Station. Both share the same structure and are partially embedded in the hill side. Both facilities have been in service for numerous decades and will need substantial improvements to keep them in service through the planning period. It is very likely that the Horizon Hill Reservoir and Pump Station will need seismic retrofits to meet current codes. It is recommended that these facilities be entirely replaced during the planning period with new infrastructure that meets current standards. Entire replacement will ensure that the facilities serve the needs of the City for well beyond the planning period.

9.4.4 Middle Blackstone Reservoir

The Middle Blackstone Reservoir is constructed of welded stainless steel and is anchored to a concrete slab. It was constructed relatively recently as a part of the Blackstone Development. No improvements to this facility are expected to be needed during the planning period.

9.4.5 Upper Blackstone Reservoir

The Upper Blackstone Reservoir is constructed of cast-in place concrete. It was constructed relatively recently as a part of the Blackstone Development. No improvements to this facility are recommended during the planning period.

9.4.6 South Reservoir

The South Reservoir is constructed of bolted steel. It was constructed recently. No improvements to this facility are expected to be needed during the planning period.

The recommended storage system improvements are discussed in greater detail in the following section.

9.5 RECOMMENDED IMPROVEMENTS

The analysis presented in this chapter and in Chapter 4 shows the need for six storage tank improvement projects during the planning period. These are abbreviated with “ST”. These improvements generally include structural improvements to improve the seismic resiliency of the tanks and replacement of tanks that have reached the end of their useful life.

The most critical improvement project is the seismic analysis and retrofit of the Upper Radar Road Reservoir. In order to perform any structural improvements, the tank will most likely need to be removed from service for several months. Draining this reservoir creates an estimated deficit of 309,000 gallons of required storage. This does not allow a sufficient volume to fight a moderate to large size fire. As such, removing the tank from service without providing some other means of storage is not recommended. Therefore, the recommended improvements include the construction of a new tank adjacent to the existing Lower Radar Road tank. This tank will eventually replace the 1945 vintage Lower Radar Road Tank. However, both tanks should remain in service until the seismic retrofit work is completed for the Upper Radar Road Tank. This approach will maintain a reasonable amount of fire storage in the

community during the improvement process. Once the seismic retrofit work on the Upper Radar Road Tank has been completed, the old 1945 tank can be decommissioned.

The recommended improvement projects are described in the following paragraphs. The projects are listed sequentially in the order in which they should be performed. The recommended project budgets include construction costs as well as soft costs such as permitting, engineering, legal, and administrative costs. A ranked prioritization of these projects into a comprehensive implementation plan is presented in Chapter 12.

- **New 250,000 gallon Lower Radar Road Reservoir – Project ST-1**

A new 250,000-gallon concrete storage reservoir is recommended next to the existing Lower Radar Road Reservoir. This new reservoir is intended to replace the existing Lower Radar Road Reservoir. Both reservoirs are recommended to temporarily be in service at the same time to provide redundant storage while improvements are made to the Upper Radar Road Reservoir. The existing tank is roughly 80 years old and will likely reach the end of its useful life during the planning period. The old 1945 and the new tank should remain in service for a period of time to allow the construction of the seismic improvements to the Upper Radar Road Tank. Once the seismic improvements are completed, the old 1945 tank can be removed from service. Valves and piping for the new reservoir will need to be able to connect to both the Upper and Lower Radar Road Service Levels. It is recommended that Project ST-1 take place prior to project ST-2 in order to facilitate this redundancy. As a side note, once the existing reservoir is demolished, the current location of the Lower Radar Road Reservoir could provide a site for a second reservoir in the future. The recommended budget for this project is \$1,717,000. A detailed breakdown is included in Appendix B. The recommended budget includes funds for the installation of a seismic valve on the tank outlet line.

- **Upper Radar Road Reservoir Seismic Evaluation - Project ST-2**

A seismic evaluation is recommended for the Upper Radar Road Reservoir. It is unlikely that the existing structure meets seismic design criteria identified in current building codes. The goal of the analysis should be to identify the scope and cost of any needed structural improvements. For this master planning effort, we have assumed that it will be most cost effective to retrofit the existing structure rather than replace it. However, the seismic evaluation may show that the opposite is actually true. If so, this plan should be updated accordingly. To perform the seismic evaluation, the City will need to retain the services of a qualified structural engineer. The engineer will need to review the plans and may need to take samples of the concrete. It may also be necessary to drain the tank for a short period (i.e., 1-3 days) of time in order to inspect the interior components. The recommended budget for this project is \$50,000. A detailed breakdown is included in Appendix B.

- **Upper Radar Road Reservoir Seismic Retrofit Improvements - Project ST-3**

Structural improvements are expected to be needed to address seismic issues for the Upper Radar Road Reservoir. The extent of these improvements will not be known until Project ST-2 is completed. The budget estimate for this project includes reasonable estimate of the costs for the seismic upgrades (Appendix B). However, this is a “placeholder” value that should be confirmed early in the design process. As noted above, this master planning effort is based on the assumption that it will be more cost effective to retrofit the existing structure rather than replace it. However, the seismic evaluation (i.e., Project ST-2) may show that replaced is the better option. If so, the City will need update the capital improvement plan accordingly. The recommended budget for this project is \$1,013,000. A detailed breakdown is included in Appendix B. In addition to structural improvements the recommended project budget includes funds for the installation of seismic valves on the tank outlet line.

- **New 20,000 gallon Horizon Hill Reservoir – See Project P-2**

A new 20,000 gallon reinforced concrete reservoir is recommended to replace the existing Horizon Hill Reservoir. This project is expected to be completed in conjunction with the project to replace the Horizon Hill Pump Station (Project P-2) and is described in greater detail in Chapter 8.

9.6 SUMMARY OF RECOMMENDED STORAGE TANK IMPROVEMENTS

Several water storage improvement projects have been identified above. These projects are summarized in the following table. These projects are assigned a priority ranking in Chapter 12.

Table 9-3| Recommended Treatment System Improvements

Project Code	Description	Recommended Budget
ST-1	New 250,000-gallon Lower Radar Road Reservoir	\$1,717,000
ST-2	Upper Radar Road Reservoir Seismic Evaluation	\$50,000
ST-3	Upper Radar Road Reservoir Seismic Retrofit Improvements	\$1,013,000
ST-4	New 20,000-gallon Horizon Hill Reservoir	See Project P-2

CHAPTER 10

SEISMIC RISK ASSESSMENT & MITIGATION PLAN

Chapter Outline

- 10.1 Introduction
- 10.2 Regulatory Requirements
- 10.3 Critical Facilities
- 10.4 Likelihood and Consequences of Failure
- 10.5 Mitigation Plan

10.1 INTRODUCTION

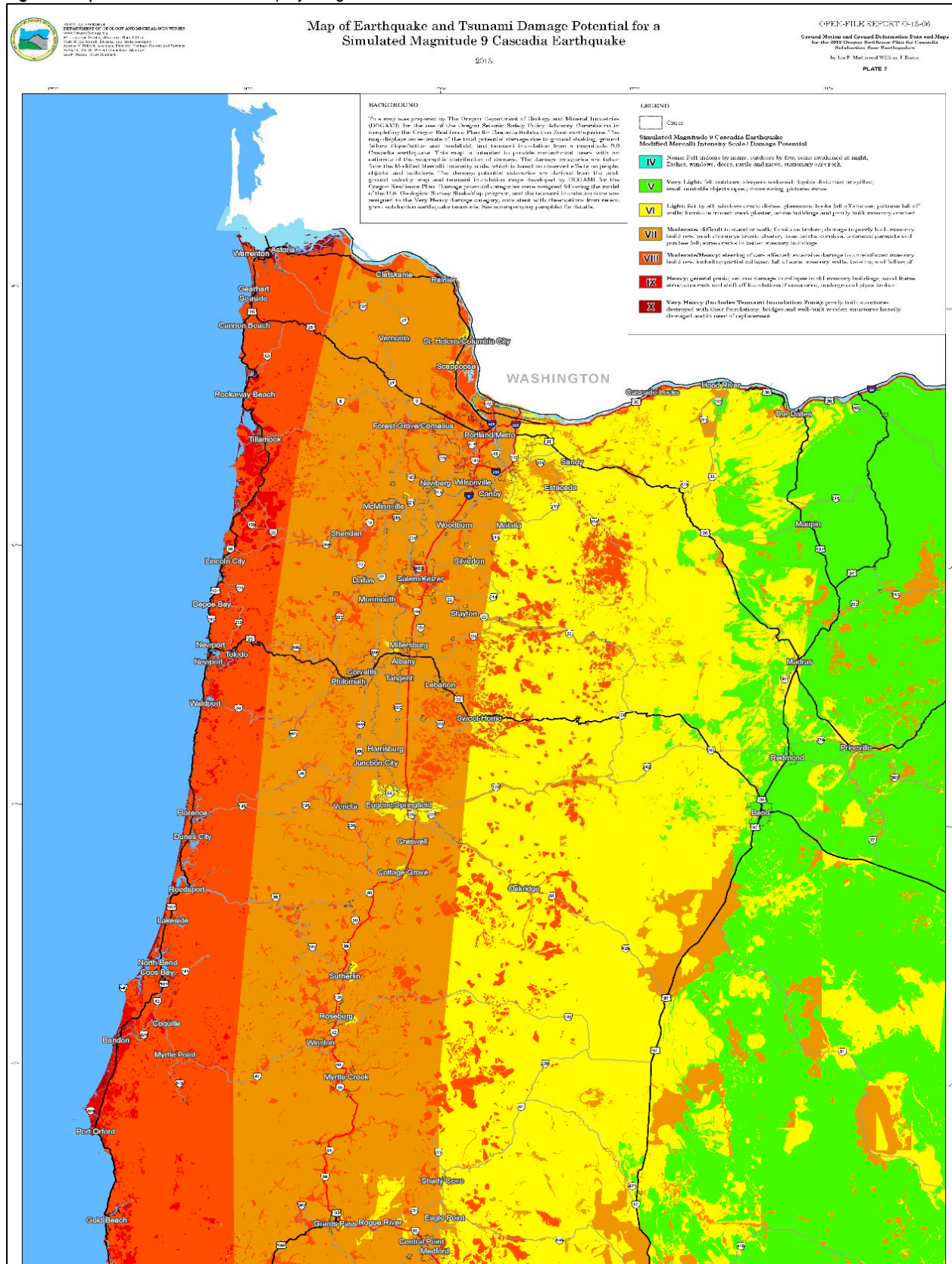
OAR 333-061-0060(5)(J) requires every community water system with more than 300 connections to conduct a seismic risk assessment and mitigation plan as part of a water master planning effort. This requirement only applies to communities located within hazard levels VI through X shown in Figure 10-1. The City is located within this hazard level. Therefore a seismic risk assessment and mitigation plan was conducted as part of this master planning effort. The results of this analysis are presented in this chapter.

10.2 REGULATORY REQUIREMENTS

The requirements for the seismic risk assessment and mitigation plan are stipulated in OAR 333-061-0060(5)(J) and include the following.

- “(J) A seismic risk assessment and mitigation plan for water systems fully or partially located in areas identified as VII to X, inclusive, for moderate to very heavy damage potential using the Map of Earthquake and Tsunami Damage Potential for a Simulated Magnitude 9 Cascadia Earthquake, Open File Report 0-13-06, Plate 7 published by the State of Oregon, Department of Geology and Mineral Industries.
- (i) The seismic risk assessment must identify critical facilities capable of supplying key community needs, including fire suppression, health and emergency response and community drinking water supply points.
- (ii) The seismic risk assessment must identify and evaluate the likelihood and consequences of seismic failures for each critical facility.
- (iii) The mitigation plan may encompass a 50-year planning horizon and include recommendations to minimize water loss from each critical facility, capital improvements or recommendations for further study or analysis.”

Figure 10-1| Seismic Hazard Level Map by Oregon State DOGAMI



10.3 CRITICAL FACILITIES

The critical facilities needed to supply water to the community include the Salmon Creek and Reedy Creek water intakes, the raw water transmission pipe between the intakes and the water treatment plant, the water treatment plant, the 12-inch transmission main from the treatment plant to the Upper Radar Road Storage Reservoir, the Upper and Lower Radar Road Storage Reservoirs, the main distribution system artery extending to the South Reservoir, the South Reservoir, and the main distribution system artery running north along Highway 101. Together these facilities form the backbone of Yachats's water system. These facilities are shown in Figure 10-2.

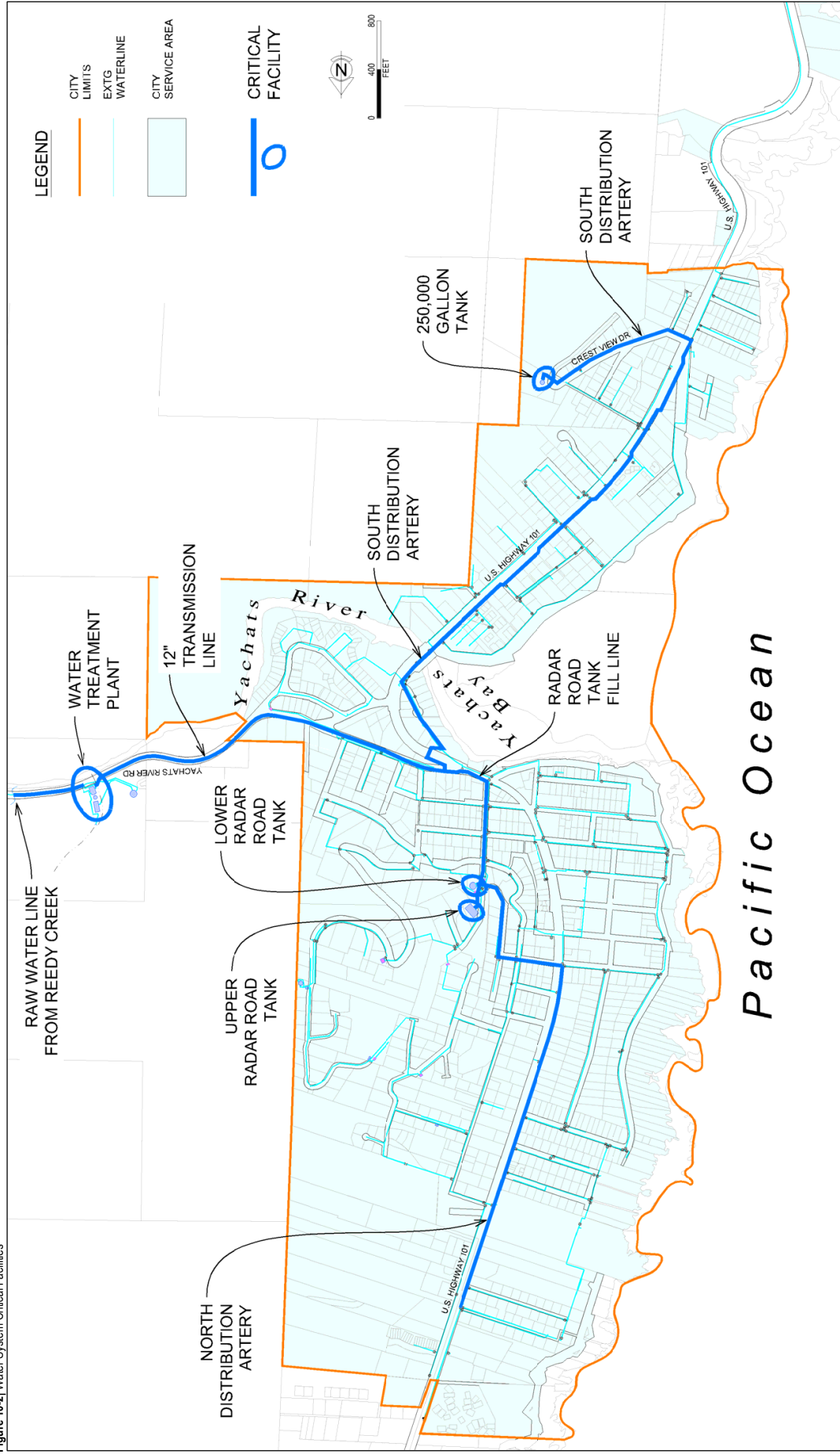
10.4 LIKELIHOOD AND CONSEQUENCES OF FAILURE

This subsection includes an analysis of the likelihood and consequences of failure for each of the critical facilities identified in the previous section. A catastrophic failure of any of these facilities will severely impact the City's ability to produce and deliver drinking water to the system.

- **Water Treatment Plant and Upper Radar Road Reservoir**

The recommended capital improvement plan includes a seismic retrofit for the water treatment plant building (Project T-7) and a seismic evaluation (Project ST-2) and seismic retrofit (Project ST-3) for the Upper Radar Road Reservoir. It is unclear if these improvements will be completed in current planning period or if they will be deferred to the next planning period. Either way, it is anticipated that these improvements will be completed within a 50-year time frame. The seismic retrofit elements of the project will all be designed in accordance with current building and seismic codes. Current building codes require the structural design to be based on Risk Category IV. The seismic load for design will also be increased by 50% since these will be deemed "essential facilities." Therefore, once the seismic retrofits are completed, the likelihood of catastrophic failure of these facilities in response to a large seismic event should be minimized. The Upper Radar Road Reservoir is located well above the Tsunami Hazard Zone, so it should not be impacted by a large Tsunami. On the other hand, the Water Treatment Plant is located within the Tsunami Hazard Zone and may be significantly damaged by a large Tsunami. This is a weakness in the City's system and the only way to correct this problem is to move the treatment plant to higher ground. The treatment plant has a significant amount of design life remaining. As the facility continues to age, it may eventually make sense to abandon it and construct a new treatment plant. At that time, the City should consider moving the plant to a higher elevation.

Figure 10-2 | Water System Critical Facilities



- **Raw Water Transmission Pipeline**

Water is conveyed from the Reedy Creek Intake to the treatment plant through a pipeline that is approximately 8,400 feet long. The first 1,500 feet of this pipeline is old AC pipe, the remaining 6,900 feet is relatively new HDPE pipe. The recommended improvements listed in this plan include replacing the AC section with HDPE pipe (Project S-4). Once this project is completed, the entire pipeline from Reedy Creek to the treatment plant will be HDPE pipe. HDPE pipe is perhaps the most resilient of the piping materials to ground motion. In an HDPE pipeline, all pipe segments are heat fused together, so there are no joints and the piping can withstand large deflections associated with seismic ground motions. Therefore, the risk of a failure of this pipeline during a seismic event will be relatively low after the completion of Project S-4.

- **New Lower Radar Road Tank Gallon Tank.**

This plan recommends the construction of a new tank to replace the Lower Radar Road Reservoir (Project ST-1). This will be a new facility designed in accordance with current building and seismic codes. As such, the risk of a catastrophic failure after a large earthquake should be minimized.

- **South Tank**

The South Tank was constructed in 2018. Therefore, the tank is modern and was constructed in accordance with current building and seismic codes. Therefore, the risk of a catastrophic failure after a large earthquake should be minimal.

- **Finish Water Transmission Main**

Water is conveyed from the water treatment plant to the Upper Radar Road Tank through a 12-inch transmission pipeline. This pipeline was constructed in three segments. The portion from the treatment plant to about Spruce Avenue was constructed in the early 2000s using HDPE pipe. The about Spruce Avenue to Highway 101 was constructed in the early 2000s using PVC pipe. The segment from Highway 101 to the to the Upper Radar Road Tank was constructed in the early 1990s using PVC pipe. Overall, the pipeline is relatively new and in good condition. The HDPE segment has good seismic resiliency. The PVC sections are less seismically resilient since the pipe joints are not restrained. A failure in this pipeline would severely impact the City's ability to supply water to the City's customers. Therefore, it would be ideal if this entire pipeline was HDPE. However, since the PVC sections are relatively new and have a significant amount of design life remaining, the City has no plans to replace them during the planning period. At some point in the future, the PVC segments will reach the end of their useful life due to age. At that time, the City should consider replacing the pipelines with materials that are more seismically resilient.

- **Main Water Distribution System Arteries**

Yachats's water system includes two main pipeline arteries through the grid (Figure 10-2). Most of the "South Artery" was constructed in the early 1990s using PVC pipe. The section of the "South Artery" between Highway 101 and the South Tank was constructed 2018 when the South Tank was constructed. This segment was also constructed using PVC pipe. The "North Artery" consists of several pipe segments that were constructed at different times with different pipe materials. Some of these segments are relatively new and some are older. For both the "South Artery" and the "North Artery" the individual pipeline segments are typically joined by unrestrained push-on joints. As such, the pipe joints are susceptible to being pulled apart if subject extreme ground motions. Therefore, some pipe failures in the distribution system are likely to occur during a large earthquake event. The distribution grid includes a network of pipes that provide multiple flow paths through the City. Therefore, even if a main pipeline artery is ruptured, there is a good chance that the segment can be isolated and bypassed for repair while still maintaining water flow to the majority of the City. Overall, the distribution piping is probably the one element of the City's system that is most susceptible to failure during a large seismic event. The recommended improvements described in this plan include replacing a small segment of the existing "North Artery" in Radar Road (Project D-6), adding an additional artery in King Street (Project D-7) and a relatively long section of the artery in Highway 101 from Sixth Street to Marine Drive (Project D-14). The City should consider using earthquake resistant piping materials for these projects.

10.5 MITIGATION PLAN

The recommended mitigation plan over the next 50 years consists of various capital improvements and recommended changes to some of the City's design & construction standards. Each element of the plan is discussed in this section.

- **Reedy Creek Raw Water Pipeline Improvements (Project S-4)**

The capital improvement plan recommended in this document (Chapter 12) lists project S-4 as a priority 1 improvement project. Project S-4 includes replacing the segment of the Reedy Creek raw water pipeline from the Reedy Creek Intake to Yachats River Road. This pipeline should be constructed using HDPE pipe with fused joints. Once this project is completed, the entire pipeline from the Reedy Creek intake to the treatment plant will be HDPE which is very resistant to ground motions caused by seismic events.

- **Water Treatment Plant Building Seismic Retrofit (Project T-7)**

The capital improvement plan includes a seismic retrofit of the treatment plant building. It is envisioned that this project will include targeted improvements to the treatment plant building structure that will improve overall seismic resiliency. These improvements will reduce the risk of a catastrophic building failure after a large earthquake. It is anticipated that this work will be completed at some point during the next 20-year planning period.

- **Upper Radar Road Seismic Retrofit (Project ST-2 & ST-3)**

The capital improvement plan recommended in this document (Chapter 12) include projects ST-2 and ST-3. These projects include a seismic evaluation of the reservoir structure and structural modifications to improve the overall seismic resiliency of the structure.

- **New Lower Radar Road Reservoir (Project ST-1)**

The capital improvement plan recommended in this document (Chapter 12) lists project ST-1 as a priority 2 improvement project. The project includes a new storage tank that will be designed in accordance with current building codes, which take into consideration large seismic events. As such, the risk of a catastrophic failure after a seismic event should be minimized. The new tank will eventually replace the existing Lower Radar Road tank. Thereby improving the overall seismic resiliency of the City's system.

- **Raw Water Transmission Pipeline**

The segment of the raw water transmission pipeline from the treatment plant to about Spruce Street was constructed using HDPE pipe. This section of the pipeline offers good seismic resiliency. The portion from Spruce Street to the Upper Radar Road Reservoir was constructed using PVC pipe. The PVC segments are relatively new and have a significant amount of design life remaining. Eventually, these segments will reach the end of their useful life due to age. At that time, the City should replace these segments with earthquake resistant materials. This will likely be needed in about 50 years and can be included as part of a future master planning effort.

- **Main Water Distribution Arteries**

The main water distribution pipelines that supply water to the City (Figure 10-2) primarily consists of PVC pipe with push-on joints. So, the risk of catastrophic failure after a large earthquake is relatively high. The recommended capital improvement plan described in Chapter 12, includes replacing sections of the "North Artery" piping on King Street (Project D-7) and Highway 101 (Project D-14). These segments should be installed using earthquake resistant piping. It is anticipated that the remaining portions of the distribution arteries will reach the end of their useful life during future planning periods (i.e., after 2041). At that time, these pipelines should also be replaced with earthquake resistant piping systems.

- **Emergency Fuel Storage Cache**

After a large earthquake, the line-power needed to operate the City's water system may not be available for several days or longer. The commercial fuel supply is also likely to be interrupted. The critical components of the City's water system will eventually be equipped with backup power generators. However, the onsite fuel storage capacity of these generators will be somewhat limited. The City may want to consider working with other emergency services agencies in the area to establish a fuel storage cache that can be used for prolonged emergency situations.

- **Earthquake Resistant Piping**

The previous discussions include several references to earthquake resistant piping systems. This paragraph includes a brief introduction to this topic. Most traditional pipe materials used for buried water distribution systems were not designed to resist extreme ground motions. Most pipelines are constructed of individual pipeline segments that are jointed using bell and spigot joints that are not restrained. Therefore, they can be pulled apart if subjected to extreme ground motions. The concept of earthquake resistant piping is relatively new. Several Japanese companies have developed earthquake resistant ductile iron pipe with flexible joints that are restrained and allow the pipe joints to move in response to ground motions without pulling apart. This pipe is commonly used in Japan and manufactured by several Japanese companies. Earthquake resistant ductile iron pipe is not commonly used in the United States. Some large western cities (e.g., Los Angeles, San Francisco, Portland, Seattle) have begun importing and installing earthquake resistant ductile iron pipe. Therefore, it may become more common in the US in the future. If so, this pipe may eventually be a reasonable option for the City for future pipeline improvement projects. In the meantime, HDPE pipe is also a good option. HDPE pipe is flexible and the individual pipe segments are joined by heat fusing. With heat-fused joints, an entire HDPE pipeline acts a single pipe without joints. Therefore, HDPE pipe is able to respond to ground motion with a low risk of failure. HDPE pipe does present installation challenges in roadways subject to vehicular traffic and is not typically used in areas where water service taps are common. However, for some of the transmission pipelines recommended in this plan, HDPE pipe may prove to be the best option since these projects are not in high-traffic areas and the pipelines will not have any water services or hydrants. As various improvements to the City's distribution system are made in the coming years, the City should consider the use of earthquake resistant piping materials. Over time, as the City is able to replace existing piping with earthquake resistant piping, the overall resiliency of the distribution grid will be improved.

- **Storage Tank Seismic Valves**

It is recommended that any new reservoirs be constructed to with seismic sensors and actuated valves to shut off the reservoir in the event of an earthquake. It is possible that water mains will rupture downstream of the tank. The actuated valve combined with the seismic sensor will ensure that water storage is not drained in the event of a line break. Once the lines in a reservoir's service level have been verified to be intact, the reservoirs can be re-opened. The budgets for the tank projects listed in this plan are envisioned to include sufficient funds for the installation of seismic sensors and actuated valves.

CHAPTER 11

OPERATION & MAINTENANCE

Chapter Outline

- 11.1 Introduction
- 11.2 Water System Record Keeping
 - 11.2.1 Water Production
 - 11.2.2 Regulatory Record Keeping
 - 11.2.3 Operations and Maintenance Records
 - 11.2.4 Water System Mapping & System Inventory
- 11.3 Water Use Audit
- 11.4 Leak Detection
- 11.5 Distribution System Flushing Program
- 11.6 Valve Exercising
- 11.7 Cross-Connection Control Program
- 11.8 Master Meter Maintenance
- 11.9 Customer Water Meter Maintenance
 - 11.9.1 Large & Mid-size Meters
 - 11.9.2 Conventional Meters
- 11.10 Hydrant Maintenance and Replacement
- 11.11 Reservoir Inspection and Maintenance

11.1 INTRODUCTION

The maintenance of water systems is necessary to ensure the proper operation of the facilities and to obtain the full useful life of those facilities. Water systems represent a significant investment of public capital. If a water system is allowed to fall into disrepair because of the lack of maintenance, it will not operate efficiently or as designed. Health problems and property damage may result from leaking mains or services, mainline breaks, inoperable valves or fire hydrants. The repair of failed portions of a public water system is costly, quite often equaling or exceeding the original cost of construction. Because of this it is imperative that municipalities consistently provide adequate maintenance funding and staffing to protect their investment.

System maintenance is frequently classified as preventative or corrective. Preventative maintenance involves routinely scheduled inspections of the system and the collection of data to identify problem areas. The proper documentation and analysis of collected data should be performed so that scheduled maintenance can be allocated to specific problems. As a general rule, as preventative maintenance increases, the amount of corrective maintenance required decreases.

Corrective maintenance, often referred to as emergency maintenance, is typically performed when the water system fails, such as leaking mainlines, inoperable pumps, control systems or fire hydrants. Corrective maintenance requires immediate action and the City will typically pay a premium for the completion of this work.

Therefore, it is important to emphasize that preventative maintenance, documentation, and program evaluation ultimately result in a lower cost to the consumer by extending the life of the treatment, distribution or storage system components and reduce costs associated with unscheduled or emergency repairs.

11.2 WATER SYSTEM RECORD KEEPING

Record keeping is an important part of a successful operation and maintenance program.

Unfortunately, record keeping is often neglected because of time and staffing limitations, and the often immediate needs of other maintenance programs. The following categories of record keeping are viewed as central to improving the long term efficiency of the operation and maintenance program.

11.2.1 Water Production

The planning elements of water system expansion and water conservation are strongly rooted in the evaluation of water system demands. The recording of daily water production and billing records provide a basis for projecting future system needs and measuring the efficacy of conservation efforts. The City should continue its good practice of diligently recording water use.

Water use data collection should include:

- Daily water production from all sources and treatment facilities
- Daily amounts of water used for filter backwash
- Historical water use. Track average day, maximum day and monthly total demands.

- Unaccounted-for-water, recorded on a monthly and annual basis to include a breakdown of non-revenue water. The City should track any use of water that is not recorded by a water meter. This includes water for hydrant testing, line flushing, and any other unmetered water sources. The City should estimate quantities of water used and keep a log to document the use of unaccounted for water.
- Daily amounts of waste streams from source and treatment facilities (i.e., filter backwash).

11.2.2 Regulatory Record Keeping

It is the responsibility of the water system operations staff to develop and maintain records relating to the quality of the water produced as well as the condition of the physical components of the system. These requirements are detailed in OAR 333-061-0040. Regulatory records should be maintained at a convenient location within or near the area served by the water system. Table 11-1 provides an overview of record keeping requirements. Operators are encouraged to review the statute for the most current compliance requirements as other rule-specific requirements may apply.

Table 11-1| General Regulatory Record Keeping Requirements

Specific Record or Report	Record Retention
Residual disinfectant measurements	2 years
Copies of public notices issued pursuant to OAR 333-061-0042 and certifications made to the ODWP	3 years
Actions taken to correct violations of primary drinking water regulations	3 years ¹
Bacteriological analysis	5 years
Monitoring plans for disinfection byproducts	5 years
Consumer Confidence Reports	5 years
Records concerning variances or permits	5 years ²
Chemical analysis, secondary contaminants, turbidity and radioactive substances results	10 years
Reports, summaries or communications on sanitary surveys	10 years
Lead and Copper Rule data	12 years

¹ Retention period begins after the last action taken with respect to the particular violation

² Retention period begins after the expiration of the variance or permit

The City is also encouraged to retain organized records of all correspondence with regulators, operator certificates, and the results of any comprehensive performance evaluations.

11.2.3 Operations and Maintenance Records

There are commercially available asset management software programs that allow cities to develop a comprehensive maintenance system to manage operational efforts for the water and wastewater systems (such as those developed by the Hansen Software Corporation). This computer software tracks and schedules work orders, labor expenditures, regularly scheduled maintenance activities, inspection reports, and repairs.

If the City does not currently use software of this type, it is recommended that the City consider acquiring software to maintain a detailed accounting of time spent on various operations and maintenance tasks. This information is helpful to establish the need for additional staff, equipment, training or other resources that may be required to accomplish operations and maintenance programs.

11.2.4 Water System Mapping & System Inventory

The City coordinates through the City Engineer to use AutoCAD to inventory and map their installed infrastructure. A complete inventory of the water system will greatly improve operational efficiency and will enhance future planning efforts.

As is often the case with municipal systems this size, the City relies on the memory and experience of staff members to provide a full account of many system details. As the City continues to grow, it becomes increasingly important that this wealth of information is transferred and organized into a formalized record keeping system.

11.3 WATER USE AUDIT

The definition of unaccounted-for-water is defined as water which is lost through leaks, evaporation, or use that is not recorded and/or accounted-for. Unaccounted-for-water includes distribution pipe leakage, unmetered water use such as fire fighting, hydrant flushing, overflows, street cleaning, and WTP backwash water or instrumentation error.

In recent years, the City has started performing these audits (see section 5.4.2) and this practice should continue. Requirements for annual water audits are set forth in OAR 690-086-150(4a). The City should begin with an inventory of all unmetered uses and install metering devices at these locations to the greatest extent possible. In the event metering is not feasible, estimates should be made to record the unmetered use.

New water meters may need to be installed to properly track waste sources such as backwash and filter-to-waste at the treatment plant. The installation of these meters will allow the City to establish a monthly audit of its raw and treated water systems.

An annual water audit should utilize the sum of all metered sales from each customer class and production records and should be performed in a systematic and well-documented manner to accurately quantify all authorized unmetered and unauthorized uses.

11.4 LEAK DETECTION

The City performs leak detection work about every two to three years. This includes hiring a leak detection firm to inspect the entire distribution system. The City's existing practices are good and should continue indefinitely. Therefore, this plan recommends establishing a formal leak detection program that with an annual budget line item. Specific recommendations are included in Section 8.4.2.

11.5 DISTRIBUTION SYSTEM FLUSHING PROGRAM

Maintaining water quality and preserving the hydraulic capacity of a water distribution system is a key concern for water utilities. Mineral precipitation, microbiological activity, and corrosion can all form deposits on the pipe walls and contribute to a reduction in flow and water quality.

Flushing the distribution water mains is an effective way to maintain water quality and system capacity.

A properly conducted flushing program can improve water quality by restoring the disinfectant residual, reducing bacterial regrowth, dislodging biofilms, removing sediments and deposits, controlling corrosion, restoring flows and pressures, eliminating taste and odor problems, and reducing disinfectant demand throughout the system. These benefits prolong the life expectancy of the distribution system and reduce the potential for waterborne disease outbreaks.

11.6 VALVE EXERCISING

Many components of the water system require periodic maintenance to remain functional. Valves and hydrants, in particular, must be exercised on a regular basis to ensure that they remain in operational condition. It is commonly recommended that all valves be exercised annually; however, this is often times not practical due to staffing limitations.

A complete valve exercising program should include the following elements:

- Systematically locating and accessing all distribution system valves. Often valves boxes have been paved over or are partially buried and are difficult to locate. Valve boxes should be cleaned out to fully expose the valve nut, adjusted and realigned as necessary to allow unobstructed access to the valve. Structurally damaged valve boxes should be replaced.
- Each valve should be operated a minimum of two full cycles and an additional cycle if the torque on the valve is high.
- Replacement of the gland packing. In many cases minor leaks in the packing will stop once the gland packing is wetted and is exercised; however, the valve should be repaired if the packing is damaged and the leak does not stop.
- All data collected from the event (valve location, size, initial open/closed status, number of turns, torque (if measured), and any other anomalies should be entered into the City's maintenance database.
- Perform minor street repairs around the valve box as required.

Valve exercising should be coordinated with flushing operations to ensure that any debris in the distribution system dislodged by the valve exercising is flushed from the system.

In cases where staffing levels do not permit the execution of a full exercising program staff should focus on operating each valve greater than 12-inches on an annual basis and other system valves on a 4 year cycle.

11.7 CROSS-CONNECTION CONTROL PROGRAM

Oregon Administrative Rules 333-061-0070 through 0074 detail the requirements for a cross-connection control program. The City is required to establish a cross-connection ordinance and must submit an annual report to ODWP. Systems with more than 300 service connections are required to provide a certified tester.

The City currently has a cross-connection control program. The City currently employs at least one certified cross connection control specialist. This person is responsible for inspecting new devices and installations, monitoring annual inspections, terminating water service in cases of non-compliance, and compiling and submitting the annual inspection report to ODWP.

The City should continue funding this program and work to integrate the location of all backflow devices into the water system mapping. The identification and monitoring of high risk installations is also recommended. In some cases, high hazard assemblies are tested every six months.

11.8 MASTER METER MAINTENANCE

Master meters are installed at the Water Treatment Plant and record the total water pumped through the treatment plant and into the distribution grid. Data from these meters is utilized in conjunction with consumed water from metered connections to establish benchmarks for water loss.

Discussions with staff indicate that some of these meters have not been calibrated for some time, and there is no program designated to accomplish this. It is recommended that these meters be calibrated on an annual basis to ensure that water loss and other operational decisions are being made on a sound basis. Eventually these meters will reach the end of their useful life and will need to be replaced. One of the recommended treatment system projects described in Chapter 7 included replacing these meters.

11.9 CUSTOMER WATER METER MAINTENANCE

The accuracy and performance of water meters is vital to utilities whose billable revenues are derived directly from the collected readings. Loss of revenue from inaccurate or broken meters can be significant and may warrant a meter testing schedule. Meters tend to under-register over time because of wear and deposits and since almost all meters lose accuracy with age, any utility can sooner or later find economic justification for meter maintenance.

11.9.1 Large & Mid-size Meters

An important part of a water utility's operations should be a systematic testing and maintenance program for its larger meters. Large meter installations typically represent a significant portion of a utility's revenue and the cost of a program that focuses on proper installation, maintenance and calibration of these larger meters is often small compared to the potential gain in revenue. Large meters are typically defined as those that are 2-inches or larger.

It is recommended that meters 2-inches and larger be calibrated annually. Large meter installations should be inspected to confirm whether strainers, isolation valves and test ports are present. The length of exposed straight pipe in the meter set should be observed for conformance to the manufacturer's recommendation. Flow-demand recording devices can be utilized to confirm that larger meters are appropriately typed and not oversized for the service they see since significantly oversized meters can result in lost revenue because of inaccurate registration during periods of low flow. Using the correct size and type of meter for each application, combined with routine calibrations, will ensure that customers are charged equitably for water use.

11.9.2 Conventional Meters

The City has been relatively proactive about maintaining and replacing the customer meters. The City only has about 50 meters that are approximately 20 years old. All other meters have been upgraded to touch read meters or radio read meters. This practice should continue indefinitely. Customer meters need to be replaced at approximately 20-year intervals. The City's current practice of replacing a portion of the meters every year or every few years is a good approach to maintaining accurate customer meters. Based on discussions with City staff, the existing meter replacement practices are considered to be adequate and no changes are recommended in this plan.

11.10 HYDRANT MAINTENANCE AND REPLACEMENT

Hydrants are maintained and replaced on an as-needed basis as they are damaged, or as problems are identified in the flushing and hydrant testing programs. Due to budgetary constraints, there is currently no formal hydrant infill program other than the policy of replacing or augmenting hydrants as waterlines are constructed and/or replaced.

Ultimately it is the community, through its economic decisions with respect to taxation and user fees, that determines the standard of fire protection and coverage. To the degree that funding is available the City is encouraged to develop an inventory of existing hydrant coverage and to integrate this in the maintenance program so that future infill efforts can proceed in a logical fashion.

11.11 RESERVOIR INSPECTION AND MAINTENANCE

Reservoirs should be inspected and potentially cleaned every 5 years. This process typically requires the use of divers. Historically the City has hired divers to clean and inspect the City's reservoir on an as-needed basis. In an effort to formalize this maintenance activity the City should work on establishing an annual reservoir maintenance program (on a rotating basis), with a proposed annual inspection budget of \$1,500. Since the City has historically performed reservoir inspection work, we have assumed that the existing operation and maintenance budget can absorb the costs of this work, so, a line item for this recurring program is not included in the recommended capital improvement plan presented in Chapter 12.

11.1 STAFFING LEVELS

The Public Works Department currently employs five full-time employees, with seasonal help hired as needed. The City currently dedicates 1.5 full-time employee to the operation and maintenance of the water system. Overall, the City's current operation and maintenance practices are very good. The recommended changes to the City's operation and maintenance practices identified in this chapter are not likely to require an additional crew member. Therefore, the City should maintain the current level of staffing, and ensure that staff has the required certifications for all aspects of the water system operations, monitoring & maintenance.

CHAPTER 12

CAPITAL IMPROVEMENT PLAN

Chapter Outline

- 12.1 Introduction
- 12.2 Prioritized Improvements
 - 12.2.1 Prioritization Criteria
 - 12.2.2 Prioritization Levels
 - 12.2.3 Prioritized Capital Improvement Projects & Estimated Project Costs
 - 12.2.4 Environmental Impacts
- 12.3 Basis of Cost Estimates
 - 12.3.1 Accuracy of Cost Estimates
 - 12.3.2 Adjustment of Cost Estimates Over Time
 - 12.3.3 Engineering and Administrative Costs, Contingencies
- 12.4 Construction Cost Estimates
 - 12.4.1 Pipeline Improvement Costs
 - 12.4.2 Source Improvement Costs
 - 12.4.3 Water Treatment Improvement Costs
 - 12.4.4 Storage Tank Improvement Costs
- 12.5 Funding Sources
 - 12.5.1 Local Funding Sources
 - 12.5.2 State and Federal Grant and Loan Programs
 - 12.5.3 Funding Recommendations
- 12.6 Recommended Implementation Plan

12.1 INTRODUCTION

As documented in the previous sections, there is a need for water system improvements within the study area to correct existing and projected deficiencies. Some of these deficiencies are more critical than others. While some deficiencies prevent the City from currently providing the desired level of service, other deficiencies will manifest as the City expands and as the existing systems continue to age.

Recommended improvements for specific components of the City's water system have been described in previous chapters. This chapter builds on that work by assigning a priority and providing background information on the costs of the improvement recommendations. The cost estimates have been developed to a conceptual level, for planning and budgeting purposes (see Section 12.3); more detailed cost estimates will be necessary as the projects are implemented.

12.2 PRIORITIZED IMPROVEMENTS

Since the scope of the proposed improvements is quite large, a prioritizing process is required. Projects that resolve immediate deficiencies or public health concerns should naturally have a higher priority than long-term growth-related improvements. The following approach is designed to provide a basis for evaluating and ranking the improvement projects.

12.2.1 Prioritization Criteria

The assignment of a particular project or capital improvement project to a priority level was made after an evaluation using the following criteria:

- *Public Health Concerns.* Projects targeted to resolve existing or near-term regulatory compliance issues were assigned the highest priority.
- *Consumed Infrastructure (end of useful life).* Projects to replace damaged or deteriorated infrastructure (particularly those facilities that have reached the end of their useful life and no longer function as designed) were assigned a higher priority.
- *Capacity or Size Deficiencies.* The severity of the deficiency was considered and compared with the service improvements provided by the replacement components. The projected benefit (versus cost) of a project was used to assign a priority.
- *City Priority.* Projects identified by City operations and maintenance personnel to be high priority due to operational or maintenance problems.
- *Demand Development.* The anticipated timeframe for the development of land within the service area of proposed improvements was considered. Projects to serve approved or near-term developments should be given higher priority than improvements targeted to long-term future developments.

12.2.2 Prioritization Levels

In order to assist the City with their planning, scheduling and construction efforts each improvement project was assigned to one of three priority levels. The priority levels are:

12.2.2.1 Priority 1- Near-Term Improvements

These projects are targeted problem areas needing immediate attention. They are projects necessary to resolve existing or near-term system deficiencies, resolve regulatory compliance issues or to serve known near-term demand increases. It is recommended that Priority 1 improvements are undertaken as soon as practical (as quickly as financing can feasibly be arranged and construction/permitting/land or easement acquisition considerations can be addressed).

12.2.2.2 Priority 2- Intermediate Improvements

These are projects that will be needed to maintain adequate water service based on the condition of aging infrastructure, seismic risk mitigation, and to improve redundancy. Although not critical at this time, they should be considered as improvement projects that will be upgraded to Priority 1 prior to the end of the planning period.

12.2.2.3 Priority 3- Long-Term Improvements/Possible Future Need

These projects are projects to improve system reliability and operability, but are not necessary during the planning period. While important, they are not considered to be critical at the present time and can be delayed to the next planning period. Should conditions in the City change, it is always the City's choice to increase the priority ranking of these projects and construct them sooner rather than later.

12.2.3 Prioritized Capital Improvement Projects & Estimated Project Costs

To aid in the development of a water system capital improvement program (CIP), each improvement project was examined and assigned to one of the priority classes described above.

Table 12-1 below summarizes the priority category totals presented in Table 12-2.

Table 12-1| Cost Summary, Capital Improvement Recommendations

Priority Group	Total Estimated Project Cost
Priority 1	\$4,904,000
Priority 2	\$8,262,000
Priority 3	\$1,313,000
Total	\$14,479,000

Table 12-2 is a comprehensive listing of the recommended water system improvement projects. The cost estimates are rounded to the nearest \$1,000 increment. Maps showing the locations of the prioritized improvements are included in Figure 12-1 through Figure 12-3. The reader is referred to previous chapters of this report for more detailed descriptions of the individual projects.

At a minimum, it is recommended that all of the Priority 1 and Priority 2 improvements be included in the City's Capital Improvement Plan (CIP) for the 20-year planning period ending in 2041. Priority 3 improvements are considered to be optional.

The recurring annual programs, listed in Table 12-2, should be incorporated into the City's operation and maintenance budgets for the water utility. It is envisioned that the City's budget will be increased by these amounts upon the adoption of this plan.

Table 12-2| Recommended Capital Improvement Priorities (Yachats Water System)

Project Code ⁽¹⁾	Project	Chapter	Priority	Total Estimated Project Cost ⁽²⁾
S-1	Permit S-29018 Partial Perfection and Extension Application	6	1	\$15,000
S-2	Yachats River Water Rights Planning Work	6	1	\$50,000
S-3	Evaluate Using SWLCWPUD as a Long-Term Source	6	1	\$75,000
S-4	Yachats River Intake and Raw Water Pipeline	6	1	\$2,893,000
S-5	Reedy Creek Raw Water Pipeline Improvements	6	1	\$208,000
T-1	WTP Electrical and Control System Improvements	7	1	\$814,000
D-1	Water System Design Standards	8	1	\$5,000
D-2	Pressure Reducing Valve Maintenance & Coordination	8	1	\$50,000
D-3 ⁽³⁾	Windsong Street Service Reconnections	8	1	\$11,000
D-4 ⁽³⁾	New PRV at 7th Street & Radar Road	8	1	\$101,000
D-5 ⁽³⁾	New PRV on King Street Between 7th and Prospect Ave	8	1	\$101,000
D-6 ⁽³⁾	New 8" Water Main on Radar Road at Prospect Ave	8	1	\$57,000
D-7 ⁽³⁾	New 8" Water Main on King Street at Prospect Ave	8	1	\$86,000
D-10	Retrofit Combs PRV	8	1	\$40,000
D-13	Replace 4" AC with 8" from Prospect Ave to Yachats River Road	8	1	\$398,000
Subtotal Priority 1				\$4,904,000
T-2	WTP Clarifier Rehabilitation	7	2	\$641,000
T-3	WTP Mixed Media Filter Rehabilitation	7	2	\$350,000
T-4	WTP Pump and Compressor Upgrades	7	2	\$402,000
T-5	WTP Instrumentation Upgrades	7	2	\$271,000
T-6	WTP Chemical Feed System Improvements	7	2	\$205,000
T-7	WTP Building Seismic Retrofit	7	2	\$270,000
D-8	New 8" Water Main on Third Street	8	2	\$167,000
D-9	New 4" Water Main and PRV on Horizon Hill Road	8	2	\$737,000
D-11	Yachats Ocean Road Service Reconnections	8	2	\$20,000
D-15	Pontiac Street Waterline - 3rd to 4th	8	2	\$88,000
D-16	Shell Street Waterline	8	2	\$79,000
D-17	Gender Drive and Windy Way Waterlines	8	2	\$254,000
D-18	Pontiac Street Waterline - 2nd to 3rd	8	2	\$105,000
D-19	Hanley Drive Waterline	8	2	\$47,000

Table 12-2| Recommended Capital Improvement Priorities (Yachats Water System)

Project Code ⁽¹⁾	Project	Chapter	Priority	Total Estimated Project Cost ⁽²⁾
P-1	New Radar Road Pump Station	8	2	\$767,000
P-2	New Horizon Hill Pump Station & Reservoir	8	2	\$1,079,000
ST-1	New 250,000-gallon Lower Radar Road Reservoir	9	2	\$1,717,000
ST-2	Upper Radar Road Reservoir Structural Inspection & Analysis	9	2	\$50,000
ST-3	Upper Radar Road Reservoir Seismic Retrofit Improvements	9	2	\$1,013,000
Subtotal Priority 2				\$8,262,000
D-12	New 8" Water Main on Green Hill Drive	8	3	\$412,000
D-14	8" Water Main Highway 101 from 6th to Marine Dr.	8	3	\$583,000
D-20	Automated Water Meter Reading System	8	3	\$318,000
Subtotal Priority 3				\$1,313,000
<i>Recurring Annual Programs</i>				
Pgm-1	Non-metered Water Use Tracking System (see section 8.4.2)	8	1	\$1,000 per year
Pgm-2	Leak Detection and Repair Program (see section 8.4.2)	8	1	\$30,000 per year
Pgm-3	Water Management & Conservation Plan Updates (see section 3.9)	3	1	\$5,000 per year
Subtotal Recurring Annual Programs				\$36,000 per year

¹ Project Code Legend:

S : Water Source/Supply

T : Water Treatment

ST : Storage

P : Pump Station

D : Distribution

Pgm : Recurring Annual Program

² See Section 12.3.2 for basis of project cost estimates, January 2021 ENR 20 City Construction Cost Index of 11630

³ As described in Chapter 8, the City may want to consider constructing Projects D-3 through D-7 as a single larger project.

Figure 12-1 | Yachats Water System Capital Improvement Priorities

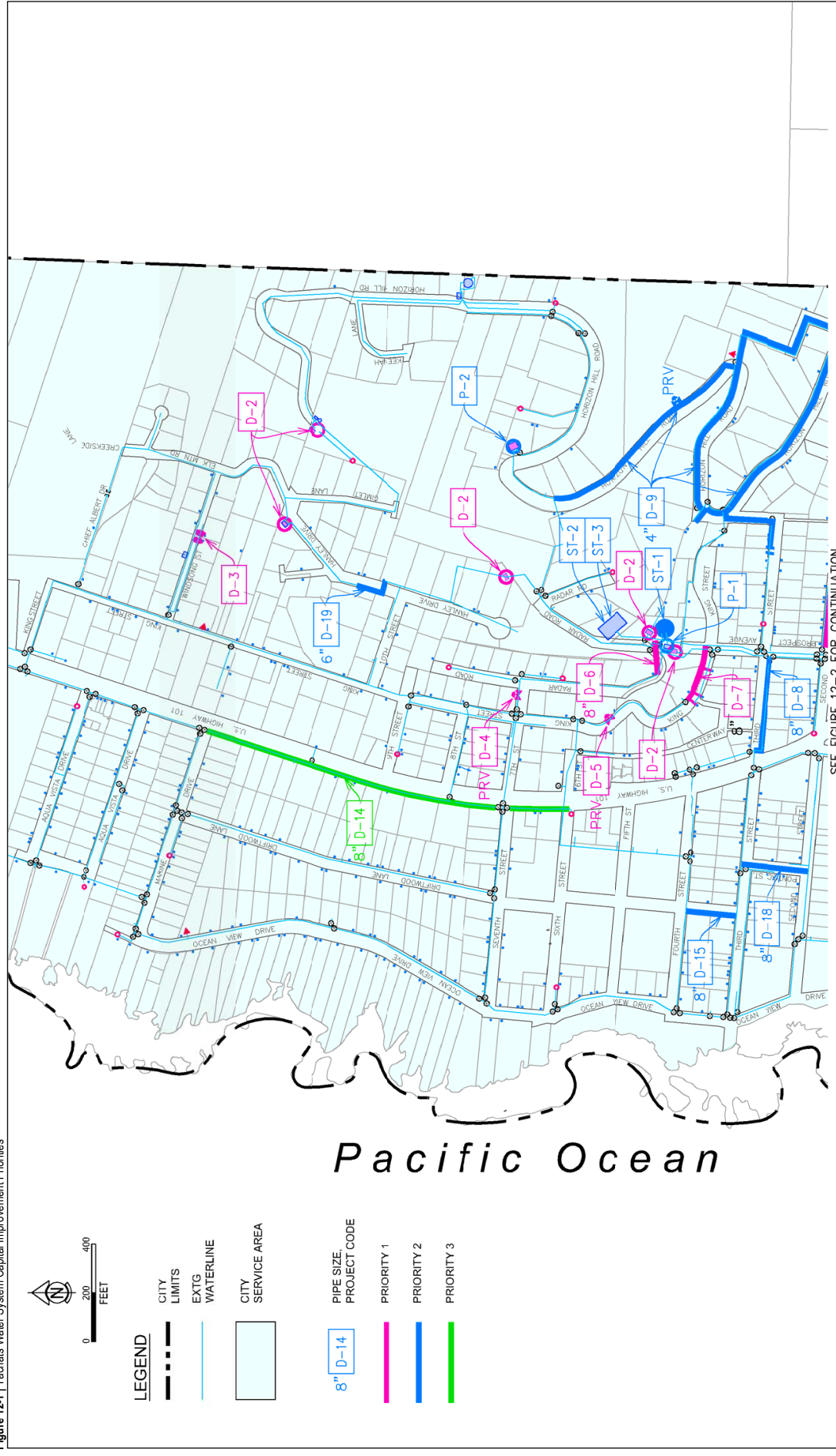


Figure 12-2 | Yachats Water System Capital Improvement Priorities

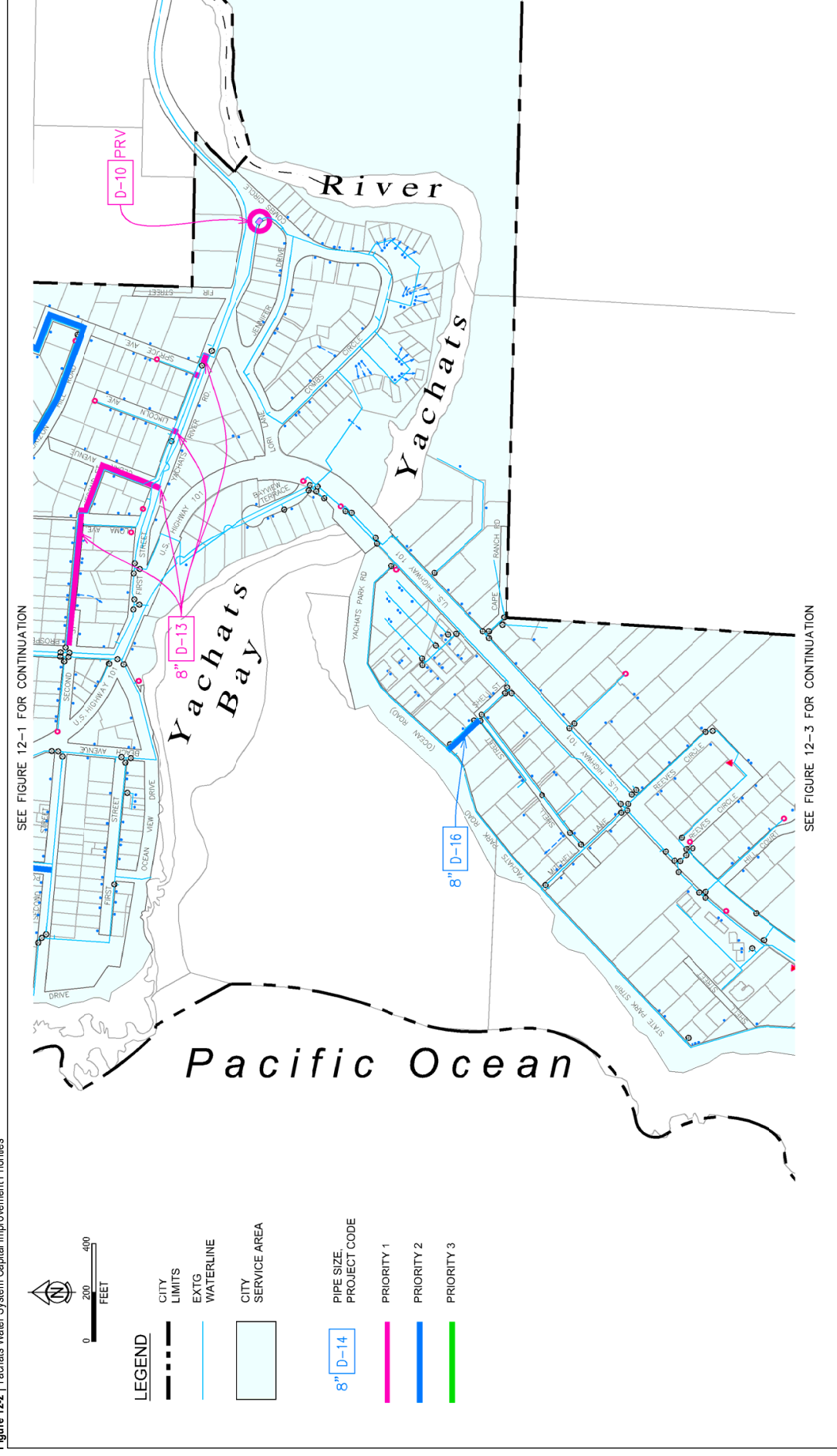
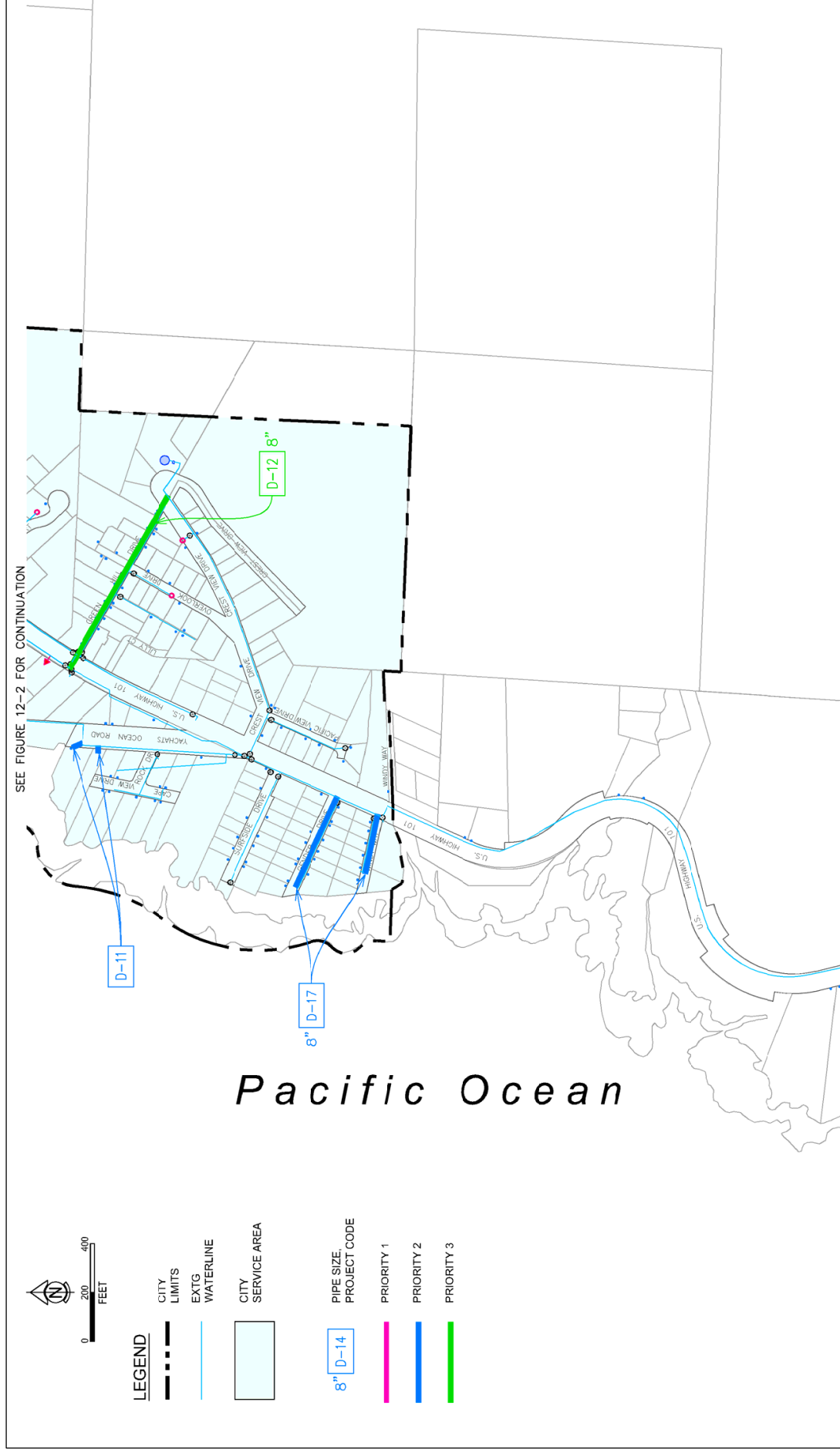


Figure 12-3 | Yachats Water System Capital Improvement Priorities



12.2.4 Environmental Impacts

It should be noted that while the improvements recommended in this report are not anticipated to have significant adverse impacts on the environment, each CIP project may need to undergo project-specific environmental review as part of the preliminary and final design process. In particular, the new Yachats River Water Intake will require work below the ordinary high water level in the river. This type of work requires an extensive permitting process due to the presence of threatened and endangered species habitat.

12.3 BASIS OF COST ESTIMATES

In order to forecast municipal capital expenditures, cost estimates have been prepared for each of the improvements. The preparation methodology and intended use of these cost estimates is summarized below. The cost estimates are based on numerous assumptions necessary due to the relative lack of detail available at the master planning stage.

12.3.1 Accuracy of Cost Estimates

The accuracy and precision of cost estimates is a function of the level to which improvement alternatives are developed (i.e., detail and design) and the techniques used in preparing the actual estimate. Estimates are typically divided into three basic categories as follows:

- *Planning Level Estimate.* These are order-of-magnitude estimates made without detailed engineering design data. They are often performed at the zero to 2 percent stage of project completion and typically range from 35 percent over to 25 percent below the final project cost. A relatively large contingency is typically included to reduce the risk of under-estimating. This is particularly important since many times the project financing must be secured before the detailed design can proceed.
- *Budgetary Estimates.* This level of estimate is prepared during the preliminary design phase using process flow sheets, preliminary layouts and equipment details. This type of estimate is typically accurate to (+)30 and (-)15 percent of the final project cost.
- *Engineer's Estimate.* This estimate is prepared on the basis of well-defined engineering data, typically when the construction plans and specifications are completed. The estimating process at this level relies on piping and instrument diagrams, electrical diagrams, equipment data sheets, structural drawings, geotechnical data and a complete set of specifications. This estimate is sometimes called a definite estimate. The engineer's estimate is expected to be accurate within (+)15 to (-)5 percent of the pricing secured during the bidding process.

The project costs prepared as part of this study are planning level estimates. Actual project costs will depend on the final project scope, labor and material costs, market conditions, construction schedule, and other variables at the time the project is built. These variables are typically uncertain at the time planning level estimates are performed.

12.3.2 Adjustment of Cost Estimates Over Time

A commonly used indicator to evaluate the change of construction costs over time is the Engineering News-Record (ENR) construction cost index. The index is computed from the prices for structural steel, Portland cement, lumber, and common labor, and is based on a value of 100 in the year 1913. The construction costs developed in this analysis are based on the January 2021 ENR 20 City Construction Cost Index of 11,630. As the planning period elapses, the costs presented in this study can be updated to the present by applying the ratio of the current cost index to the index used during the preparation of the estimate.

12.3.3 Engineering and Administrative Costs, Contingencies

The cost of engineering services for major projects typically covers special investigations, pre-design reports, topographic surveying, geotechnical investigations, contract drawings and specifications, construction administration, inspection, project start-up, the preparation of O&M manual narratives, and performance certifications. Depending on the size and type of the project, engineering costs may range from 16 to 25 percent of the contract cost when all of the above services are provided. The lower percentage applies to large projects without complex mechanical systems. The higher percentage applies to smaller, more complex projects that require the integration of a complex design into an existing facility and where full time inspection is required by the funding agencies or desired by the Owner.

The City will have administrative costs associated with any construction project. These include internal planning and budgeting costs, administration of engineering and construction contracts, legal services, and coordination with regulatory and funding agencies. The specific values used for engineering, administrative, and construction costs for each type of improvement project are described in the following sections.

Since the funding sources for the completion of the recommended improvements have not yet been confirmed, the cost estimates outlined below are based on the assumption that each of the projects will be designed and constructed separately with local funds.

12.4 CONSTRUCTION COST ESTIMATES

The planning level estimates for the water system improvements recommended in this study are based on a number of assumptions as follows. The cost estimates reflect projects bid in late winter or early spring for summer construction. The estimates are based on construction costs of similar historical projects and on current estimates solicited from material and equipment vendors. The estimates are expected to have accuracies of +35 percent and – 25 percent of the actual project cost. The following sections describe the cost estimating process for the various categories of projects.

12.4.1 Pipeline Improvement Costs

The proposed pipeline improvement projects range in size from 4-inches to 8-inches in diameter. These costs were developed using the following assumptions:

- Pipe material for buried pipelines is PVC AWWA C900
- Installation of valves and hydrants are included and shall be installed per City standards
- Standard soil cover is 3 feet and trenching costs exclude rock excavation and trench dewatering
- Reconnection of all services are included for waterline replacement projects
- Asphalt trench repair for the full length of the project for the trench width only
- Railway and highway bores must be added to the unit costs at \$900 per linear foot
- Construction contingencies are 10% of estimated construction cost
- Engineering is 20% of estimated construction cost
- Legal, permits and administrative costs are 5% of estimated construction cost

Total project costs per foot of installed pipe appear in Table 12-3, along with the percentages listed above for engineering design and administrative costs. Detailed cost estimates for the distribution system improvements are include in Appendix B.

Table 12-3| Estimated Pipeline Improvement Costs

Size & Location	Total Cost per Foot
4-inch Pipe in City Right-of-Way	\$100
6-inch Pipe in City Right-of-Way	\$110
8-inch Pipe in City Right-of-Way	\$120
8-inch Pipe in ODOT Right of Way	\$175
Mainline Connections	\$9,000 each
Auger Bore Pipe Installation	\$900
Water Services	\$4,000 each
New Fire Hydrants Including Lateral Piping	\$8,000 each

12.4.2 Source Improvement Costs

Construction costs for the new intake structure includes in-water work isolation, site preparation, structures, buildings, pumps, mechanical piping, electrical and instrumentation. Project costs have been based on historical construction cost information for similarly sized projects.

A construction contingency of 10% was assumed for the source improvements. Engineering costs of 20% as well as legal, administration, and permitting costs of 5% were also assumed for these projects.

12.4.3 Water Treatment Improvement Costs

Construction costs for water treatment plant improvements include mobilization, demolition, associated mechanical piping and pumping, as well as electrical and instrumentation modifications.

A construction contingency of 10% was assumed for the water treatment improvements. Engineering costs of 20% as well as legal, administration, and permitting costs of 5% were also assumed for these projects.

12.4.4 Storage Tank Improvement Costs

Construction costs for storage tank improvements include mobilization, erosion control, excavation & earthwork, associated mechanical piping, electrical and instrumentation, as well as civil site improvements.

A construction contingency of 10% was assumed for the storage tank improvements. Engineering costs of 20% as well as legal, administration, and permitting costs of 5% were also assumed for these projects.

12.5 FUNDING SOURCES

As a general rule, small communities are not able to finance major water system improvements without some form of government funding such as low interest loans or grants. It is anticipated that the funding for the recommended capital improvement plan outlined in this report will be secured from multiple sources, including system development charges (SDCs), monthly user fees, as well as state and federal grant and loan programs. The following section outlines the major local and State/Federal funding programs that may be available for these projects.

12.5.1 Local Funding Sources

To a large degree, the type and amount of local funding used for the water system improvements will depend on the amount of grant funding obtained and the requirements of any loan funding. Local revenue sources for capital improvements include ad valorem taxes (property taxes), various types of bonds, water user fees, connection fees and SDCs. Local revenue sources for operating costs are generally limited to water user fees. The following sections discuss local funding sources and financing mechanisms that are most commonly used for the type of capital improvements presented in this study.

12.5.1.1 Existing Debt Service

The City currently has three outstanding loans (Table 12-4). As of June of 2020, the total outstanding principal owed is approximately \$1,872,000 and the minimum debt service payments total approximately \$126,600 per year.

Table 12-4 | Water Utility Existing Debt

Loan Description	Loan Amount	Term (years)	Payoff Date	Interest Rate	Annual Payment	Outstanding Principal (6/2020)
Water Revenue Bond	\$512,000	15	2032	3.07%	±\$42,850	\$427,416
Water General Obligation Bond	\$533,000	15	2032	3.0%	±\$43,825	\$439,091
South Tank Business Oregon Loan	\$1,030,000	30	2049	1.0%	±\$39,911	\$1,005,500

12.5.1.2 User Fees

User fees are monthly charges to all residences, businesses, and other users that are connected to the water system. User fees are established by the city council and are typically the sole source of revenue to finance operation and maintenance. The City's water user fee system is established by Resolution 2015-12-01. For most residential and commercial connections (i.e., 5/8 and 3/4 inch meters), the City currently charges a flat fee of \$48.24 that includes up to 200 cubic feet of water per month. An additional charge of \$6.00 is assessed for each 100 cubic foot above the initial amount that is included in the base charge. The City does have some users with larger meters. These users are charged a special rate that is based on usage.

The anticipated revenue from water billings for the fiscal year 2020/2021 is budgeted to be approximately \$585,000. Including other various charges and interest earnings, the total water fund revenues, for the 2020/2021 fiscal year are budgeted to be approximately \$588,000. It should be noted that these budget amounts are less than the historic revenue from user rates. In the previous two fiscal years, the revenue from user rates was about \$650,000 and \$600,000. Due to the Covid-19 pandemic, the City anticipated less revenue for the 2020/2021 fiscal year.

The City's water fund must provide sufficient revenues to properly operate and maintain the water system and provide reserves for normally anticipated replacement of key system components such as pumps, motors, pump station control equipment, chemical feed equipment, fire hydrants and distribution piping repairs. Although the City relies exclusively on user fees for operation and maintenance costs, the water fund is typically not adequate to finance major capital improvements without outside funding sources.

12.5.1.3 System Development Charge Revenues

A system development charge (SDC) is a fee collected by the City as each piece of property is developed (SDC fees are collected at issuance of building permits). SDCs are used to finance necessary capital improvements and municipal services required by the development. SDCs can be used to recover the capital costs of infrastructure required as a result of the development, but cannot be used to finance either operation and maintenance, or replacement costs.

The SDC fee system was most recently revised by Resolution Number 2007-01-01. The City charges different SDC fees based on the size of the water meter installed at each property. The current fee structure is listed in Table 12-5.

Table 12-5 | Current Water SDC Fees

Meter Size	SDC Charge
¾ by ⅝ - Inch	\$3,133
¾ - Inch	\$4,700
1- Inch	\$7,833
1 ½ - Inch	\$15,665
2 - Inch	\$25,064
3- Inch	\$50,128
4- Inch	\$78,325
6- Inch	\$156,650

As established in ORS 223, an SDC can have two principal elements, the reimbursement fee and the improvement fee. The reimbursement fee portion of the SDC is the fee for buying into either existing capital facilities or those that are under construction (i.e., it represents a charge for utilizing excess capacity in an existing facility that was paid for by the City or previous developers). The revenue from this fee is typically used to repay existing improvement loans.

The improvement fee portion of the SDC is the fee designed to cover the costs of capital improvements that must be constructed to provide an increase in capacity to support the development.

Over the last three fiscal years, the City has collected an average of about \$50,000 in water system development charges.

Based on the infrastructure improvements and cost projections presented in this master plan, the existing SDC fee structure is insufficient to meet the planning period goals. This plan accordingly recommends that the City complete a full review of its SDC rate structure and update these fees accordingly.

12.5.1.4 Connection Fees

Many cities charge connection fees to cover the cost of connecting a new development to the municipal water system. There are two types of connection fees. The first is for newly constructed connections and is designed to cover the cost of City inspections at the time of connection to the distribution system. The second type of fee is designed to defray the City's administrative cost of setting up a new account and is charged against newly constructed connections as well as transfers of an existing service to a new owner.

12.5.1.5 Capital Construction Fund

Capital construction funds or sinking funds are often established as a budget line item to set aside money for a particular construction purpose. A set amount from each annual budget is deposited in a sinking fund until sufficient reserves are available to complete the project. Such funds can also be developed from user fee revenues or from SDCs.

The City maintains a capital reserve fund used to make improvements to the water system. In recent years, the City has typically contributed an average of about \$90,000 from user fees to this fund. At the end of the 2020/2021 fiscal year, the ending balance in this fund is anticipated to be about \$325,000.

12.5.1.6 General Obligation Bonds

The sale of municipal general obligation bonds is a traditional method of funding municipal water improvement projects. General obligation bonds utilize the City's basic taxing authority and are retired with property taxes based

on an equitable distribution of the bonded obligation across the City's assessed valuation. General obligation bonds are normally associated with the financing of facilities that benefit an entire community and must be approved by a majority vote of the City's voters.

General obligation bonds are backed by the City's full faith and credit, as the City must pledge to assess property taxes sufficient to pay the annual debt service. This portion of the property tax is outside the State constitutional limits that restrict property taxes to a fixed percentage of the assessed value. The City may use other sources of revenue, including water user fee revenues, to repay the bonds. If it uses other funding sources to repay the bonds, the amount collected as taxes is reduced commensurately.

The general procedure followed when financing water system improvements with general obligation bonds is typically as follows:

- Determination of the capital costs required for the improvement
- An election by the voters to authorize the sale of bonds
- The bonds are offered for sale
- The revenue from the bond sale is used to pay the capital cost of the project(s)

General obligation bonds can be "revenue supported", wherein a portion of the user fee is pledged toward repayment of the bond debt. The advantage of this method is that the need to collect additional property taxes to retire the bonds is reduced or eliminated. Such revenue supported general obligation bonds have most of the advantages of revenue bonds in addition to a lower interest rate and ready marketability.

The primary disadvantage of general obligation debt is that it is often added to the debt ratios of the City, thereby restricting the flexibility of the municipality to issue debt for other purposes.

12.5.1.7 Revenue Bonds

Revenue bonds are similar to general obligation bonds, except they rely on revenue from the sales of the utility (i.e., user fees) to retire the bonded indebtedness. The primary security for the bonds is the City's pledge to charge user fees sufficient to pay all operating costs and debt service. Because the reliability of the source of revenue is relatively more speculative than for general obligation bonds, revenue bonds typically have slightly higher interest rates.

The general shift away from ad valorem property taxes makes revenue bonds a frequently used option for payment of long term debt. Many communities prefer revenue bonding, because it ensures that no additional taxes are levied. In addition, repayment of the debt obligation is limited to system users since repayment is based on user fees.

One advantage with revenue bonds is that they do not count against a City's direct debt. This feature can be a crucial advantage for a municipality near its debt limit. Rating agencies closely evaluate the amount of direct debt when assigning credit ratings. There are normally no legal limitations on the amount of revenue bonds that can be issued; however, excessive issue amounts are generally unattractive to bond buyers because they represent high investment risks.

Under ORS 288.805-288.945, cities may elect to issue revenue bonds for revenue producing facilities without a vote of the electorate. Certain notice and posting requirements must be met and a sixty (60) day waiting period is mandatory.

The bond lender typically requires the City to provide two additional securities for revenue bonds that are not required for general obligation bonds. First, the City must set user fees such that the net projected cash flow from user fees

plus interest will be at least 125% of the annual debt service (a 1.25 debt coverage ratio). Secondly, the City must establish a bond reserve fund equal to maximum annual debt service or 10% of the bond amount, whichever is less.

12.5.1.8 Improvement Bonds

Improvement (Bancroft) bonds are an intermediate form of financing that are less than full-fledged general obligation or revenue bonds. This form of bonding is typically used for Local Improvement Districts.

Improvement bonds are payable from the proceeds of special benefit assessments, not from general tax revenues or user fees. Such bonds are issued only where certain properties are recipients of water system improvements. For a specific improvement, all property within the designated improvement district is assessed on the same basis, regardless of whether the property is developed or undeveloped. The assessment is designed to divide the cost of the improvements among the benefited property owners. The manner in which it is divided is in proportion to the direct or indirect benefits to each property. The assessment becomes a direct lien against the property, and owners have the option of either paying the assessment in cash, or applying for improvement bonds. If the improvement bond option is taken, the City sells Bancroft Improvement Bonds to finance the construction, and the assessment is paid in accordance with a payment schedule.

The assessments against the properties are usually not levied until the actual cost of the project is determined. Since actual costs cannot normally be determined until the project is completed, funds are not available from assessments for the purpose of paying costs at the time of construction. Therefore, some method of interim financing must be arranged.

The primary disadvantage to this source of revenue is that the development of an assessment district is very cumbersome and expensive when facilities for an entire City are contemplated. Therefore, this method of financing should only be considered for discrete improvements to the system where the benefits are localized and easily quantified.

12.5.1.9 Certificates of Participation

Certificates of Participation are a form of bond financing that is distinct from revenue bonds. While it is more complex, and typically has a higher interest rate than revenue bonds, it is a process controlled by the City Council, and it does not have to be referred to the voters. This can result in significant time savings.

12.5.1.10 Ad Valorem Taxes

Ad valorem property taxes were often used in the past as a revenue source for public utility improvements. These taxes were the traditional means of obtaining revenue to support all local governmental functions. Ad valorem taxation is a financing method that applies to all property owners that benefit, or could potentially benefit from a water system improvement, whether the property is developed or not. The construction costs for the improvement project are shared proportionally among all property owners based on the assessed value of each property. Ad valorem taxation, however, is less likely to result in individual users paying their proportionate share of the costs as compared to their benefits.

12.5.2 State and Federal Grant and Loan Programs

Several state and federal grant and loan programs are available to provide financial assistance for municipal water system improvements. The primary sources of funding available for water system financing are Rural Utilities Service (RUS), Special Public Works Fund (SPWF), the Water/Wastewater (W/W) Financing Program, the Community Development Block Grant (CDBG) program, and the Clean Water State Revolving Fund (CWSRF).

12.5.2.1 Rural Utility Services

Rural Utility Service (RUS) provides federal loans and grants to rural municipalities, counties, special districts, Indian tribes, and not-for-profit organizations to construct, enlarge, or modify water treatment and distribution systems and wastewater collection and treatment systems. Preference is given to projects in low-income communities with populations below 10,000.

Borrowers of RUS loans must be able to demonstrate the following:

- Monthly user rates must be at or above the state-wide average.
- They have the legal authority to borrow and repay loans, to pledge security for loans, and to operate and maintain the facilities and services.
- They are financially sound and able to manage the facility effectively.
- They have a financially sound facility based on taxes, assessments, revenues, fees, or other satisfactory sources of income to pay for all facility costs including O&M and to retire indebtedness and maintain a reserve.

The maximum RUS loan term is 40 years, but the finance term may not exceed statutory limitations on the agency borrowing the money or the expected useful life of the improvements. The reserve can typically be funded at 10 percent per year over a ten-year period. Interest rates for RUS loans vary based on median household income, but tend to be lower than those obtained in the open market.

12.5.2.2 Infrastructure Finance Authority

The Oregon Infrastructure Finance Authority (IFA) manages a number of grant and low interest loan programs as describe in the following sections.

- *Special Public Works Fund*

The IFA administers the Special Public Works Fund (SPWF) program. The SPWF is a lottery-funded loan and grant program that provides funding to municipalities, counties, special districts, and public ports for infrastructure improvements to support industrial/manufacturing and eligible commercial economic development. Eligible commercial economic development is defined as commercial activity that is marketed nationally, or internationally, and attracts business from outside Oregon. Funded projects are usually linked to a specific private sector development and the resulting direct job creation (i.e., firm business commitment), of which 30% of the created jobs must be "family wage" jobs. The program also funds projects that build infrastructure capacity to support industrial/manufacturing development where recent interest by eligible business(s) can be documented.

The SPWF is primarily a loan program, although grant funds are available based on economic need of the community. Although the maximum loan term is 25 years, loans are generally made for 20-year terms. The maximum loan amount for projects funded with direct SPWF money is \$1 million, while the maximum for projects financed with bond funds is \$10 million.

- *Bond Bank Program*

The Bond Bank program, administered by IFA, attempts to lower the cost of issuing debt by pooling small revenue bond issues from many communities into one large revenue bond issue. It uses lottery proceeds to write down financing costs, and to improve the debt/equity ratio on projects. The interest rate for repayment of funds is typically around 6 percent, with up to a 25 year term.

- *Water/Wastewater Financing Program*

IFA also administers the W/W Financing Program, which gives priority to projects that provide system-wide benefits and helps communities meet the Clean Water Act or the Safe Drinking Water Act standards. It is intended to assist

local governments that have been hard hit with state and federal mandates for public drinking water systems and wastewater systems. In order to be eligible for this program, the system must be out of compliance with federal or state rules, regulations or permits, as evidenced by issuance of a Notice of Non-Compliance by the appropriate regulatory agency. The funded project must be needed to meet state or federal regulations. Priority is given to communities under economic distress.

Similar to the SPWF, the W/W Financing Program is primarily a loan program, although grant funds are available in certain cases, based on economic need of the community. Although the maximum loan term is 25 years, loans are generally made for 20-year terms. The maximum loan amount for projects funded with direct W/W money is \$500,000, while the maximum for projects financed with bond funds is \$10 million.

- *Economic and Community Development Block Grant*

The IFA administers the CDBG, but the funds are from the U.S. Department of Housing and Urban Development (HUD), so all federal grant management rules apply to the program. The federal eligibility standards are strict. There are two subcategories of Public Works projects eligible for funding, "Public Water and Wastewater," and "Public Works for New Housing." Only the former is considered in this discussion.

Grants are available for critically needed construction, improvement, or expansion of publicly owned water and wastewater systems for the benefit of current residents. Generally, projects must be necessary to resolve regulatory compliance problems identified by state and/or federal agencies and the project must serve a community that is comprised of more than 51% of low and moderate income persons.

The program separates projects into three parts. Grants are available for:

- *Preliminary Engineering and Planning Projects.* Generally, these grants fund preparation or update of Water System Master Plans and Wastewater Facility Plans, as required by the Oregon Department of Environmental Quality or Oregon Health Division. In addition, funds for grant administration and preparation of a final design funding application can be included in the project budget. All plans produced with grant funds must be approved by the appropriate regulatory agency. Grants of up to \$10,000 can also be made for problem identification studies to delineate problems and corrective measures, as required by a regulatory agency.
- *Final Design and Engineering Projects.* Final design and engineering, bid specifications, environmental review, financial feasibility, rate analysis, grant administration, and preparing a construction funding application are all eligible project activities. The final design, plans and specifications must be approved by the appropriate regulatory agency before a grant will be awarded.
- *Construction Projects.* These grants fund construction and related activities, grant administration, and land/permanent easement acquisition. IFA has established an evaluation system that gives priority to projects that provide system-wide benefits. The overall maximum grant amount per water or wastewater project is \$2,500,000 (including all planning, final engineering, and construction). The project cannot be divided locally into phases with the expectation of receiving more than one \$2,500,000 grant. In order to qualify for grant funding under this program, the water user rates must be at or above statewide averages.

12.5.2.3 Safe Drinking Water Loan Fund & Drinking Water Protection Loan Fund

The Safe Drinking Water Loan Fund is administered by IFA with assistance from ODWP and provides loans to cities, counties, special districts, and Indian tribes to construct, expand, or rehabilitate water treatment, distribution, and storage facilities in order to comply with the federal Safe Drinking Water Act.

Interest rates on loans are about 80% of the general obligation bond rate; however, there are additional financing costs and annual service fees that increase the effective rate. The maximum loan amount per project is \$6,000,000.

The maximum loan term is 20 years except for disadvantaged communities that may qualify for loan terms up to 30 years provided the loan term does not exceed the useful life of the facility being constructed.

12.5.2.4 Water Development Loan Fund

The Water Development Loan Fund is administered by the Oregon Water Resources Department. This program provides loans to municipal water suppliers with a population under 30,000. These loans are available with up to 30-year terms.

12.5.3 Funding Recommendations

As available grant funding on public works projects has decreased in the last several years, it will be incumbent upon the City to aggressively pursue funding to finance the cost of the recommended improvements.

Based on the infrastructure improvements and cost projections presented in this master plan, the existing user rates and SDC fee structure is insufficient to fund all the Priority 1 and Priority 2 projects. This plan accordingly recommends that the City complete a full review of its SDC and user fee structure and update these fees accordingly.

For large projects (e.g., the Yachats River Intake) a key step in the funding process is to schedule a "one stop meeting" with Oregon Infrastructure Finance Authority (IFA). These meetings include representatives from the various state and federal funding programs. Each funding program is evaluated for the particular project under consideration. A one-stop meeting is a good way to quickly determine the best funding program for a particular project.

12.6 RECOMMENDED IMPLEMENTATION PLAN

It is recommended that the City plan to construct all Priority 1 and Priority 2 projects during the planning period. It is envisioned that the Priority 3 improvements will be constructed by the City after the current planning period (i.e., after 2041). It is recommended to begin design work on the highest priority projects as soon as possible after final approval of the Master Plan

APPENDIX A

CITY OF YACHATS WATER SYSTEM MAPS

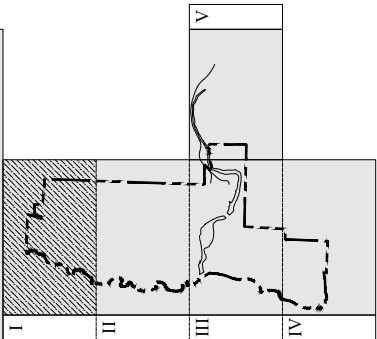
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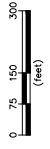
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- 4" WATER LINE
- 6" WATER LINE
- 8" WATER LINE
- 10" WATER LINE
- 12" WATER LINE

CITY LIMITS

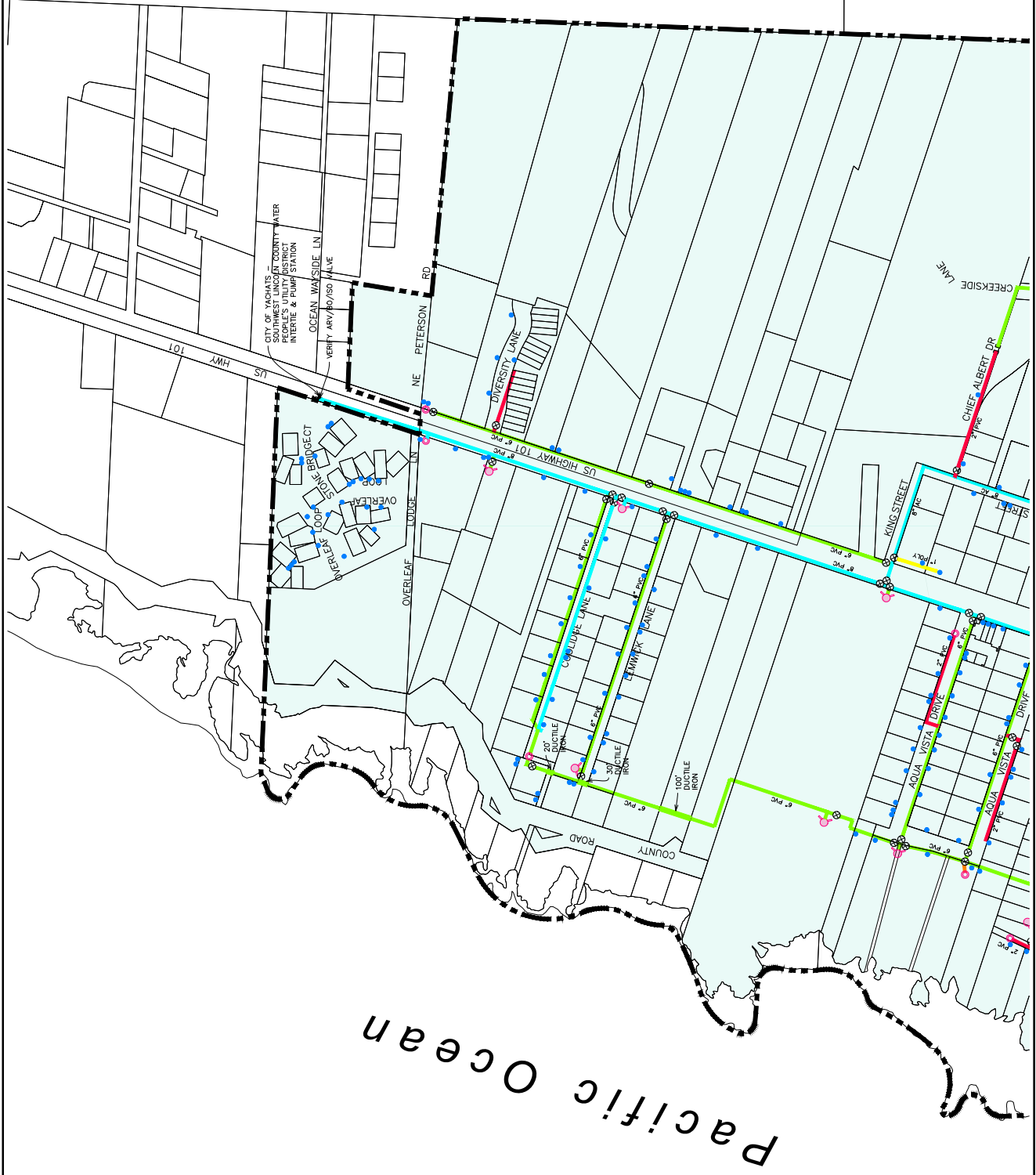
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- PRESSURE REDUCING VALVE (PRV)
- FIRE HYDRANT
- ISOLATION VALVE
- BLOWOFF VALVE (BV)
- AIR RELIEF VALVE (ARV)
- APPROX. WATER METER LOCATION



MAP KEY



Pacific Ocean

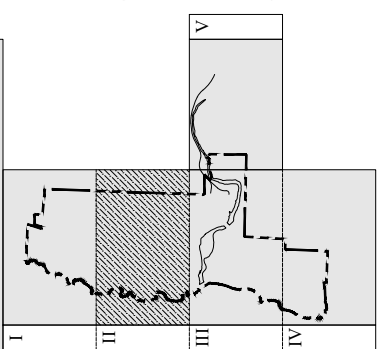


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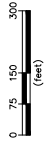
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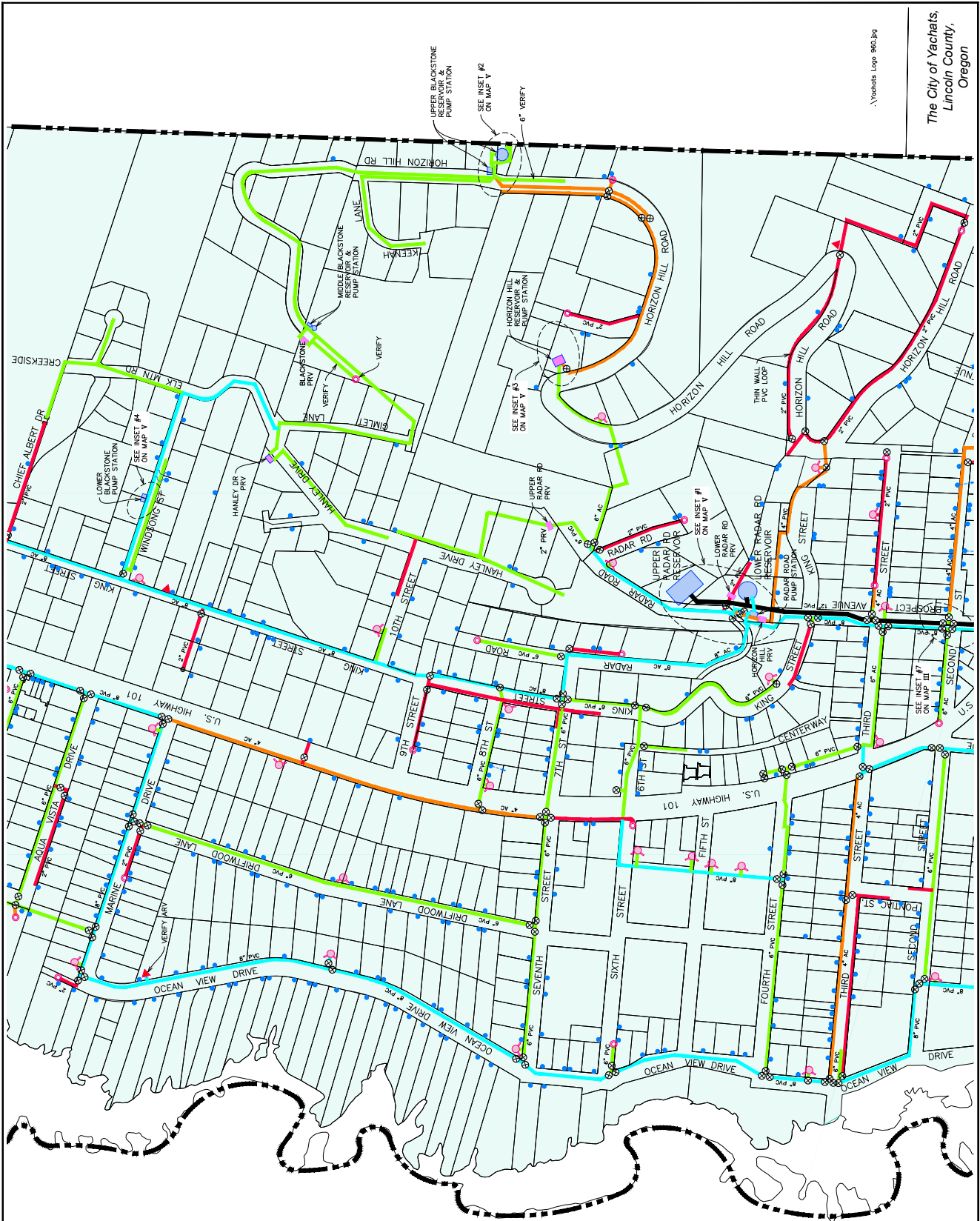
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- WATER RESERVOIR
- PRESSURE REDUCING VALVE (PRV)
- FIRE HYDRANT
- ISOLATION VALVE (IV)
- BLOWOFF VALVE (BV)
- AIR RELIEF VALVE (ARV)
- APPROX. WATER METER LOCATION



MAP KEY

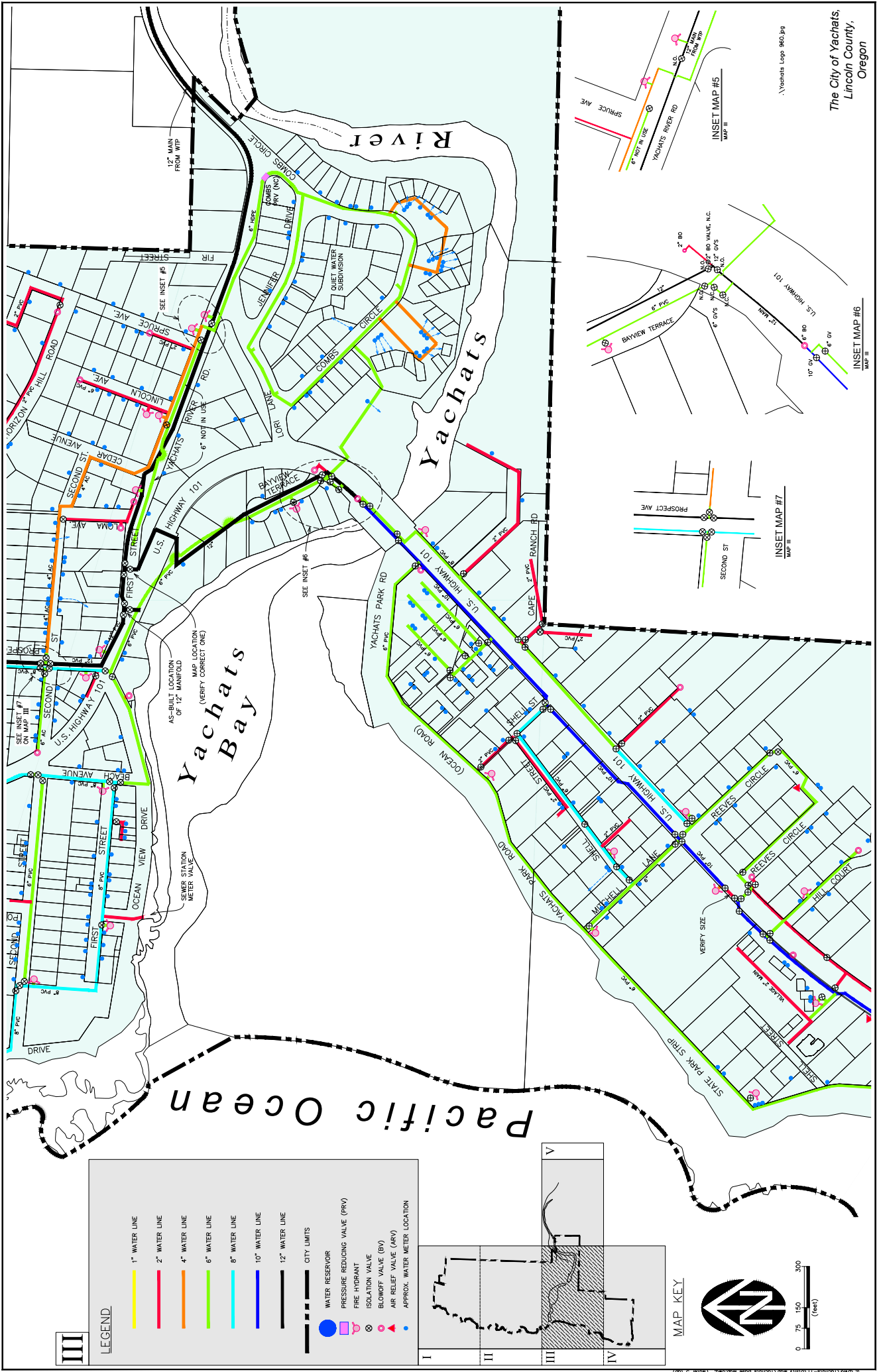


Pacific Ocean



The City of Yachats,
Lincoln County,
Oregon

Yachats Logo 8602.jpg

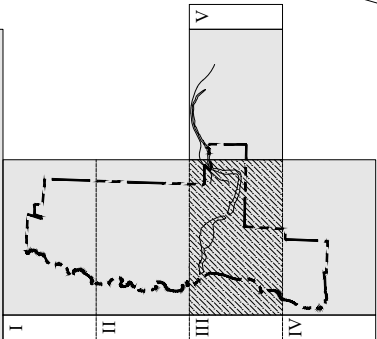


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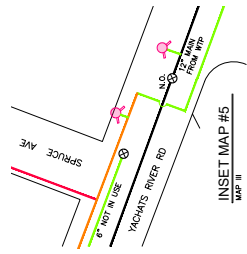
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- 6" WATER LINE
- 8" WATER LINE
- 10" WATER LINE
- 12" WATER LINE
- CITY LIMITS

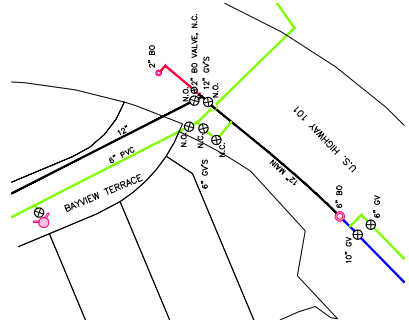
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- ISOLATION VALVE
- BLOWOFF VALVE (BV)
- AIR RELIEF VALVE (ARV)
- APPROX. WATER METER LOCATION



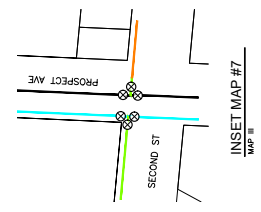
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INSET MAP #5



INSET MAP #6



INSET MAP #7

Yachats Logo 8602.jpg

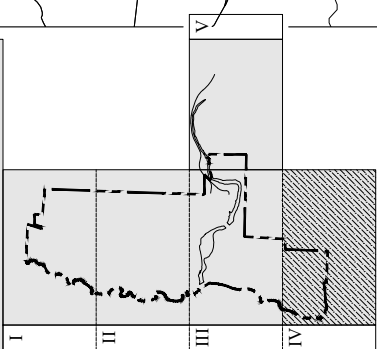
The City of Yachats,
Lincoln County,
Oregon

IV

LEGEND

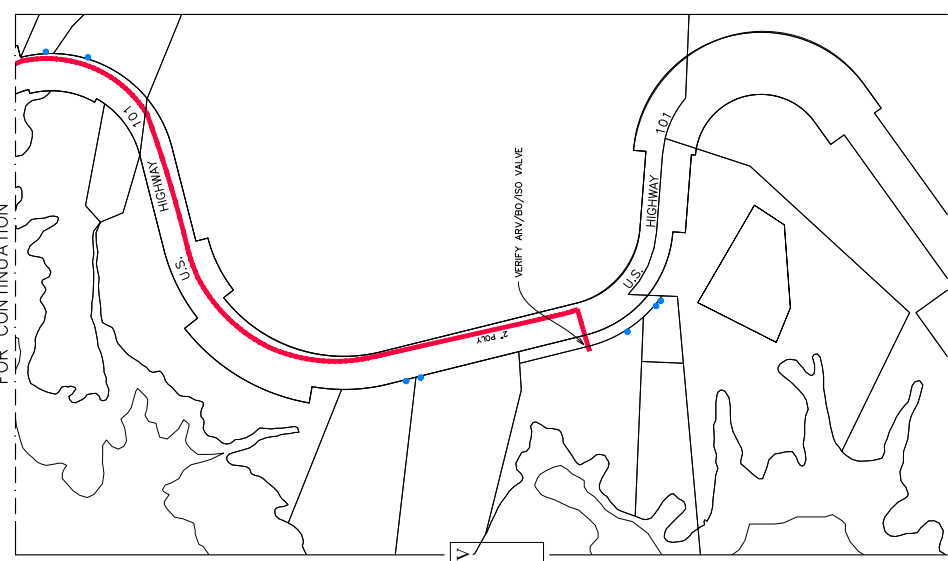
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- 4" WATER LINE
- 6" WATER LINE
- 8" WATER LINE
- 10" WATER LINE
- 12" WATER LINE
- CITY LIMITS

- WATER RESERVOIR
- PRESSURE REDUCING VALVE (PRV)
- FIRE HYDRANT
- ISOLATION VALVE
- BLOWOFF VALVE (BV)
- AIR RELIEF VALVE (ARV)
- APPROX. WATER METER LOCATION



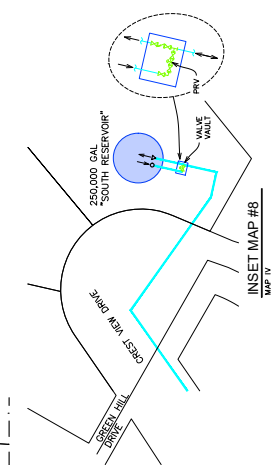
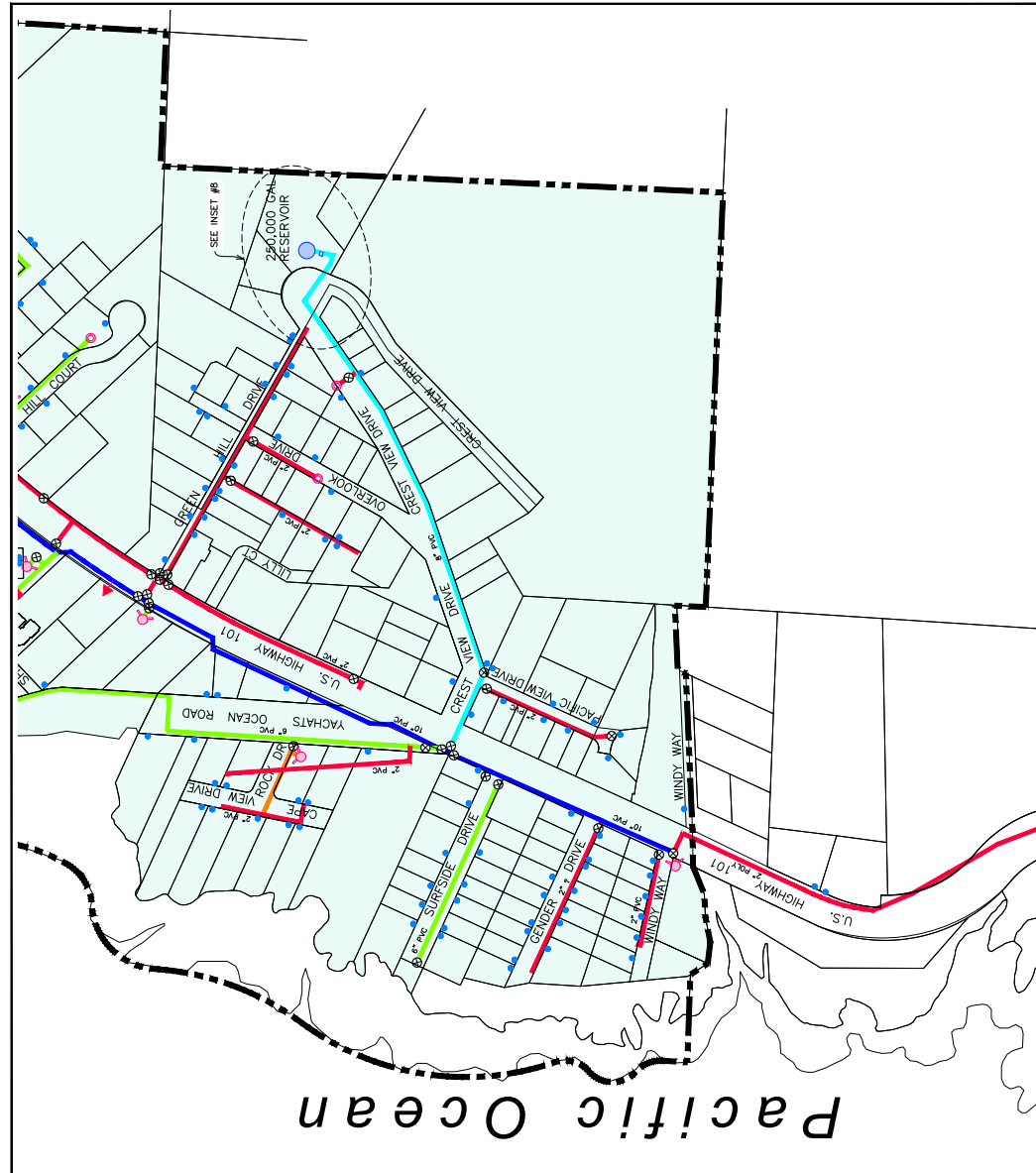
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(feet)

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FOR CONTINUATION



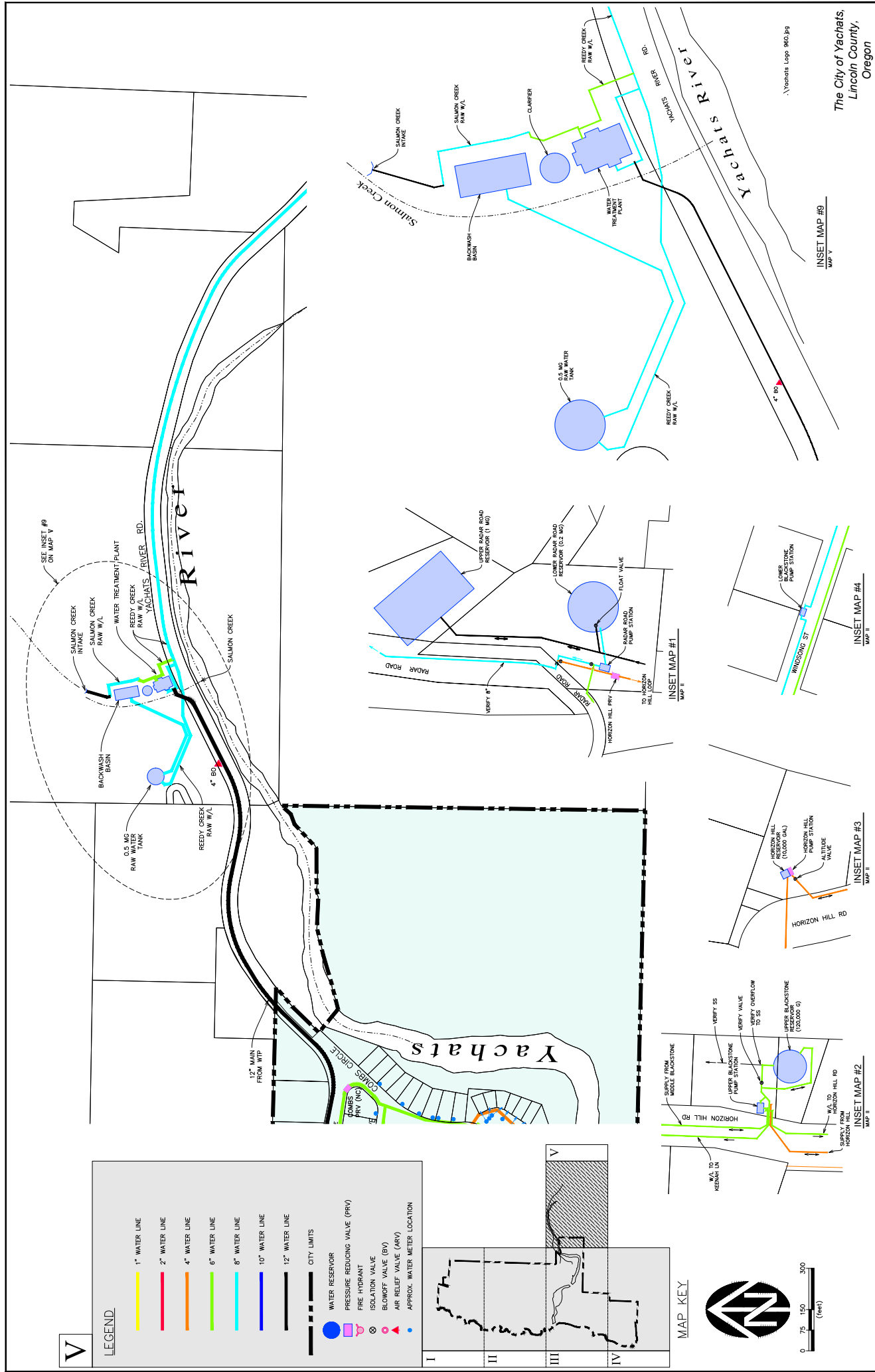
Pacific Ocean

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Yachats Logo 860.jpg

The City of Yachats,
Lincoln County,
Oregon



APPENDIX B

COST ESTIMATES FOR RECOMMENDED CAPITAL IMPROVEMENT PROJECTS

Table C-1
Recommended Budget Level Cost Estimates
Yachats Water System Master Plan
3096.4000.0

5/11/2021

1 = priority 1
2 = priority 2
3 = priority 3

Priority Code	Project Code	Project & Location(s)	(in)	(ft)	(\$/foot)	(#)	(#)	(each)	Costs	Contingency	Cost	Admin	Project	Total	Priority 1	Priority 2	Priority 3
Transmission/Distribution System Improvements																	
1	D-1	Water System Design Standards						Not Used					\$5,000	\$5,000	\$5,000	\$0	\$0
1	D-2	Pressure Reducing Valve Maintenance & Coordination						Not Used					\$50,000	\$50,000	\$50,000	\$0	\$0
1	D-3	Windsong Street Service Reconnections						Not Used				\$400	\$10,800	\$11,000	\$11,000	\$0	\$0
1	D-4	New PRV at 7th Street & Radar Road						Not Used				\$750	\$101,250	\$101,000	\$101,000	\$0	\$0
1	D-5	New PRV on King Street Between 7th and Prospect Ave						Not Used				\$3,750	\$101,250	\$101,000	\$101,000	\$0	\$0
1	D-6	New 8" Water Main in Radar Road	8	200	\$120	0	2	0				\$2,100	\$56,700	\$57,000	\$57,000	\$0	\$0
1	D-7	New 8" Water Main in Radar Road	8	250	\$120	0	2	4				\$3,200	\$86,400	\$86,000	\$86,000	\$0	\$0
2	D-8	New 8" Water Main in King Street West of Prospect Ave	8	450	\$120	0	2	11				\$12,400	\$167,000	\$167,000	\$167,000	\$0	\$0
2	D-9	New 4" Water Main and PRV on Horizon Hill Road	4	3800	\$100	0	4	20			\$50,000	\$27,300	\$737,100	\$737,000	\$0	\$737,000	\$0
1	D-10	Retrofit Combs PRV						Not Used					\$40,000	\$40,000	\$40,000	\$0	\$0
2	D-11	Yachats Ocean Road Service Reconnections						Not Used					\$20,000	\$20,000	\$20,000	\$0	\$0
3	D-12	New 8" Water Main in Green Hill Drive	8	750	\$120	100	5	16				\$15,250	\$411,750	\$412,000	\$0	\$20,000	\$0
1	D-13	Replace 4" AC with 8" from Prospect Ave to Yachats River Road	8	1300	\$120	0	3	24				\$14,750	\$398,250	\$398,000	\$398,000	\$0	\$0
3	D-14	8" Water Main Highway 101 from 6th to Marine Dr.	8	1600	\$175	0	8	5	\$20,000			\$2,600	\$583,200	\$583,000	\$0	\$0	\$583,000
2	D-15	Pontiac Street Waterline - 3rd to 4th	8	225	\$120	0	2	1				\$3,250	\$87,750	\$88,000	\$0	\$88,000	\$0
2	D-16	Shell Street Waterline	8	225	\$110	0	2	1				\$2,938	\$79,313	\$79,000	\$0	\$79,000	\$0
2	D-17	Gender Drive and Windy Way Waterlines	8	650	\$120	0	2	19				\$3,600	\$254,000	\$254,000	\$0	\$254,000	\$0
2	D-18	Pontiac Street Waterline - 2nd to 3rd	8	300	\$120	0	2	4				\$7,800	\$105,300	\$105,000	\$0	\$105,000	\$0
2	D-19	Henley Drive Waterline	6	150	\$110	0	2	0				\$1,725	\$46,575	\$47,000	\$0	\$47,000	\$0
3	D-20	Automated Water Meter Reading System						See Table C-12					\$318,000	\$318,000	\$0	\$0	\$318,000
2	P-1	New Radar Road Pump Station						See Table C-10				\$28,400	\$766,800	\$767,000	\$0	\$767,000	\$0
2	P-2	New Horizon Hill Pump Station & Reservoir						See Table C-11				\$39,950	\$1,078,650	\$1,079,000	\$0	\$1,079,000	\$0
1	S-1	Permit S-29018 Partial Perfection and Extension Application						Not Used					\$15,000	\$15,000	\$15,000	\$0	\$0
1	S-2	Yachats River Water Rights Planning Work						Not Used					\$50,000	\$50,000	\$50,000	\$0	\$0
1	S-3	Evaluate Using SWLCPUD as a Long-Term Source						Not Used					\$75,000	\$75,000	\$75,000	\$0	\$0
1	S-4	Yachats River Intake and Raw Water Pipeline						See Table C-2					\$2,893,050	\$2,893,000	\$2,893,000	\$0	\$0
1	S-5	Ready Creek Raw Water Pipeline Improvements						See Table C-3					\$207,900	\$208,000	\$208,000	\$0	\$0
1	T-1	WTP Electrical and Control System Improvements		8	1000	\$120	0	2				\$700	\$814,050	\$814,000	\$814,000	\$0	\$0
2	T-2	WTP Clarifier Rehabilitation						See Table C-4				\$20,150	\$641,250	\$641,000	\$0	\$641,000	\$0
2	T-3	WTP Mixed Media Filter Rehabilitation						See Table C-5				\$12,950	\$349,650	\$350,000	\$0	\$350,000	\$0
2	T-4	WTP Pump and Compressor Upgrades						See Table C-6				\$14,900	\$402,300	\$402,000	\$0	\$402,000	\$0
2	T-5	WTP Instrumentation Upgrades						See Table C-7				\$10,050	\$271,350	\$271,000	\$0	\$271,000	\$0
2	T-6	WTP Chemical Feed System Improvements						See Table C-8				\$7,600	\$205,200	\$205,000	\$0	\$205,000	\$0
2	T-7	WTP Building Seismic Retrofit						Not Used				\$10,000	\$270,000	\$270,000	\$0	\$270,000	\$0
2	ST-1	New 250,000-gallon Lower Radar Road Reservoir						See Table C-9				\$63,600	\$1,717,200	\$1,717,000	\$0	\$1,717,000	\$0
2	ST-2	Upper Radar Road Reservoir Seismic Evaluation						Not Used					\$50,000	\$50,000	\$0	\$50,000	\$0
2	ST-3	Upper Radar Road Reservoir Seismic Retrofit Improvements						Not Used					\$1,012,500	\$1,013,000	\$0	\$1,013,000	\$0
Grand Totals														\$14,479,000	\$4,904,000	\$8,262,000	\$1,313,000
Notes																	
(1) Other costs include costs for new pressure reducing station																	

Notes
(1) Other costs include costs for new pressure reducing station
(2) Other costs include additional surface restoration for work in ODOT right of way/permitting and traffic control

Table C-2

Project S-2: Yachats River Intake and Raw Water Pipeline

Recommended Budget Level Construction Cost Estimate

Yachats Water System Master Plan

3096.4000.0

Construction Costs				
Item	Qty	Unit	Unit Cost	Total Cost
Miscellaneous Permitting Requirements	1	LS	\$50,000	\$50,000
Mobilization (percentage of total)	8.0%	LS	\$155,000	\$155,000
In Water Work Area Isolation and Fish Salvage	1	LS	\$25,000	\$25,000
Concrete Intake Structure	1	LS	\$125,000	\$125,000
Underground Yard Piping	1	LS	\$50,000	\$50,000
Water Control Gates	2	Each	\$6,500	\$13,000
Earthwork	1	LS	\$15,000	\$15,000
Baserock	100	C.Y.	\$50	\$5,000
Miscellaneous Site Improvements	1	LS	\$50,000	\$50,000
Building Structure	300	SF	\$225	\$67,500
Intake Screen	1	LS	\$25,000	\$25,000
Intake Air Burst System	1	LS	\$30,000	\$30,000
Pumps Valves & Piping	1	LS	\$100,000	\$100,000
Miscellaneous Mechanical Improvements	1	LS	\$25,000	\$25,000
Power Service	1	LS	\$25,000	\$25,000
Control Panel and Variable Frequency Drives	1	LS	\$90,000	\$90,000
Electrical & Controls	1	LS	\$65,000	\$65,000
Pipeline to Reedy Creek Pipeline	9600	L.F.	\$125	\$1,200,000
Connection to Existing Pipe	1	LS	\$5,000	\$5,000
Air Valve Stations	3	Each	\$7,500	\$22,500
Construction Total				\$2,143,000

Table C-3

Project T-1: WTP Electrical and Control System Improvements

Recommended Budget Level Construction Cost Estimate

Yachats Water System Master Plan

3096.4000.0

Construction Costs				
Item	Qty	Unit	Unit Cost	Total Cost
Mobilization (percentage of total)	8.0%	LS	\$44,600	\$44,600
Demo Cabinetry and Flooring	1	LS	\$5,000	\$5,000
New Power Service and Entrance Disconnect	1	LS	\$20,000	\$25,000
New Control Panel & Programming	1	LS	\$50,000	\$90,000
New Motor Control Center	1	LS	\$60,000	\$60,000
New Generator and ATS	1	LS	\$50,000	\$50,000
New Generator Slab and Misc Sitework Imps	1	LS	\$25,000	\$25,000
New Laboratory Cabinetry	1	LS	\$30,000	\$30,000
New Lab Room Floor Covering	1	LS	\$5,000	\$5,000
Lab Sink and Plumbing	1	LS	\$5,000	\$5,000
Lab Appliances	1	LS	\$3,000	\$3,000
Miscellaneous Architectural Improvements	1	LS	\$10,000	\$10,000
Electrical Labor and Materials	1	LS	\$90,000	\$210,000
SCADA Programming	1	LS	\$40,000	\$40,000
Construction Total				\$603,000

Table C-4

Project T-2: WTP Clarifier Rehabilitation

Recommended Budget Level Construction Cost Estimate

Yachats Water System Master Plan

3096.4000.0

Construction Costs				
Item	Qty	Unit	Unit Cost	Total Cost
Mobilization (percentage of total)	8.0%	LS	\$35,200	\$35,200
Demolish Existing Clarify Equipment	1	LS	\$20,000	\$20,000
New Clarifier Equipment	1	LS	\$275,000	\$275,000
Clarifier Equipment Installation	1	LS	\$75,000	\$75,000
Miscellenaous Mechanical Improvement	1	LS	\$35,000	\$35,000
Electrical and Controls	1	LS	\$35,000	\$35,000
Construction Total				\$475,000

Table C-5

Project T-3: Mixed Media Filter Rehabilitation

Recommended Budget Level Construction Cost Estimate

Yachats Water System Master Plan

3096.4000.0

Construction Costs				
Item	Qty	Unit	Unit Cost	Total Cost
Mobilization (percentage of total)	8.0%	LS	\$19,200	\$19,200
Filter Media and Equipment Removal	2	Each	\$5,000	\$10,000
New Underdrain, Filter Media and Backwash Equipment	2	Each	\$85,000	\$170,000
Equipment Installation	2	Each	\$20,000	\$40,000
Miscellaneous Mechanical Improvements	2	Each	\$10,000	\$20,000
Construction Total				\$259,000

Table C-6

Project T-4: WTP Pump and Compressor Upgrades
Recommended Budget Level Construction Cost Estimate
Yachats Water System Master Plan
3096.4000.0

Construction Costs				
Item	Qty	Unit	Unit Cost	Total Cost
Mobilization (percentage of total)	8.0%	LS	\$22,000	\$22,000
Replace Salmon Creek Intake Pumps	1	Each	\$16,500	\$16,500
Replace Existing Backwash Pump	1	Each	\$32,500	\$32,500
Concrete Pedestal for Second Backwash Pump	1	LS	\$7,500	\$7,500
Redundant Backwash Pump	1	Each	\$32,500	\$32,500
Backwash Pump Discharge Piping & Valves	1	LS	\$17,500	\$17,500
Backwash Pump VFDs	2	Each	\$10,000	\$20,000
Replace High Service Pumps	2	Each	\$35,000	\$70,000
New Air Compressors	2	Each	\$2,000	\$4,000
Miscellaneous Mechanical Improvements	1	LS	\$25,000	\$25,000
Electrical, Controls, SCADA Programming	1	LS	\$50,000	\$50,000
Construction Total				\$298,000

Table C-7

Project T-5: WTP Instrumentation Upgrades

Recommended Budget Level Construction Cost Estimate

Yachats Water System Master Plan

3096.4000.0

Construction Costs				
Item	Qty	Unit	Unit Cost	Total Cost
Mobilization (percentage of total)	8.0%	LS	\$14,500	\$14,500
Raw Water Flow Control Valve Control Imps	1	LS	\$5,000	\$5,000
New Raw Water Flow Meter	1	Each	\$10,000	\$10,000
New Salmon Creek Flow Meter	1	Each	\$7,500	\$7,500
New Finish Water Flow Meter	1	Each	\$10,000	\$10,000
New Streaming Current Monitor	1	Each	\$17,500	\$17,500
New Turbidimeters	5	Each	\$8,000	\$40,000
New Particle Counter	2	Each	\$10,000	\$20,000
New Chlorine Residual Analyzer	1	Each	\$3,000	\$3,000
New Clearwell Level Transducer	1	Each	\$3,000	\$3,000
Miscellaneous Mechanical Improvements	1	LS	\$20,000	\$20,000
Electrical, Controls, SCADA Programming	1	LS	\$50,000	\$50,000
Construction Total				\$201,000

Table C-8

Project T-6: Chemical Feed Improvements

Recommended Budget Level Construction Cost Estimate

Yachats Water System Master Plan

3096.4000.0

Construction Costs				
Item	Qty	Unit	Unit Cost	Total Cost
Mobilization (percentage of total)	8.0%	LS	\$11,200	\$11,200
Demolish Existing Chemical Storage Tank	1	LS	\$10,000	\$10,000
New Polymer Feed Equipment	1	LS	\$17,500	\$17,500
New Filter Aid Feed Equipment	1	LS	\$17,500	\$17,500
New Soda Ash Feed Equipment	1	LS	\$12,000	\$12,000
Rehabilitate Onsite Chlorine Generation Sys	1	LS	\$35,000	\$35,000
New Chlorine Distribution Panel	1	Each	\$3,500	\$3,500
Miscellaneous Mechanical Improvements	1	LS	\$10,000	\$10,000
Electrical, Controls, SCADA Programming	1	LS	\$35,000	\$35,000
Construction Total				\$152,000

Table C-9

Project ST-1: New 250,000-gallon Lower Radar Road Storage Reservoir

Recommended Budget Level Cost Estimate

Yachats Water System Master Plan

3096.4000.0

Construction Costs				
Item	Qty	Unit	Unit Cost	Total Cost
General & Civil Sitework				
Mobilization (percentage of total)	8.0%	LS	\$94,200	\$94,200
Erosion Control	1	LS	\$7,500	\$7,500
Clearing & Grubbing	1	LS	\$5,000	\$5,000
General Excavation, Backfill, Spoils Disposal	1	LS	Lump Sum	\$40,000
Miscellaneous Civil Improvements	1	LS	\$25,000	\$25,000
Chainlink Fencing & Gate	520	LF	\$125	\$65,000
Site Storm Drainage	1	LS	Lump Sum	\$35,000
Yard Piping, New & Realignment of Existing	800	LF	\$130	\$104,000
Sanitary Sewer Realignment	200	LF	\$125	\$25,000
Sanitary Sewer Manholes	3	EA	\$7,000	\$21,000
Retaining Wall, Site & Access Road	1000	SF	\$45	\$45,000
Retaining Wall, Tank, Along Radar Road	800	SF	\$45	\$36,000
Tank Backfill	500	CY	\$60	\$30,000
Base Rock & Gravel Surfacing, Site Work	LS	ALL	Lump Sum	\$15,000
Base Rock, Tank	260	CY	\$35	\$9,100
Fine Grading and Seeding	LS	ALL	Lump Sum	\$15,000
Radar Road Rehabilitation Work	LS	ALL	Lump Sum	\$75,000
Reinforced Concrete Tank Structure				
24-inch mat slab on grade	180	CY	\$550	\$99,000
Wall base and top joints	380	LF	\$50	\$19,000
Structural walls	200	CY	\$750	\$150,000
Structural columns	20	CY	\$850	\$17,000
Elevated slab and roof curbs	80	CY	\$1,000	\$80,000
Expansion and construction joints	140	LF	\$10	\$1,400
Miscellaneous Metalwork				
Overflow cone assembly	1	EA	\$850	\$850
Silt-stop assembly	2	EA	\$500	\$1,000
Reservoir exterior access ladder	1	EA	\$8,500	\$8,500
Reservoir downspouts & roof scuppers	4	EA	\$300	\$1,200
Roof hatches	1	EA	\$8,000	\$8,000
Roof vent	1	EA	\$6,500	\$6,500
Reservoir interior access ladder (SST)	1	EA	\$7,500	\$7,500
Safety railing at hatches	30	LF	\$100	\$3,000
Process Instrumentation				
Ultrasonic Level Transmitter	1	EA	\$3,500	\$3,500
Reservoir sampling cabinet, valves and piping	1	LS	\$9,500	\$9,500
Chlorine residual analyzer	1	EA	\$4,500	\$4,500
Valve Vault				
Valve Vault Structure	1	LS	\$30,000	\$30,000
Piping, and Valves	1	LS	\$50,000	\$50,000
Seismic Controller and Valve	1	LS	\$50,000	\$50,000
Miscellaneous Mechanical Equipment	1	LS	\$25,000	\$25,000
Electrical and Controls	1	LS	\$50,000	\$50,000
Construction Total				\$1,272,000

Table C-10

Project P-1: New Radar Road Pump Station
 Recommended Budget Level Cost Estimate
 Yachats Water System Master Plan
 3096.4000.0

Construction Costs				
Item	Qty	Unit	Unit Cost	Total Cost
General & Civil Sitework				
Mobilization (percentage of total)	8.0%	LS	\$42,100	\$42,100
Demolish Existing Pump Station	1	LS	\$5,000	\$5,000
Clearing & Grubbing	1	LS	\$2,000	\$2,000
Earthwork	40	CY	\$50	\$2,000
Erosion Control	1	LS	\$1,500	\$1,500
Baserock & Gravel Surfacing	1	LS	\$2,500	\$2,500
Chain Link Fencing	90	LF	\$125	\$11,300
Miscellaneous Civil Improvements	1	LS	\$20,000	\$20,000
Bollards	4	EA	\$750	\$3,000
Piping				
Underground Suction & Discharge piping	100	LF	\$120	\$12,000
Storm Drainage Piping	75	LF	\$50	\$3,800
Sanitary Sewer Service Piping	80	LF	\$70	\$5,600
Building Structure	400	SF	\$200	\$80,000
Building Specialties				
Roll Up Door	1	LS	\$7,000	\$7,000
Concrete Steps & Railing	1	LS	\$8,000	\$8,000
Misc. Mechanical	1	LS	\$12,500	\$12,500
Equipment				
Pumps, Piping, and Valves	1	LS	\$100,000	\$100,000
Instrumentation	1	LS	\$20,000	\$20,000
Equipment Installation (20% of Equip. Cost)	1	LS	\$24,000	\$24,000
Auxiliary Power Generator & ATS	1	LS	\$60,000	\$60,000
Variable Frequency Drives	2	Each	\$15,000	\$30,000
Control and Telemetry Panels	1	LS	\$45,000	\$45,000
Power Service	1	LS	\$15,000	\$15,000
Electrical & Controls (12% of Total Cost)	1	LS	\$56,000	\$56,000
Construction Total				\$568,000

Table C-11

Project P-2: New Horizon Hill Pump Station & Reservoir
Recommended Budget Level Cost Estimate
Yachats Water System Master Plan
3096.4000.0

Construction Costs				
Item	Qty	Unit	Unit Cost	Total Cost
General & Civil Site Work				
Mobilization (percentage of total)	8.0%	LS	\$59,200	\$59,200
Erosion Control	1	LS	\$1,500	\$1,500
Construct New PRV Vault & Piping (Bypass Reservoir)	1	LS	\$70,000	\$70,000
Demolish Existing Pump Station & Reservoir	1	LS	\$10,000	\$10,000
Clearing & Grubbing	1	LS	\$2,000	\$2,000
Earthwork & Excavation	100	CY	\$50	\$5,000
Civil Site Work	LS	ALL	\$10,000	\$10,000
Yard Piping	80	LF	\$130	\$10,400
Base Rock & Gravel Surfacing	LS	ALL	Lump Sum	\$3,000
Chain Link Fencing & Gate	100	LF	\$125	\$12,500
Bollards	4	EA	\$750	\$3,000
Miscellaneous Civil	1	LS	\$20,000	\$20,000
Reinforced Concrete Tank Structure, 20,000 g				
24-inch mat slab on grade	20	CY	\$525	\$10,500
Wall base and top joints	100	LF	\$50	\$5,000
Structural walls	50	CY	\$750	\$37,500
Elevated slab and roof curbs	10	CY	\$1,000	\$10,000
Expansion and construction joints	1	LS	\$1,000	\$1,000
Miscellaneous Metalwork				
Overflow cone assembly	1	EA	\$850	\$850
Silt-stop assembly	1	EA	\$500	\$500
Reservoir exterior access ladder	1	EA	\$4,000	\$4,000
Reservoir downspouts & roof scuppers	2	EA	\$300	\$600
Roof hatch	1	EA	\$6,000	\$6,000
Roof vent	1	EA	\$4,500	\$4,500
Reservoir interior access ladder (SST)	1	EA	\$5,000	\$5,000
Safety railing at hatch	15	LF	\$50	\$750
Valve Vault				
Valve Vault Structure	1	LS	\$25,000	\$25,000
Piping, and Valves	1	LS	\$40,000	\$40,000
Piping				
Underground Suction & Discharge piping	100	LF	\$120	\$12,000
Storm Drainage Piping	50	LF	\$50	\$2,500
Sanitary Sewer Service Piping	60	LF	\$70	\$4,200
Washdown Water Piping	20	LF	\$40	\$800
Washdown Water Station	1	EA	\$1,000	\$1,000
Building				
Structure	400	SF	\$200	\$80,000
Roll Up Door	1	LS	\$7,000	\$7,000
Pump Station Equipment				
Misc. Mechanical	1	LS	\$20,000	\$20,000
Pumps, Piping, and Valves	1	LS	\$100,000	\$100,000
Instrumentation	1	LS	\$20,000	\$20,000
Auxiliary Power Generator & ATS	1	LS	\$40,000	\$40,000

Variable Frequency Drives	1	LS	\$15,000	\$15,000
Control and Telemetry Panels	1	LS	\$45,000	\$45,000
Power Service	1	EA	\$15,000	\$15,000
Electrical & Controls (12% of Total Cost)	1	LS	\$79,000	\$79,000
Construction Total				\$799,000

Table C-12

Project D-20: Automated Water Meter Reading System

Recommended Budget Level Cost Estimate

Yachats Water System Master Plan

3096.4000.0

I. Capital Costs**Construction Costs**

Item	Qty	Unit	Unit Cost	Total Cost
External Antennas	300	Each	\$60	\$18,000
Radio-Receiving Station Equipment	3	Each	\$15,000	\$45,000
Radio-Receiving Station Installation	3	Each	\$30,000	\$90,000
AMI Software & Setup	All	LS	\$30,000	\$30,000
Customer Portal Setup	All	LS	\$25,000	\$25,000
Construction Total				\$208,000

Soft Costs

Construction Contingency (10%)				\$21,000
Engineering (20%)				\$42,000
Administration and Permitting Costs (10%)				\$21,000
Billing Software Integration				\$35,000

Total Recommended Capital Project Budget				\$327,000
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II. Annual Operation and Maintenance Costs

AMI Data Hosting and Annual Customer Portal Fees	All	LS	\$35,000	\$35,000
Total Estimated Operation and Maintenance Costs				\$35,000

EXHIBIT A
AGREEMENT FOR PAYMENT OF LAND

This agreement is between the City of Yachats, hereinafter called "City", and the Yachats Rural Fire Protection District, hereinafter called "District".

The City is transferring to the District all of its right, title, and interest in Lot 26, Block 1, FIRST ADDITION TO YACHATS, Lincoln County, Oregon. The current District fire station is located partially on that property. The deed transferring the City's interest to the District has a reversionary clause which must be met at such time as the property is no longer being used for fire protection purposes. Based on the above, the parties as follows:

1. At such time as the above-referenced property is no longer used for fire protection purposes and the ownership of that property is transferred by the Yachats Rural Fire Protection District or any successor district, the City shall be entitled to receive an amount equal to the value of the land only at the time of the transfer.
2. The parties agree that this amount shall be established by an independent appraiser at the time of the actual sale. If the parties cannot agree upon an appraiser, the presiding judge of the Circuit Court for Lincoln County shall appoint such an appraiser. The appraiser's determination of value of the land only shall be binding upon all parties. The City and District are to share equally the costs of an appraisal of the property.
3. The District may elect to postpone payment, provided it continues to maintain a fire station within the city limits, after such sale. The City agrees to sign any waiver of interest in the property required for completion of sale. The District agrees to assign to the City a reversionary interest in such substitute property where a new fire station is located, giving the City a right to the proceeds of any sale of that property. Proceeds shall be an amount equal to the appraiser's value established at the time of the original sale of the property, plus the percentage of increase in value based on the increase in the Portland Consumer Price Index (CPI-U) between the time of the original sale and the current sale.

CITY OF YACHATS:

Nancy Reynolds
Mayor

Janice C. Victoria
City Recorder

STATE OF OREGON)
) ss.
County of Lincoln)

This instrument was acknowledged before me on the 20 day
of April, 1992, by Nancy L. Reynolds and
Janice C. Victoria as Mayor and City Recorder of the City
of Yachats.

Gail J. Atkinson
Notary Public for Oregon
My Commission Expires 10/18/93

YACHATS RURAL FIRE PROTECTION DISTRICT:

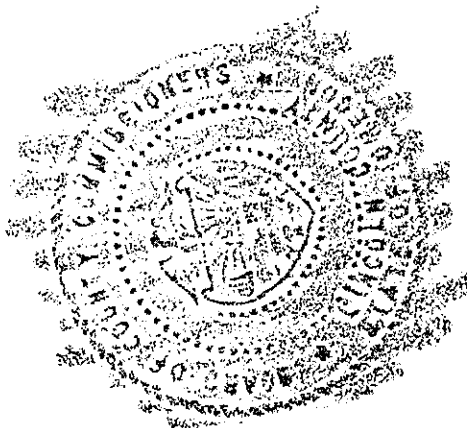
Donna L. Brewer
District

Ray Hicks Jr.
District

STATE OF OREGON)
) ss.
County of Lincoln)

This instrument was acknowledged before me on the 17th day
of April, 1992, by DONNA L. BREWER and
RAY HICKS, JR. as authorized signers for the Yachats
Rural Fire Protection District.

Gail J. Atkinson
Notary Public for Oregon
My Commission Expires 10/18/93



STATE OF OREGON } ss.
County of Lincoln

I, Dana W. Jenkins, County Clerk, in and for said county, do hereby
certify that the within instrument was received for record, and
recorded in the Book of Records of said county at Newport, Oregon.
Book 245 Page 1170

WITNESS my hand and seal of said office affixed.

DANA W. JENKINS, County Clerk

By PK Brink Deputy

Doc : 6079893

Rect : 29429

06/05/1992 11:59:09AM

20.00
WT

EXHIBIT B
BARGAIN AND SALE DEED

The City of Yachats, on behalf of itself and as successor in interest of the Yachats Water District, conveys to Yachats Rural Fire Protection District, the following-described real property:

Lot 26, Block 1, First Addition to Yachats, Lincoln County, Oregon.

THIS INSTRUMENT WILL NOT ALLOW THE USE OF THE PROPERTY DESCRIBED IN THIS INSTRUMENT IN VIOLATION OF APPLICABLE LAND USE LAWS AND REGULATIONS. BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON ACQUIRING FEE TITLE TO THE PROPERTY SHOULD CHECK WITH THE APPROPRIATE CITY OR COUNTY PLANNING DEPARTMENT TO VERIFY APPROVED USES.

RESERVATION: The City reserves the right to receive compensation in an amount equal to the value of the land only at such time as ownership of the property is transferred and it is no longer used for fire protection purposes. Payment will be determined and will be due in accordance with an Agreement for Payment of Land between the parties dated the 20 day of April, 1992.

The true consideration for this conveyance is other than cash.

DATED this 20 day of April, 1992.

GRANTOR:

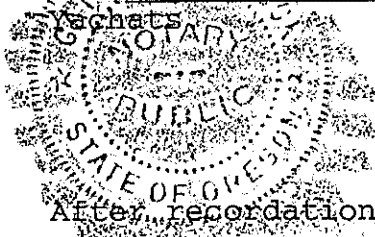
Nancy Reynolds
Mayor, City of Yachats

ATTEST:

Janice C. Victoria
City Recorder

STATE OF OREGON, County of Lincoln) ss.

This instrument was acknowledged before me on the 20 day of April, 1992, by Nancy L. Reynolds as Mayor, and Janice C. Victoria as City Recorder of the City of Yachats.



Sail J. Robinson
Notary Public for Oregon
My Commission Expires 10/18/93

After recordation return to:

Yachats Rural Fire Protection District
P.O. Box 1
Yachats, OR 97498

THIS INDENTURE OF LEASE, Made in duplicate at Newport, Oregon

on this 1st day of May, 1950

by and between Yachata Water District, a municipal corporation
hereinafter known and referred to as the lessor, (whether singular or plural) and Yachata Rural Fire
Protection District, a municipal corporation, hereinafter known
and referred to as the lessee, (whether singular or plural).

WITNESSETH: That in consideration of the covenants, agreements and stipulations herein contained
on the part of said lessee to be paid, kept and faithfully performed by said lessee, the said lessor does hereby
lease, demise and let unto said lessee that certain premises described as follows: The

west 35 feet of the south 40 feet of Lot 22, Block 1, First Addition
to Yachata in Lincoln County, Oregon

in the County of Clatsop, State of Oregon

TO HAVE AND TO HOLD said premises hereby leased for a period of Forty (40) years,

from the 1st day of May, 1950, to and including the 1st day of
May, 1990, said lessee paying and yielding as rental thereon, during
said term, the full sum of Forty (\$40.00) - - - - -

lawful money of the United States, to be paid as follows: The sum of \$1.00 upon execution hereof
being rental for the first year of said lease and the further sum of \$1.00
on the first day of each May hereafter until said rental is wholly paid.

That in addition to said monetary rental, it is understood and agreed
that the lessor herein shall have free rental of a room in the southwest
corner of the main floor of the building constructed on said premises by
the lessee during the term of this said lease, said room to be used as an
office by the said Water District and said lessee to have the further right
of using the meeting room on the 2nd floor of said building for water meet-
ings when this larger space is required. It is understood and agreed that
the Fire Protection District shall be responsible for insurance, maintenance
and repair of said building and that the said Water District shall be re-
sponsible for furnishing its share of the lights and heat for said building.

That said lessee will make no unlawful, improper or offensive use of the premises; that at the expiration of the
said term or upon any sooner termination of this lease, said lessee will quit and deliver up the premises, and all
future erections or additions to or upon the same, to the said lessor, or those having their estate therein, peace-
ably, quietly, in as good order and condition (reasonable use and wearing thereof, fire and other unavoidable
casualties excepted) as the same now are or may be put in by the lessor or those having their estate in the prem-
ises; that said lessee will not suffer nor commit any strip or waste thereof, nor make nor suffer to be made any
alterations or additions to or upon the same, nor assign this lease, nor underlet, or permit any other person or
persons to occupy the same, without the consent of the said lessor or those having their estate in the premises,
being first obtained in writing, and also that it shall be lawful for the said lessor and those having their estate
in the premises, at reasonable times, to enter into and upon the same, to examine the condition thereof.

PROVIDED always, and there presents are upon this condition, that if the said rent shall be in arrears for the space of Thirty (30) days, or if the said lessee his representatives or assigns, shall neglect or fail to do or perform, and observe any or either of the covenants hereinbefore contained, which on said lessee's part are to be performed, then and in either of the said cases, the said lessor, or those having their estate in the said premises lawfully may, immediately or at any time thereafter, and while said neglect or default continue, and without further notice or demand, enter into and upon the said premises, or any part thereof, in the name of the whole and repossess the same, of their former estate, and expel the said lessee, and those claiming under said lessee, and remove his effects (forcibly if necessary), without being taken or deemed guilty in any manner of trespass, and without prejudice to any remedies which might otherwise be used for arrears of rent, or preceding breach of covenants.

Any waiver of any breach of covenants herein contained to be kept and performed by the lessee shall not be deemed or considered as a continuing waiver, and shall not operate to bar or prevent the lessor from declaring a forfeiture for any succeeding breach, either of the same condition or covenant or otherwise.

Any holding over by the lessee after the expiration of the term of this lease, or any extension thereof, shall be as a tenancy from month to month and not otherwise.

IN WITNESS WHEREOF, the respective parties have executed this instrument the day and year first hereinabove written, in duplicate.

Executed in the presence of:

YACONATS WATER DISTRICT

By: K. P. Mitchell
President
R. W. Wardell
Secretary

YACONATS WATER DISTRICT

By: John D. Schwartz
Deputy

STATE OF OREGON
COUNTY OF LINCOLN
I hereby certify
that the within instrument
was received for record on
the 15th day of April 1978
at 1:30 o'clock P. M. and
recorded in Book 18
in page 308. A true and
correct copy of the
original is on file in my
office and is available
for inspection by the
public. My commission
expires on the 15th day
of May 1980.
Notary Public for Oregon
John D. Schwartz, Deputy

J. C. Schwartz
Yacata, Ore.

Ch. D. Schwartz

STATE OF _____
County of _____

BE IT REMEMBERED, That on this _____ day of _____, 19____
before me, a _____ in and for said County and State, personally appeared
the within named _____

who _____ known to me to be the identical individual _____ described in and who executed the within instrument,
and acknowledged to me that _____ executed the same freely and voluntarily.

IN TESTIMONY WHEREOF, I have hereunto set my hand and
seal the day and year last above written.

Notary Public for _____
My Commission expires _____

MEMORANDUM OF LEASE

NOTICE IS HEREBY GIVEN to all persons that a lease dated July 21, 1983 was entered into regarding the following property:

Lot 26, Block, First Addition to Yachats
by Lessor, City of Yachats and Lessee, Yachats Rural Fire Protection District, said lease expiring June 30, 2004 unless otherwise terminated pursuant to the terms and provisions of said lease. The property leased to Lessee shall be used solely for a public fire hall and station. Said lease merges the lease previously entered into by Lessor's predecessor and Lessee concerning a portion of said lot, recorded in Lincoln County Miscellaneous Records, Book 18, page 307.

LESSOR:

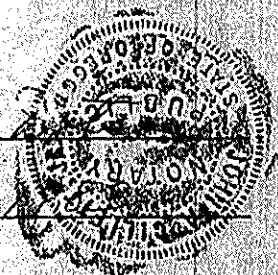
CITY OF YACHATS

By Gerald R. [Signature]
MAYOR

DATE: July 21, 1983

ATTEST:

Theresa T. Lynn
City Recorder



LESSEE:

YACHATS RURAL FIRE PROTECTION DISTRICT

By Sam C. Darning
President

ATTEST:

David A. Brown
Secretary

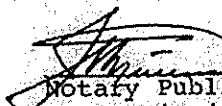
STATE OF OREGON)
) ss.
County of Lincoln)

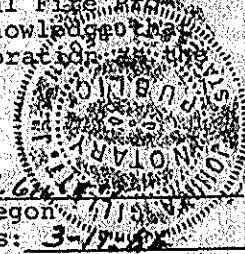
On this 22nd day of JULY, 1983, personally appeared before me, a notary public in and for said state and county, the above named GERALD L. DOTSON and MICHIO RYU, who are personally known until me to be, respectively, the Mayor and City Recorder of the City of Yachats, a political subdivision of the State of Oregon, and acknowledge that they executed the foregoing on behalf of said City as the act and vote of the Council thereof and pursuant to authority of the Common Council of said City.

John A. Bennett
Notary Public for Oregon
My Commission Expires: 3-19-86

STATE OF OREGON)
) ss.
County of Lincoln)

On this 27 day of JULY, 1983, personally appeared before me, a notary public in and for said state and county, the above named SAM DORRANCE and DAVID BOWEN, who are personally known unto me to be, respectively, the President and Secretary of Yachats Rural Fire Protection District, a municipal corporation, and acknowledged that they executed the foregoing on behalf of said corporation as the act and voluntary deed thereof.

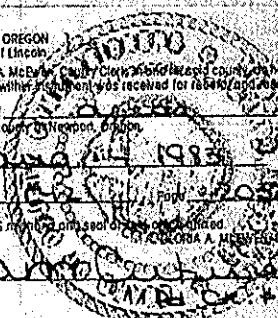

Notary Public for Oregon
My Commission Expires: 3-17-84



AFTER RECORDING, RETURN TO:

✓ Evan P. Boone
Minor, Yeck & Beeson, P.C.
P. O. Box 510
Newport, Oregon 97365

STATE OF OREGON
County of Lincoln
I, Gloria A. McEwen, County Clerk of said county, do hereby certify that the within instrument was received for recording and is in the record of said county in Oregon, to wit:
Date July 27, 1983 Page 13
Book 142 Page 2034
WITNESS my hand and seal of office on the day and date first above written.
By Gloria A. McEwen Deputy



D 68336 MICROFILM

MINUTES OF THE DIRECTORS MEETING
YACHATS RURAL FIRE PROTECTION DISTRICT , YACHATS
~~MARCH 8~~, 1971
FEB

Meeting was called to order by President Ray Cox at 7:25 P.M.

ROLL CALL: Directors present were; President Ray Cox , Vice President Louis Will , Secretary-Treasurer Max Gardner , Ray Dutcher, and Don Taggart. Others present were Fire Chief George Long.

MINUTES: The minutes of the previous meeting held on January 11 , 1971, were read and approved.

FINANCIAL REPORT: The Secretary read and explained the Financial report for the month of January, 1971. ~~The Secretary explained the~~ A motion was made by Ray Dutcher and seconded by Louis Will that the report be accepted. The motion carried.

BILLS FOR APPROVAL: Secretary Max Gardner submitted bills for approval in the amount of \$594.50. The Secretary explained that the bills received from Duxol Gas in the amount of \$38.75 and from Standard Oil in the amount of \$1.50 had been paid in January. A motion was made by Louis Will and seconded by Ray Dutcher that the bills be approved and paid. The motion carried.

CORRESPONDENCE: A letter from the Yachats Water District was read in which they requested the right to meet on their regular meeting night without interference from the City Council. They cited the provisions in the deed restrictions that gave them the right to have an office and a meeting place where they could meet on the First Thursday following the 5th of each month. They also suggested the City Council select another meeting night ~~so~~ as to not conflict with their meeting dates. President Ray Cox pointed out that upon completion of the new fire hall and re-modeling there would be a 7 by 16 foot room on the bottom floor that should provide the Water District with ~~a~~ suitable quarters for both an office and a meeting place. A motion was made by Max Gardner and seconded by Don Taggart that since Ray Dutcher was a member of the Water District, that he should take this matter up with the Water District and ask them to hold any action in obedience until the new fire hall was built. The motion carried.

Don Taggart reported he had been questioned by the State Police about driving the North End Disaster Car on an expired license. Fire Chief George Long stated the Yachats Disaster Car also had expired license plates. Secretary Max Gardner explained that he had attempted to arrange for new license plates but was told we would have to surrender the old plates before we could get the new ones. Both Don Taggart and George Long agreed to bring in the old plates.

Fire Chief George Long asked permission for the Volunteer Firemen to use the Fire Hall for a party on the night of February 12th. The permission was granted.

Fire Chief George Long submitted the following bills for approval; From McGrath Motors a bill for repairs in the amount of \$30.50, and, from Everson Ross Company a bill for Firemen Badges in the amount of \$61.24. A motion was made by Ray Dutcher and seconded by Don Taggart that the two bills be approved and paid. the motion carried.

There being no further business the meeting was adjourned by President Ray Cox at 8:00 P.M.

Respectfully submitted, by
Max Gardner

YACHATS RURAL FIRE PROTECTION DISTRICT
MINUTES OF THE BOARD OF DIRECTOR'S MEETING

October 13, 1975

The meeting was called to order by President Merle Longnecker at 7:30 P.M.

Board Members Present: Merle Longnecker, Harold Edsall, and Walter Ramage. Absent were Mary Peer and Charles Sisson. JoAnn Long substituted as secretary for this meeting. Guests were Dick Ough and George Long.

Minutes of the September 8th, 1975, were read and approved.

Financial Report: Approved as read.

Bills for Approval: Presented. The bill from Lincoln Co. Dept. Emergency Services Revolving Fund was discussed and questioned as to the generator purchased. After this was accepted, a motion by Merle Longnecker to pay the bills was seconded by Harold Edsall and it was passed unanimously by the members. It was decided by the Board to have permission in the future for any one charging any sizable purchases.

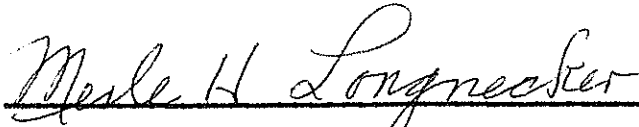
Correspondence from the P.T.A. and a letter telling of a Seminar of October 17th and 18th for Board members were all read.

Walter Ramage reported that he had heard of Ambulance Service calls not being answered and even turned down in our area. Merle Longnecker said this should be investigated by the Fire District. It is agreed that 3 ambulances are to be available(1 in Yachats, 1 in Waldport, and 1 in Newport). Waldport and Newport services transport to Corvallis. Yachats will not do so.

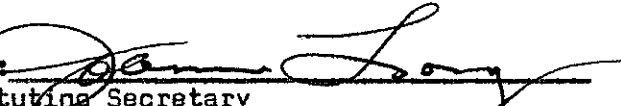
George Long stated that the Fire District owns the land which has the new fire building situated upon it, and that the City of Yachats owns the section of land upon which the old fire building is located. The latter section of land is leased by the Fire District in the sum of \$1.00 per year.

George Long said that the outside door leading to the stairs could be fixed for \$50.00. This is to be done and weather stripped. When the big garage door is replaced, he will put in the new door leading into the garage from the entrance to the stairs.

The meeting was ajourned at 8:15 P.M. by President Longnecker.



President

Attest: 

Substituting Secretary

11-10-75

YACHATS RURAL FIRE PROTECTION DISTRICT

January

Regular Meeting of the Board of Directors

December 13, 1976

The meeting was called to order by the Vice Chairman Charles Sisson at 7:30 P.M.

Directors Present: Harold Edsall, Walt Ramage, Charles Sisson and Marge Hobson. Also Present were: Fire Chief Bill Brooks and the Ass't Glen Fisher.

The minutes were read and the correction noted that the 6x6 truck was not ready for use. Minutes were approved with the correction.

The Financial report was given with the explanation given on the Amended Report that the SAIF Fund and the Dues Fund had been adjusted so that the totals reflect the current budget since monies were paid out in 1976 that should have been deducted from the 1975-76 budget. Both financial statements were accepted.

The correspondence were read and discussed. No action necessary.

It was reported that the trucks are now licensed and can be moved.

Walt Ramage moved that the secretary be instructed to write a letter to the City of Yachats and offer \$1.00 for the property that the Fire House stands on. Harold Edsall seconded. Motion carried.

Glen Fisher asked for permission to buy additional hose; two flashlights with straps and 6 big flashlights for use on the trucks. Permission was given.

The secretary was instructed to write a letter to the FBI in Portland regarding a circular received concerning the Public Safety Officers' Benefits Act of 1976, Public Law 94-430.

There being no further business the meeting was adjourned at 8:15 P.M.

Charles H. Longprucker
Chairman

Attest:

Marjorie Hobson
Marjorie Hobson, Sec.

*\$2/42
Re: 1000*

**Yachats Rural Fire
Protection District
P.O. Box 1
Yachats, Oregon 97498**

MINUTES OF THE REGULAR BOARD MEETING OF OCTOBER 12, 1987:

The meeting was called to order at 7:31 p.m. Members present were Sam Dorning, Verlin Post, Ray Hicks, Bob Coleman and Donna Brewer. Others present were Steve Hamilton, Bob Simko and Hal Smith.

Minutes of the September 14, 1987 meeting were read and approved. Bills were reviewed. A motion to approve payment of the bills was made by Bob, seconded by Verlin, and carried.

Correspondence during the month included sending the recent newspaper interview of Ed Keech to the United Pacific claims adjustor.

OLD BUSINESS

The matter of ownership of the Fire Hall property was brought up again. It was decided to ask the city how much they would want for the portion we now lease. Since we have another meeting before the City Council meets, this will be discussed again next meeting. Meantime, Steve will ask the question informally and Donna will check with the County to be sure of just which portion is leased and which portion we own and to ascertain if the purchase has been recorded.

Since the weather has held, the Job Corps has already started preparing the Fire Hall for paint. Grey paint with red trim were picked by the Board and will be purchased by Bob Simko.

FIRE VOLUNTEERS REPORTS

Steve reported good attendance at training meetings.

Donna reported that she has learned that Junior Firemen between 16 and 18 would have identical coverage both for life insurance and worker's comp insurance to the other firement. The cost of worker's comp would be the same and the life insurance would be a little cheaper than for regular firefighters. Ray asked that we get in writing that the compensation insurance would cover them.

NEW BUSINESS

Ray moved that meetings be continued to be held at the Yachats Library Conference room. Bob seconded and the motion passed unanimously. The consensus was not to ask that the \$5.00 fee be waived.

Steve told of a new series of shots available to protect against Hepatitis B. The cost would be about \$150.00 per person. He felt that we should provide this for those who have close contact with accident victims, etc. Donna moved that the District provide Hepatitis shots for those who Steve feels are at risk and that the money be transferred from Contingency Fund. Bob seconded the motion. It passed unanimously.

We discussed closing the Equipment Fund and establishing the Building Fund; however it was decided to wait to be sure we don't need any further equipment this year.

The meeting was adjourned at 8:38 p.m.

Donna Brewer
Donna Brewer, Secretary

Sam Dorning, Chairman

Yachats Rural Fire
Protection District
P.O. Box 1
Yachats, Oregon 97498

MINUTES OF THE REGULAR BOARD MEETING OF August 14, 1989:

The meeting was called to order at 7:30 p.m. Members present were Sam Dorning, Ray Hicks, Rex Williams, Bob Coleman and Donna Brewer. Also present was Bob Simko.

Minutes of the July 10, 1989 meeting were read and approved. Bills were reviewed. A motion to approve payment of the bills was made by Donna and seconded by Rex. The motion carried.

Correspondence received included the Volunteer's life insurance policy.

OLD BUSINESS

Bob Simko reported that the North Station is being painted by the Job Corps. The second coat will go on Tuesday and trim on Thursday. Bob also reported that John Scott (just before he retired from the Job Corps) said that he did not want the Corps to roof it. It was suggested that someone talk to his replacement about this since we have had the material for a year and they have had us on the list for one and a half years.

In regard to selling the tanker, Bob had two answers to the ad, but neither bought it. Sam suggested just hauling it off. Bob said that Elmer Ostling would buy it for the metal.

The school property was discussed again. Donna reported on sale prices and dates of property surrounding the present station. Sam again suggested trying for a variance to go over to Clark's Market to gain additional parking space. It was decided that Donna would write one or more proposed letters to the City Council for review by the Board at the next meeting. These should state that we would like to buy the underlying ground under the Yachats station and/or that we would like a variance over to Clark's and that we would like prompt action since we are needing to make decisions about where we will grow.

FIRE VOLUNTEERS REPORTS

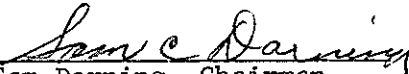
Bob Simko requested several items: Climbing gear that was needed at a recent rescue at Seal Rock and should be on hand including rope; cost about \$150.00; a wooden ladder for the North Station; and, parts for the Kirby vacuum sweeper for about \$26.00. Ray moved and Bob seconded and the motion passed. Bob Simko was also authorized to get a front-end alignment on Rescue 18.

NEW BUSINESS

Ray moved that we renew our Building Fund C.D. for \$20,000 for one year when it matures on August 18. Bob seconded. The motion passed.

The District has received a \$500.00 donation from Mr. and Mrs. Perry Downing. Ray moved and Bob seconded a motion to deposit the check, thank the Downings and contribute the \$500.00 to the Volunteer Department. The motion passed. The Board authorized paying \$55.00 for rent of this room for remainder of the year. The meeting was adjourned at 8:53 p.m.


Donna Brewer, Secretary


Sam Dorning, Chairman

**Yachats Rural Fire
Protection District
P.O. Box 1
Yachats, Oregon 97498**

MINUTES OF THE REGULAR BOARD MEETING OF SEPTEMBER 11, 1989:

The meeting was called to order at 7:34 p.m. Members present were ~~Sam Dorning~~, Bob Coleman, Ray Hicks, Rex Williams and Donna Brewer. Others present were Steve Hamilton and Bob Simko.

Minutes of the August 14, 1989 meeting were read and approved. Bills were reviewed. A motion to approve payment of the bills was made by Bob, seconded by Rex and carried.

Correspondence during the month consisted of 1) a thank you letter sent to Downings for their contribution which was passed on to the Department and 2) a letter from the Highway Division of Oregon asking for comment re closing highways for emergencies. This letter was answered by Steve.

Old Business

Bob reported that he had answers to his latest ad re selling the water tank but no takers.

Bob reported that there will be a dinner to honor the Job Corps students who worked on our Fire Station and other projects. It will be held Thursday, September 14 at 3:00 p.m. at the Job Corps and one or more from the Fire District are invited. Bob or Steve were encouraged to attend.

Steve reported that the City of Yachats, the City of Waldport and Southwest Lincoln water districts may go together to share water in an emergency. South West Lincoln has 800,000 gallons of storage, Waldport has 1,000,000 and Yachats will have 1,000,000 gallons. Donna reported that in her conversation with the Insurance Service Office, they indicated that such a contract to share has been done before and that it "might" help our rating. Steve is continuing to work for this agreement. Discussed calling for a new rating.

Donna showed two versions of a letter to the City of Yachats asking to buy the land under the Fire Station. Bob moved and Rex seconded a motion to send the letter that also asked for a variance to allow us to build over to Clark's market. *Motion carried*

Fire Volunteer Reports

Bob Simko reported that Rescue 18 got new ^{front}brakes today. He also reported that the Job Corps has finished painting the North Station and that it looks very good. They would also like to paint the inside of the Station for practice. They request that we buy enamel for the job. No action was taken.

New Business

The C.D. that comes due in October was discussed. Tentatively, it was decided to switch it to Bank of Newport. Final decision will be made at the next meeting.

The meeting was adjourned at 8:40 p.m.

Donna Brewer
Donna Brewer, Secretary

Sam Dorning
Sam Dorning, Chairman

**Yachats Rural Fire
Protection District
P.O. Box 1
Yachats, Oregon 97498**

MINUTES OF THE REGULAR BOARD MEETING OF OCTOBER 9, 1989

The meeting was called to order at 7:29 p.m. Members present were Sam Dorning, Rex Williams, Ray Hicks and Donna Brewer. Others present were Bob Simko, Rick Boston and Jeff Griffin.

Minutes of the September 11, 1989 meeting were read and approved. Bills were reviewed. A motion to approve payment was made by Rex, seconded and carried.

The meeting was turned over to Jeff Griffin, our insurance agent. Jeff discussed new things happening in Fire District insurance. They will be able to offer new coverages including disability for Volunteers. They would like to come and talk to the Volunteers in the Spring and do some risk training. He also stated that he thought we had transferred our worker's compensation at the right time. We are supposed to bid for an agent of record now because of the size of our combined premiums. Plans were made to do this. Jeff will put an ad in an insurance magazine and Bob Simko will handle calls in Donna's absence. Sam moved that we choose an Agent of Record according to the above plan. Ray seconded and the motion passed.

FIRE VOLUNTEER REPORTS

Rick Boston asked if the Board would approve flu shots for the volunteers at \$5.00 per person at the local clinic. Ray moved that we do so, Rex seconded and the motion passed. Rick also suggested that if the District could furnish or partly furnish health insurance for the volunteers, it would be a big plus in attracting and keeping volunteers. He suggested that there could be strict limits on who would be eligible and that this could be considered for next year's budget.

Bob reported that he finally received his wooden ladder today. He also reported that the jeep is back in the North Station and that the Job Corps would still like to paint the inside of the North Station if we will furnish paint. It was decided not to do this. We need 3 new turnouts. Ray moved and Rex seconded a motion to buy turnouts but try to keep it within ~~the~~ \$800. ~~left in the budget.~~ *Corrected.*

NEW BUSINESS

Donna reported that a letter had been sent to the City Council of Yachats on September 26 asking for a variance to expand over to Clark's Market and offering to buy lots 8700 and 8701. Sam reported that the City had contacted him for plans for the variance. Ray will make a drawing and deliver it on Wednesday.

Sam moved that we move the C.D. to Newport Bank and purchase a \$60,000 one year C.D. and purchase a 6 month certificate for the remainder of the Building Fund C.D.. Ray seconded and the motion passed.

The meeting adjourned at 8:55 p.m.


Donna Brewer, Secretary


Sam Dorning, Chairman

**Yachats Rural Fire
Protection District
P.O. Box 1
Yachats, Oregon 97498**

MINUTES OF THE REGULAR BOARD MEETING OF JANUARY 8, 1990:

The meeting was called to order at 7:30 p.m. Members present were Sam Dorning, Ray Hicks, Bob Coleman, and Donna Brewer. Others present were Steve Hamilton and Bob Simko. Rex Williams was absent.

Minutes of the December 11, 1989 meeting were read and approved. A motion to approve payment of the bills was made by Bob, seconded and carried.

Correspondence included a Notice of Public Hearing for January 18 on our variance request.

OLD BUSINESS

Donna reported that a C.D. had been purchased for the Equipment Fund as directed at the last meeting. This was our 1989-1990 budgeted addition of \$4,000. It was invested at National Security Bank at a rate of 7.45 % and matures on June 12, 1990.

Donna reported that insurance for the jeep was obtained on December 29, 1989.

FIRE VOLUNTEERS REPORTS

Bob reported that everything was quiet and the equipment was all running. Steve reported that he learned that Southwest Lincoln Water District has still not received the Mutual Aid agreement from the City of Yachats, so it is still not signed.

NEW BUSINESS

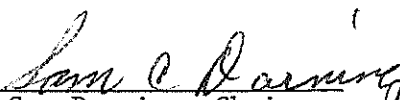
Ray Hicks moved and Bob seconded a motion to buy the State book on Public Meetings for \$8.00. The motion passed.

After discussion, Bob moved that we write to the City of Yachats and offer them \$5,000. for Lots 8700 and 8701, but that the offer be contingent upon their removing the property from the Public Facility Zone and that they also allow the set-back variance we have currently requested. A June 30, 1990 deadline was also put on the offer. Sam seconded the motion and it passed unanimously. The group felt that the property has always been in the hands of the Fire Department and the District was entitled to the property without charge; however, the amount was agreed upon to avoid criticism of the City by those who do not know the full history and to keep the District independent of the City.

Sam announced need for more radio equipment. Bob moved and Ray seconded a motion to buy needed antennas and two more hand held units. The motion passed.

The meeting was adjourned at 8:16 p.m.


Donna Brewer, Secretary


Sam Dorning, Chairman

**Yachats Rural Fire
Protection District
P.O. Box 1
Yachats, Oregon 97498**

MINUTES OF THE REGULAR BOARD MEETING OF FEBRUARY 12, 1990:

The meeting was called to order at 7:30 p.m. Members present were Sam Dorning, Ray Hicks, Bob Coleman, Rex Williams and Donna Brewer. Others present were Steve Hamilton and Bob Simko.

Minutes of the January 8, 1990 meeting were read and approved. A motion to approve payment of the bills was made by Rex, seconded and carried. Correspondence received included our insurance policies for the year from Wilson-Heirgood together with notice of a credit balance on our account.

OLD BUSINESS

Donna reported that the letter offering to buy Lots 8700 and 8701 had been sent. No response has been received. Sam reported that the City called him and suggested that, rather than get a variance under our R-3 zoning, we ask for C-1 zoning and call off the variance hearing. Sam told them that he could not make that decision and asked that they send a letter to our Board. They did not. Donna attended the hearing, but the audience was told that it was called off. Furthermore, they have put the Fire District property into the Public Facility Zone in their final papers, saying that the LCDC requested that.

Steve reported that he had attended a City Council meeting and discussed several Fire District items: The City wishes to enact a burning permit law and have the District enforce it. Steve assured them that with a volunteer staff that would not be possible. The City assured Steve that they would immediately act on the Mutual Aid agreement that Steve has been working on for months. Steve also reported that Ray Cox gave the Council a history of the Fire District that should help their understanding.

FIRE VOLUNTEERS REPORTS

Steve reported that he has met with Gary Pankey concerning the strict new Hazmat rules being enforced by OSHA. They require a great deal of training before going near hazardous materials even to save a life.

NEW BUSINESS

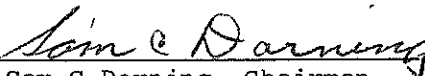
Donna was authorized to buy the new Budget video when it becomes available. It is \$5.00. There was some discussion about what vehicle should be purchased next and the timing for budget purposes. Bob moved that the \$8,690.46 C.D. due to mature on 2/17/90 be rolled over for 6 months only. Rex seconded and the motion passed.

Ray moved that we pay \$6.00 per hour for special work on the building and equipment. This would be retroactive to 1/1/90. Donna seconded and the motion passed unanimously. This is an increase of \$1.00 per hour. There had been no increase in 4 or 5 years.

Sam asked for another scanner (costing about \$220.00) for the Fire Hall, with Bob Simko being allowed to take the old one home. Donna so moved, Bob seconded and the motion passed.

The meeting was adjourned at 8:49 p.m.


Donna Brewer, Secretary


Sam C Dorning, Chairman

**Yachats Rural Fire
Protection District
P.O. Box 1
Yachats, Oregon 97498**

MINUTES OF THE REGULAR BOARD MEETING OF APRIL 9, 1990:

The meeting was called to order by Chairman Sam Dorning at 7:34 p.m. Other board members present were Ray Hicks, Bob Coleman, Rex Williams and Donna Brewer. Also present was Steve Hamilton.

Minutes of the March 12th meeting were read and approved. The bills were reviewed. Bob moved that they be paid. The motion was seconded and passed.

OLD BUSINESS

The Public Facility Zone and our other requests from the City were discussed. It was decided to write a letter to the City Council asking for action and answers to our requests. The entire Board dictated the letter with a special request to answer soon enough that we can plan our budget for 1990-1991.

FIRE VOLUNTEERS REPORT

Steve reported that attendance has been good. He announced a special training session on drug labs to be held from 6:00 p.m. to 10:00 p.m. on April 30. He invited the Board to attend.

Steve announced that it will probably cost \$3,000 to repair Unit 15. Bob moved that they proceed with fixing it. Rex seconded the motion and the motion passed unanimously. Steve announced that no further work would be done on Unit 12 until Unit 15 is fixed since two units need to be ready to roll at all times.

NEW BUSINESS

After discussion, Donna moved that we pass resolution 90-1 to initiate annexation proceedings to annex Lot 330 as described in Exhibit A attached to the resolution at the request of Norman and Joanne Kittel. Ray seconded and the motion passed unanimously. Steve felt that it would not be necessary to inspect the property since the LCDC is also requiring access roads in addition to fire protection. The Kittel property is contiguous to the District boundaries.

Donna mentioned that the \$25,000+ Building Fund C.D. at Bank of Newport matures April 12, 1990. It was decided to let it roll over for a second six months.

Donna was instructed to send out-of-district fire bills for \$250.00 to Heiligman for the Tenmile Fire on March 22 and the Giffen forest fire on this date.

Ray Hicks brought up a concern about the Vandehey building on West Fourth. After discussion, Ray moved that we send a letter to the City of Yachats asking them to take steps to have the building removed since it is a considerable fire hazard that we may not be able to contain. Also, he suggested offering our assistance in accomplishing this. Sam seconded and the motion passed unanimously.

The meeting was adjourned at 9:03 p.m.

Donna Brewer
Donna Brewer, Secretary

Sam C. Dorning
Sam C. Dorning, Chairman

Yachats Rural Fire
Protection District
P.O. Box 1
Yachats, Oregon 97498

MINUTES OF REGULAR BOARD MEETING OF AUGUST 13, 1990:

The meeting was called to order at 7:37 p.m. Members present were Sam Dorning, Bob Coleman, Rex Williams, Ray Hicks and Donna Brewer. Others present were Steve Hamilton, Bob Simko, Mike Keeney and Jeff Griffin. Ray presided at the meeting since Sam Dorning was a little bit tardy.

Minutes of the August 2, 1990 special meeting were read and approved. A motion to approved payment of the bills was made by Bob, seconded by Rex and carried. A letter from Dave Campbell regarding insurance ^{retired} was read by the Secretary. Donna mentioned that a new charge sheet with State approved rates was received. Bob Simko pointed out that this pertains to fires on Forest Service property. Donna mentioned that a contribution from the Eagles Ladies Auxiliary had been received for the defibrillator. It has been signed over to the Defibrillator Fund.

OLD BUSINESS

We discussed our intentions with regard to increasing the size of the Hall and the purchase of the property. Sam moved that we again send a letter to the City Council offering to purchase the land under the Fire Hall. The motion was seconded by Bob and approved unanimously.

Jeff Griffin of Wilson-Heirgood spoke to us, at our request, about retirement plans and the possible ways to structure them. He assured us that the projected State retirement plan for fire fighters will not pass this year. He will send us names to contact for more information.

FIRE VOLUNTEER REPORTS

Steve reported the the defibrillator has been ordered and will be delivered in 30 to 45 days. The Men's Fellowship will have a program on it on August 25 and the Yachats Lioness will have one, with a potluck on August 27.

NEW BUSINESS

We discussed Rescue 18 and possible ways to replace it.

Steve said that there was a commercial washer is for sale for \$500. at the Laundromat. It could be used for turnouts. The DEQ now requires that they be washed after each use. Donna moved that two members look at the machine and buy it if it seemed appropriate. Bob seconded and the motion passed. Ray and Rex were appointed to look at the machine.

The meeting was adjourned at 9:13 p.m.


Donna Brewer, Secretary


Sam Dorning, Chairman

Yachats Rural Fire
Protection District
P.O. Box 1
Yachats, Oregon 97498

MINUTES OF REGULAR BOARD MEETING OF OCTOBER 8, 1990:

The meeting was called to order at 7:31 p.m. Members present were Sam Dorning, Rex Williams, Ray Hicks, Bob Coleman and Donna Brewer. Others present were Steve Hamilton, Bob Simko, Frankie Petrick and Mike Keeney.

Minutes of the September 10 meeting were read and approved. A motion to approved payment of the bills was made by Bob, seconded by Ray and carried. Correspondence consisted of 1) a copy of a letter sent to Mrs. Jake Weidman by our insurance carrier. It denied the death claim we had sent because the cause of death did not fit our insurance criteria. 2) a letter from Jeff Griffin giving us contacts to help us about our retirement plan, and 3) a letter from the City Council responding to our offer to purchase the land under part of our building.

OLD BUSINESS

Donna reported that she had heard that the Waldport City attorney was holding up the 3-district reciprocal emergency water agreement. She was instructed to write a letter to Dave Gorden of Waldport asking the reason for the holdup.

The City of Yachats letter was discussed. It was decided that we would ask to attend a work session of the City Council to present our case. Ray Hicks will make the contact. If the meeting is in October, Rex will attend with Ray and if it is in November, Donna will attend with Ray. The Board agreed that we would be willing to pay half the cost of an election (estimated to be about \$100. for our half) since the law now requires a vote of the people on sales or purchases of land. Sam moved, Rex seconded and this motion passed.

It was decided to follow up on contacts ~~their~~ⁱⁿ Jeff Griffin's letter and the coming Convention before doing anything further about a retirement plan.

FIRE VOLUNTEERS REPORTS

Steve reported that the Volunteers did a very good job on the Blue Whale fire and the very difficult out-of-district brush fire off Wakonda Beach road. They had a pizza feed at the last meeting. Frankie brought up that after the fires, every turnout was unwearable and had to be washed. She asked that they be allowed to charge such cleaning at the Laundromat. She was assured that it was our policy to pay for that even though there is no longer a line item in the budget for it. It will be charged to Miscellaneous Expense and not to Volunteer's Benefits.

The Volunteers asked that something be done about Rescue 18 because repairs have not worked and it still breaks down. After discussion, it was agreed that all concerned would try to find a used rescue rig or a chassis that could be built upon within the amount we have budgeted for this year. At the same time they would have a mechanic use the Eugene Fire Department method to cure the overheating problem in our present rescue rig. Ray will go to Eugene tomorrow to trade some surplus items and will look for something usable.

Yachats Rural Fire
Protection District
P.O. Box 1
Yachats, Oregon 97498

MINUTES OF REGULAR BOARD MEETING OF MARCH 12, 1991:

The meeting was called to order at 7:35 p.m. Members present were Sam _ Dorning, Rex Williams and Ray Hicks. Bob Coleman and Donna Brewer were absent. Others present were Steve Hamilton and Bob Simko.

Minutes of the February 11 meeting were read and approved. Bills were approved for payment.

Ray read the newest version of the Mutual Water Agreement which had been received from the City of Yachats. It was decided that Steve would sign it and Ray would notify the City.

VOLUNTEER'S REPORT

The firefighters have been taking CPR and fire fighting classes. The whole Department is now a Safety Committee.

OLD BUSINESS

Ray and Rex reported on their meeting in executive session with the City Council. They may still decide that \$5,000. is still not adequate, but they are willing to negotiate and suggested one person (or the City attorney) from the City and one person from the Fire Board make up an agreement. They may ask for a right to share in the profits if sold withing a certain period of time as a condition of sale. This is similar to the School purchase deal. Ray was told to go ahead and persue it.

Also, Ray and Rex discussed burning permits. It was decided that Bob Simko will issue burning permits from the Fire Hall. Rick Boston no longer wishes to issue them.

Rex moved and Ray seconded a motion that Copelands be contacted and asked to refund the \$690. we paid for shingles on June 29, 1988. Alternatively, we would take the shingles. Bob Simko is to talk to them. The motion was approved.

NEW BUSINESS

Bob Hays has said he will serve on the Budget Committee.

Ray has asked the City Attorney if we are responsible for people who do Department work as a Community Service. He said we are and there was some discussion about whether to continue to accept such help.

Ray moved and Rex seconded Resolution #91-1 to transfer \$1,900. to the Equipment Fund to pay for the 1980 Datsun pickup just purchased. The motion passed.

Ray moved that we buy tires for the new pickup and have the rotors turned and the front wheels packed. Sam seconded and the motion passed.

They encouraged Steve to get some firefighters to attend classes. We will pay and they can use the pickup for transportation.

Ray will see about getting a hose rack and nozzles from Eugene.

The meeting was adjourned at 8:47 p.m.

Donna Brewer
Donna Brewer, Secretary

Sam C. Dorning
Sam C. Dorning, Chairman

Yachats Rural Fire

Protection District

P.O. Box 1

Yachats, Oregon 97498

MINUTES OF REGULAR BOARD MEETING OF APRIL 8, 1991:

The meeting was called to order at the library at 7:35 p.m. Members present were Sam Dorning, Ray Hicks and Donna Brewer. Bob Coleman and Rex Williams were absent. Steve Hamilton and Bob Simko were also present.

Minutes of the March 12, 1991 meeting were read and approved. The budget report was reviewed. Donna moved that we pass Resolution No. 91-2 to transfer the remaining \$2,000. from Operating Contingency and \$700. from A/C 922 Radio Communications to cure all of our over-budget accounts and to bring #926, Gas, Oil and Lube and #931 Training and Education up to the amounts needed to finish out the year. Ray seconded the motion and the Resolution was passed. Ray then moved that the bills be paid, Sam seconded and the motion passed. Correspondence from City of Yachats re Fire Regulations was read.

VOLUNTEER'S REPORT

Steve Hamilton reported on two meetings he has recently attended. One was a User Board meeting for 9-1-1 in Waldport. The other was a meeting of County Fire Chief's in Toledo. Steve noted that we had the best fire permit set-up in the region. The Fire Chiefs voted to not allow any burning during July, August and September. This will cover all of Lincoln County.

OLD BUSINESS

Ray reported on negotiations with the City regarding purchasing Lot 8700. He has met with the City Council and had one session with the City Attorney. The City Attorney sent appraisals for our consideration and asked us to decide on what we would pay for the property. After discussion, it was decided that it was doubtful whether any agreement could be reached with the City and even so the sale must go to a vote of the people. There would still be no assurance that we would be able to add to the building or to sell the land and building that we now own due to the Public Facility Zoning. Donna was instructed to prepare a letter to James Ruggeri, Attorney that we wish to abandon our attempt to buy the ground under one-half of the Fire Department building.

NEW BUSINESS

Donna moved and Ray seconded a motion to adopt new Burn Permit Regulations proposed by Steve Hamilton and Bob Simko. The motion passed. Steve and Bob have also produced a letter to new members of the community for the Hi Neighbor! organization. These explain our emergency and other services. The letter is signed by Steve.

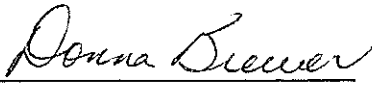
The proposed Yachats City Fire Regulations were circulated and commented upon. Donna was instructed to write to the City

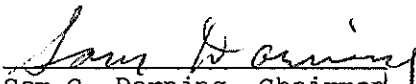
Yachats Rural Fire
Protection District
P.O. Box 1
Yachats, Oregon 97498

MINUTES OF MAY 13, 1991-page 2

James Ruggeri, City Attorney for the City of Yachats, came to the meeting at 9:10 p.m. to bring a proposal from the City Council. They will give us a choice of buying the land for \$5,000. with the City retaining the right to one-half the proceeds on the sale of that property for 25 years, or we could buy the property for \$1.00 with the City retaining the right to one-half the proceeds in perpetuity. In either case, Jim said an election would have to be held no matter which option we chose. After further questions, Jim left and discussion continued. Sam suggested that we accept the \$1.00 offer to sell. The consensus was that was the best option and Donna was instructed to inform the City Council.

The meeting was adjourned at 9:44 p.m.


Donna Brewer, Secretary


Sam C. Dorning, Chairman

Yachats Rural Fire
Protection District
P.O. Box 1
Yachats, Oregon 97498

MINUTES OF REGULAR BOARD MEETING OF JULY 8, 1991:

The meeting was called to order at 7:35 p.m. at the Fire Hall. Members present were Sam Dorning, Rex Williams, Ray Hicks, Donna Brewer and Bob Arnold. Others present were Steve Hamilton and Bob Simko.

Donna read the oath of office to the two newly elected members, Sam Dorning and Bob Arnold and they were sworn in. Sam called for nominations for Chairman. Rex nominated Ray Hicks for Chairman. The motion was seconded and passed. Ray then took over the meeting and Sam moved that Rex be Vice-Chairman. That motion was also seconded and passed. Sam moved that Donna be Secretary/Treasurer and that was also seconded and passed. Rex Williams will be added to check signers as Vice-Chairman and Sam will remain a signer.

Minutes of the June 10, 1991 meeting were read and approved. Bills were reviewed. Donna moved that they be paid, Rex seconded and the motion passed. The answer written to South Lincoln Water District's letter of May 21 was read.

VOLUNTEER'S REPORT

Steve reported that they have had an earthquake practice. Unit 12 has been repaired and is in good shape. Ninety percent of the engine was rebuilt. The cost was \$6,491.86. Ray said that the truck should now be run about an hour a day.

OLD BUSINESS

Ray will talk to Copelands about the shingles.

We discussed how best to get the City to get our purchase of Lots 8700 and 8701 agreed upon and on the ballot for the November election. The deadline is September 5 for the November election. Ray appointed Rex and Donna to work on the problem and report at the next meeting.

NEW BUSINESS

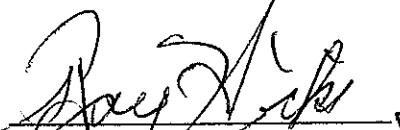
Steve reported that our air compressor needs to be tested and certified. SDAo will test for about \$45. a bottle but we must provide transportation to Portland. Bob Simko and Bob Arnold thought they might be able to do some of the transporting.

Donna reported that there is not enough money in any category of the 1991-1992 budget to pay for the Unit 12 repairs. After discussion, Donna moved that we pass Resolution 91-4 to transfer \$6,500. from #990 Operating Contingency to #927 Equipment Maintenance to pay the repair bill. Bob Arnold seconded and the motion passed unanimously. It was suggested that we put the Equipment Reserve funds into a new certificate for six months.

Sam has arranged for us to use the new tower on the mountain behind Yachats to help with our communications. We will also need two \$100. radios to link our equipment and encoders for our hand helds. Rex moved that we rent space on the tower for \$35.00 permonth and purchase the two radios and gradually add decoders. The motion was seconded by Sam and passed unanimously. The tower is owned by Frank Schwartz and we will use the 154.325 frequency.

The meeting was adjourned at 8:57 p.m.


Donna Brewer, Secretary


Ray Hicks, Chairman

Yachats Rural Fire
Protection District
P.O. Box 1
Yachats, Oregon 97498

Page 2--MINUTES OF NOVEMBER 11, 1991:

Ray and Donna reported that they had met with Art Roberts and Larry Nixon of the Yachats City Council and had reached an agreement that they would deed the property to us with no money changing hands, but with the reservation that if the District ever sold or discontinued use of the property as a Fire Station, that the value of the City-owned land only would be paid to the City. The payment could again be deferred for as long as the District maintained a station in the City. The amount of money would be based on an appraisal at the time of sale, and if deferred further the amount would be subject to increase as measured by the Consumer Price Index until paid.

The correspondence from our attorney contained documents ready for use to agree to a transfer in 1991 and to complete the purchase after an election in 1992. Ray moved and Donna seconded that we sign the agreement to transfer the documents and approve the arrangements made at the joint agreement. The motion passed unanimously.

Donna moved that we pass Resolution #91-5 to authorize representatives from the District to purchase federal surplus property for the District from the Department of General Services. Sam seconded the motion and it passed. Those signing to purchase were Ray Hicks, Sam Dorning, Steve Hamilton, Dennis Clary and Robert Arnold.

Bob Arnold reported on his attendance at the OFDDA convention in Springfield on November 8 and 9.

The meeting was adjourned at 8:58 p.m.


Donna Brewer, Secretary


Ray Hicks, Chairman

Yachats Rural Fire
Protection District
P.O. Box 1
Yachats, Oregon 97498

MINUTES OF THE REGULAR BOARD MEETING OF JANUARY 13, 1992:

The meeting was called to order by Chairman Ray Hicks at 7:34 p.m. Other members present were Sam Dorning, Rex Williams, Ray Hicks, Bob Arnold and Donna Brewer. Steve Hamilton was also present.

Minutes of the December 9, 1991 meeting were read and approved. Bills were reviewed. Donna moved that they be paid, Rex seconded and the motion passed.

Correspondence consisted of the following:

- Answer from Public Safety Officer's Benefits Program denying a benefit for Beverley Simko.
- Acceptance of Bob Simko's worker's comp claim.
- Final agreement to transfer received and signed.
- Wilson-Heirgood letter with quotes on pumper insurance.

FIRE VOLUNTEER REPORTS

Steve reported that the Department will be meeting every Monday, even on Fire Board nights and then probably less frequently during the summer. Gary and Frankie have been doing training. Ray suggested that we set up some kind of attendance award program. This met with approval from all attending but no specific plans were made.

Steve reported that there still is money in the Bob Simko Fund and explained how the money has been used, including the trip, medicine and burial.

There are some problems with Unit 18 and Unit 12. Ray will look at them and advise or have them fixed.

OLD BUSINESS

The final agreement to purchase Lots 8700 and 8701 have been signed by the City and the District and Ken Jones is preparing the ballot measure.

The Copeland shingle money has been received.

In regard to conditions under which the Fire Board will pay Volunteers to work, the following was decided:

1. We will continue to pay \$6.50 an hour and review it at budget time.
2. Permission to do paid work on the equipment must be given by Steve or Gary.
3. Ordering and purchasing may be done by Dennis or Gary or anyone with permission from Steve or Ray.
4. Sam will order radios.
5. Dennis will continue to do the work Bob was doing including the record keeping.
6. A motion was made by Donna, seconded by Sam and passed to limit the number of hours that may be charged to Equipment Maint to 20 per month, Building Maint to 10 per month, and Office to 20 per month.

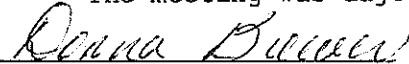
NEW BUSINESS

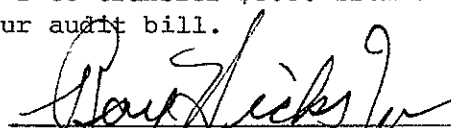
Sam moved and Bob seconded a resolution (92-1) to transfer \$8,000. from the General Fund to Equipment Fund per our budget and to invest it in the Pool together with the Equipment Fund C.D. at its maturity date, January 29, 1992.

The completed review prepared by Harrison & Trope' was distributed.

Donna moved that we pass Resolution 92-2 to transfer \$500. from Contingency to #934, Audit & Legal so that we can pay our audit bill.

The meeting was adjourned at 9:18 p.m.


Donna Brewer, Secretary


Ray Hicks, Chairman

THIS INDENTURE OF LEASE, Made in duplicate at Newport, Oregon

, on this 1st day of May, 19 50

by and between Yachats Water District, a municipal corporation
hereinafter known and referred to as the lessor, (whether singular or plural) and Yachats Rural Fire
Protection District, a municipal corporation, hereinafter known
and referred to as the lessee, (whether singular or plural).

WITNESSETH: That in consideration of the covenants, agreements and stipulations herein contained
on the part of said lessee to be paid, kept and faithfully performed by said lessee, the said lessor does hereby
lease, demise and let unto said lessee that certain premises described as follows: The

west 25 feet of the south 40 feet of Lot 22, Block 1, First Addition
to Yachats in Lincoln County, Oregon

in the County of Lincoln, State of Oregon

TO HAVE AND TO HOLD said premises hereby leased for a period of Forty (40) years,

from the 1st day of May, 19 50, to and including the 1st day of
May, 19 90, said lessee paying and yielding as rental therefor, during
said term, the full sum of Forty (\$40.00) - - - - -

lawful money of the United States, to be paid as follows: The sum of \$1.00 upon execution hereof
being rental for the first year of said lease and the further sum of \$1.00
on the first day of each May hereafter until said rental is wholly paid.

That in addition to said monetary rental, it is understood and agreed
that the lessor herein shall have free rental of a room in the southeast
corner of the main floor of the building constructed on said premises by
the lessee during the term of this said lease, said room to be used as an
office by the said Water District and said lessor to have the further right
of using the meeting room on the 2nd floor of said building for water meet-
ings when this larger space is required. It is understood and agreed that
the Fire Protection District shall be responsible for insurance, maintenance
and repair of said building and that the said Water District shall be re-
sponsible for furnishing its share of the lights and heat for said building.

That said lessee will make no unlawful, improper or offensive use of the premises; that at the expiration of the
said term or upon any sooner termination of this lease, said lessee will quit and deliver up the premises, and all
future erections or additions to or upon the same, to the said lessor, or those having their estate therein, peace-
ably, quietly, in as good order and condition (reasonable use and wearing thereof, fire and other unavoidable
casualties excepted) as the same now are or may be put in by the lessor or those having their estate in the prem-
ises; that said lessee will not suffer nor commit any strip or waste thereof, nor make nor suffer to be made any
alterations or additions to or upon the same, nor assign this lease, nor underlet, or permit any other person or
persons to occupy the same, without the consent of the said lessor or those having their estate in the premises,
being first obtained in writing, and also that it shall be lawful for the said lessor and those having their estate
in the premises, at reasonable times, to enter into and upon the same, to examine the condition thereof.

MEMORANDUM OF LEASE

NOTICE IS HEREBY GIVEN to all persons that a lease dated July 21, 1983 was entered into regarding the following property:

Lot 26, Block, First Addition to Yachats
by Lessor, City of Yachats and Lessee, Yachats Rural Fire Protection District, said lease expiring June 30, 2004 unless otherwise terminated pursuant to the terms and provisions of said lease. The property leased to Lessee shall be used solely for a public fire hall and station. Said lease merges the lease previously entered into by Lessor's predecessor and Lessee concerning a portion of said lot, recorded in Lincoln County Miscellaneous Records, Book 18, page 307.

LESSOR:

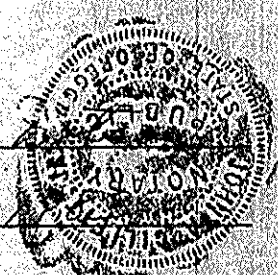
CITY OF YACHATS

By Gerald L. Ryan
MAYOR

DATE: July 21, 1983

ATTEST:

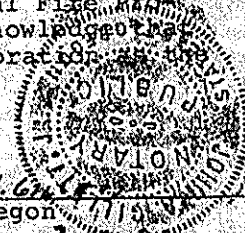
Theresa T. Ryan
City Recorder



STATE OF OREGON)
) ss.
County of Lincoln)

On this 27 day of JULY, 1983, personally appeared before me, a notary public in and for said state and county, the above named SAM DORRANCE and DAVID BOWEN, who are personally known unto me to be, respectively, the President and Secretary of Yachats Rural Fire Protection District, a municipal corporation, and acknowledged that they executed the foregoing on behalf of said corporation as the act and voluntary deed thereof.

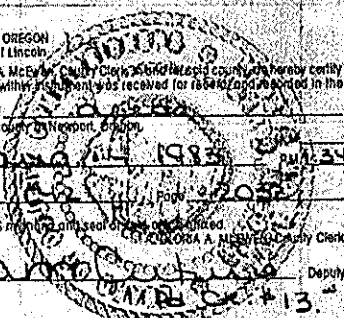

Notary Public for Oregon
My Commission Expires: 3-17-84



AFTER RECORDING, RETURN TO:

✓ Evan P. Boone
Minor, Yeck & Beeson, P.C.
P. O. Box 510
Newport, Oregon 97365

STATE OF OREGON
County of Lincoln
I, Gloria A. McEvoy, County Clerk of Lincoln County, do hereby certify that the within instrument was received for recording and entered in the record of said county in Newport, Oregon.
Date July 27, 1983 PM 4:34
Book 142 Page 2034
WITNESS my hand and seal of office on the day and date first above written.
By Gloria A. McEvoy Deputy
CLERK OF LINCOLN COUNTY





LINCOLN COUNTY OFFICE
126 W. OLIVE • P.O. BOX 1177
NEWPORT, OREGON 97365 • PHONE 265-8591

OTHER OFFICES OF WILLAMETTE VALLEY TITLE CO.

MARION COUNTY
MAIN OFFICE
318 CHURCH ST. N.E.
P.O. BOX 825
SALEM, OR. 97308

BENTON COUNTY
582 N.W. VAN BUREN
P.O. BOX 951
CORVALLIS, OR. 97330

LINN COUNTY
310 WEST THIRD
P.O. BOX 981
ALBANY, OR. 97321

POLK COUNTY
168 S.W. COURT ST.
P.O. BOX 451
DALLAS, OR. 97338

LANE COUNTY
845 EAST PARK
P.O. BOX 10188
EUGENE, OR. 97401

COOS COUNTY
294 CENTRAL
COOS BAY, OR. 97420

March 17, 1983

Waldport REalty
P. O. Box 262
Waldport, Oregon 97490

Attention: Darlene

At your request we have searched the records of Lincoln County Oregon for the ownership of Lot 26, Block 1, First Addition to YACHATS, and as of March 11, 1983 at 5:00 P.M. we find that the last deed of record runs to

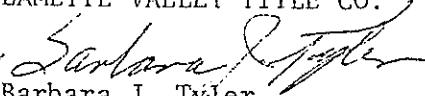
Yachats Water District
Dated: March 6, 1941
Recorded: March 8, 1941
Book 86, Page 637 of the
Deed Records of Lincoln County, Oregon.

We further note that a portion of said Lot 26, Block 1, First Addition to Yachats was leased to Yachats Rural Fire Protection District, by Yachats Water District, by lease recorded April 15, 1970 in Book 18, page 307 of the Miscellaneous Records of Lincoln County, Oregon. Said Lease was dated May 1st, 1950 and expires May 1st, 1990.

Should you need further information, please contact the undersigned.

Yours very truly,

WILLAMETTE VALLEY TITLE CO.

By: 
Barbara J. Tyler
Title Officer

COPY

BJT/s

CITY OF YACHATS
P. O. BOX 67
YACHATS, OREGON 97498
(503) 547-3565

*from Lincoln County
Nothing recorded*

September 13, 1983

Lincoln County Tax Assessor
County Courthouse
225 West Olive
Newport, OR 97365

SUBJECT: Memorandum of Lease between Yachats RFPD
and City of Yachats

Gentlemen:

The following is in response to your telephone request this morning.

1. The property identification on the memorandum should be: Lot 26, Block 1, First Addition to Yachats.
2. The enclosed copy of City Ordinance No. 51 shows the City is the successor of the Yachats Water District.

Sincerely,

Michiko T. Ryan
Michiko T. Ryan

enc.

ORDINANCE NO. 51

AN ORDINANCE ANNEXING CERTAIN TERRITORY

WHEREAS, there has been submitted to the City of Yachats, a proposal for annexation and consent thereto by all owners of the territory contiguous to the City which is described below;

WHEREAS, Ordinance No. 50 was passed, initiating the annexation of said territory, calling a hearing and directing that notice be given thereon, and since the hearing was held at which time all objections or remonstrances with reference to said proposed annexation were considered by the City Council and since the body feels that annexation is to the best interest of the City and of the contiguous territory, now, therefore,

THE CITY OF YACHATS ORDAINS AS FOLLOWS:

Section 1. Annexation Area. The following described contiguous territory is hereby proclaimed to be annexed to the City of Yachats:

That portion of the southeast quarter of the southwest quarter of Section 26, T 14 S, R 12 W, W.M., in Lincoln County, Oregon, lying southerly of the centerline of the Yachats River.

Section 2. Record. The City Recorder shall submit to the Secretary of State for the State of Oregon the following:

- 1) A copy of this Ordinance,
- 2) A copy of the Statement of Consent of the land owners in the territory annexed, and
- 3) A copy of the Ordinance No. 50 dispensing with an election in the City on the question of annexation.

The City Recorder shall also send a description by metes and bounds, or legal subdivision, of the new boundaries of the City

within ten (10) days of the effective date of annexation to the Lincoln County Assessor and Lincoln County Clerk.

WHEREAS, this annexation will bring the boundaries of the Yachats Water District within the boundaries of the City of Yachats, and therefore on the effective date of this ordinance by virtue of ORS 222.510 the District will be extinguished and the City shall succeed to all assets and become charged with all liabilities, obligations and functions of the District.

WHEREAS, it would be in the best interest of the City and of the District that the City take control of the assets, liabilities, obligations and functions of the District as soon as possible in order to coordinate the operations of the Water District an emergency is hereby declared to exist and this ordinance shall take effect on immediately.

PASSED BY THE CITY COUNCIL of the City of Yachats this 2 day of October, 1975.

APPROVED by the Mayor this 2 day of October, 1975.

Mike H Longmeyer
MAYOR

ATTEST:

[Signature]
City Recorder

Yachats Rural Fire

Protection District

P.O. Box 1

Yachats, Oregon 97498

September 26, 1989

City Council
City of Yachats
P.O. Box 67
Yachats, Oregon 97498

Dear Councilors:

The Yachats Rural Fire Protection District building on Second Street is getting quite crowded. We need to make some long range plans for storage of our equipment.

As you know, the building which the District owns sits partly on District land and partly on City land. We lease lots 8700 and 8701 from the City of Yachats for \$1.00 a year on a lease that runs until June 30, 2004.

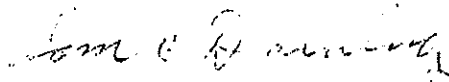
Would the City sell us lots 8700 and 8701 and at the same time grant us a variance so that we could enclose the area east from our building to Clark's Market?

We must make some decisions in the near future; therefore, we request that the Council discuss this matter and respond to us as soon as possible.

Sincerely yours,

YACHATS RURAL FIRE PROTECTION DISTRICT

Sam Dorning, Chairman



Yachats Rural Fire
Protection District
P.O. Box 1
Yachats, Oregon 97498

January 11, 1990

City Council
City of Yachats
P.O. Box 67
Yachats, Oregon 97498

Dear Councilors:

The Yachats Rural Fire Protection District hereby offers to buy Lots 8700 and 8701 from the City of Yachats for the amount of \$5,000 subject to the following two conditions. First, that the City drop the proposed Public Facility Zone on the property (leaving the property in Zone R-3), and second, that the City grant a variance to the East side setback limitations as is under review at this time.

We feel that this is a fair price for the following reasons:

- 1) The YRFPD has occupied the property continually since its inception in 1949.
- 2) The YRFPD owns the building that is on the property.
- 3) The YRFPD has an existing lease (at \$1.00 per year) that extends until June 30, 2004.

The Board asks that you accept this offer to purchase subject to the above conditions. The time limit on this offer is June 30, 1990.

Sincerely yours,

YACHATS RURAL FIRE PROTECTION DISTRICT

Sam C. Dorning, Chairman

COPY

Yachats Rural Fire
Protection District
P.O. Box 1
Yachats, Oregon 97498

April 11, 1990

City Council
City of Yachats
P.O. Box 67
Yachats, Oregon 97498

Dear Councilors:

The Fire District Board of Directors wishes the City Council to know that we are distressed that you are not listening to us.

We have sent you a resolution asking not to be included in the Public Facilities Zone, but you have put us in anyway.

We have paid for a variance hearing and it was canceled without notice to us. It has not been rescheduled nor has our money been returned.

We have sent you a proposal offering to buy the ground under the Fire Hall which was acquired by the City when the City took over the Water District. That letter has not even been acknowledged.

We have received some phoned and spoken promises, but none of them have been carried out. Due to these delays, we will not be able to add any much needed room this fiscal year. Since we are now preparing the budget for the next fiscal year, we need to know immediately what we can expect. If we cannot get any cooperation from the City, we may be forced to move from the City.

May we have a reply, in writing, telling us what your intentions are with respect to our needs?

Sincerely yours,

YACHATS RURAL FIRE PROTECTION DISTRICT

Sam Dörning, Chairman

Donna Brewer, Secretary/Treasurer

CITY OF YACHATS

500 WEST SEVENTH STREET

P.O. BOX 345

YACHATS, OREGON 97498

(503) 547-3565

April 19, 1990

Yachats Rural Fire Protection District
PO Box 1
Yachats, Oregon 97498

COPY

Dear Firepeople,

Mayor Chamberlin asked us to respond to your letter of April 11, rather than await presentation at the May Council meeting. We apologize for delays due to (unwarranted) optimism about process, inadequate communication, and consequent misunderstandings. Carol spoke by telephone with Sam Dorning last December regarding both the PFZ and the variance request. From that conversation we inferred that the Fire District was willing to coalesce with the City through the rather slow and somewhat complicated process the State recommended we take, in order to reach the ultimate goal that would accommodate the District's request. From conversations with Sam Dorning and Donna Brewer, City officials concluded, also, that the District has decided to enlarge present facilities rather than to seek other space. We are congenial to that goal and wish to help you attain it.

To reiterate, Planning Commission and Council accepted direction by Gail McEwen, of the State LCDC for our Comprehensive Plan Review. She said that to designate a Public Facility zone we needed to include all publicly owned land in the City. Our intention has been, once the Comp plan was adopted, to hold hearings to change the fire station property to a commercial zone. Then the Fire District could build right up to the property line without needing a variance. That seemed to solve both of our problems. If this is to be the procedure your fee will certainly be refunded.

Council completes deliberation of the Comprehensive Plan Review in May. The Plan must be adopted by the City and approved by the State before June 30. The Planning Commission intends to start the rezoning hearing at its June 28th meeting. The Council should hold a hearing at its July 12 meeting. This should give you time to build by August 1 if you so choose. As you know a request for rezoning commercial this and adjacent property has been made, and will be considered at this meeting. Several officers of the YRFPD signed this petition. This clouds the issue somewhat. Some may object to the larger parcel who would not object to rezoning the fire station property. We will do our best to expedite your primary concern.

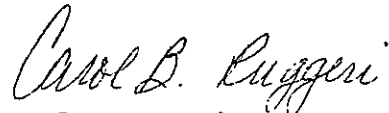
Your offer to purchase the property under the Fire Hall was received by the Council. You stipulated a time limit of June 30, 1990. The offer was conditioned upon a) the City dropping the proposed Public Facility zoning and leaving the property in Zone R-3, and b) granting the requested variance. You may wish to reconsider these conditions. If the property should be rezoned either commercial or Public Facilities we couldn't respond to your offer even if you were to receive a variance. If you intend enlarged facilities on the present site either course will suffice: variance (from R-3 or PF) or rezoning commercial. If you seek to protect land values against possible future sale and relocation, then land use hearings always provide a way to rezone. Your resolution of conditions attached to the offer will need to precede serious consideration by the Council of the proposed purchase. Accordingly the City hasn't taken formal action. Informally Councilors felt the amount offered, a flat \$5000.00, was inadequate to property value.

Thanks for your patience. These have been hectic months for us all. We appreciate very much the work of the Fire District. We are all volunteers on behalf of the common good of our community. I hope we can continue to work together harmoniously.

Sincerely,



Arthur O. Roberts
Building Commissioner



Carol Ruggeri, Chairperson
Planning Commission

cc: Mayor Chamberlin

Yachats Rural Fire
Protection District
P.O. Box 1
Yachats, Oregon 97498

August 15, 1990

Yachats City Council
P.O. Box 67
Yachats, Oregon 97498

Dear City Council Members:

Thank you for your letter in response to our January and April letters.

Since the rezoning of District property has still not been resolved, we are hesitant to go ahead with building plans. We would, however, like to get the ownership of the land cleared up.

You indicate in your letter that our January offer of \$5,000.00 may not be sufficient. What do you believe is a fair price?

As you know, the Yachats Fire Department has been on this property for about 50 years. Also, the City did not purchase the land--just inherited it. We offered \$5,000.00 so that you would not be accused of giving away City property. In light of the fact that the property is encumbered by our long term lease and our building plus the fact that the City has just bought the School property from another Government agency at an under-market price, we don't feel that you will be chastised for selling it for less than its bare land value. We also point out that the City enjoys fire protection at absolutely no cost, while the Fire District is required to pay the City for water, sewer and rent.

Please let us know what price you believe to be fair, or perhaps we could have a meeting to discuss the issue.

Sincerely yours,

YACHATS RURAL FIRE PROTECTION DISTRICT

Sam C. Dorning, Chairman

Yachats Rural Fire
Protection District
P.O. Box 1
Yachats, Oregon 97498

April 10, 1991

Mr. James Ruggeri, Attorney
City of Yachats
P.O. Box 345
Yachats, Oregon 97498

Dear Mr. Ruggeri:

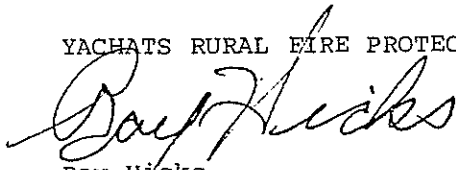
You have asked the Yachats R.F.P.D. Board to respond to your latest proposal by the City Council meeting on April 11.

At the board meeting of April 8, 1991, the Board made the decision to abandon our attempt to buy the ground under one-half of our Fire Department building. We will continue to operate under the terms of our lease.

Thank you for your efforts to arrive at a price satisfactory to both the City and the Fire District. It appears to us, however, that we cannot spend a great deal of taxpayer's money to acquire the land when there is no assurance that we will be able to expand or to sell the land and building that we own.

Sincerely yours,

YACHATS RURAL FIRE PROTECTION DISTRICT


Ray Hicks
Vice-Chairman

Yachats Rural Fire
Protection District
P.O. Box 1
Yachats, Oregon 97498

May 15, 1991

City Council
City of Yachats
P.O. Box 345
Yachats, Oregon 97498

Dear Councilors:

The Board of Directors of Yachats Rural Fire Protection District wishes to thank you for sending City Attorney Jim Ruggeri to our meeting with your proposals regarding Lots 8700 and 8701.

The Board decided that we would like to accept your offer to sell the land to us for \$1.00 while reserving one-half of any future sale proceeds for the City.

Would you please have your attorney draw up some definite wording on how the sale proceeds split would be computed before we take any final action?

We request that as a part of the arrangement that we would be given title to the property.

We realize that this must go to a vote of the people and that we have agreed to pay one-half of the cost. While we would like to go ahead immediately with the transaction, we do not believe that a special election is necessary. There is no particular hurry on our part. It is more important that this all be straightened out correctly.

Please call Sam Dorning or me if you have any questions or when there is anything we can do to help with the language of the agreement.

Sincerely yours,

YACHATS RURAL FIRE PROTECTION DISTRICT

Donna L. Brewer

Donna L. Brewer, Secretary/Treasurer

James L. Ruggeri
ATTORNEY AT LAW
P.O. Box 669
Yachats, Oregon 97498
(503) 547-4242

hand delivered
9/4/91 10:39 AM
unsigned

September 3, 1991

Mrs. Donna Brewer
Yachats Rural Fire Protection District
P. O. Box 1
Yachats, Oregon 97498

Re: Second Street property

Dear Donna:

The Council is in receipt of your response to the City's counter offer which may have been misunderstood. It is perplexing to understand the District's hesitancy to enter into a sales agreement involving the property. The City basically accepted your offer of 3/4 - 1/4 split with the provision that if the District sold the property within the first ten years then the split would be 50 -50. Do you plan to sell within 10 years?

The City's last offer was to either split any future sale proceeds 60% District - 40% City or for the first 10 years to have a 50 -50 split and after 10 years the split would be the Districts proposed 75% District - 25% City. The City is willing to enter into such an agreement to help provide for the Districts base of operation to remain at the present location. The 10 year stipulation is a means of ensuring that if the District sold the property within 10 years the City would receive an equitable share.

During these negotiations, I have often heard that the building belongs to the Fire District. I would encourage you to discuss ownership of the building with your attorney. In my discussions with Ray Hicks we were trying to agree on value of the land. The City is not looking at absolute value but the concept of providing for the citizens of Yachats.

The Council is not interested in the legal issues. They want to allow the District to renovate their facilities and have a comfort level about expending District funds on City owned property. There are two elements to this dilemma. First, the District encompasses an area much larger than the City's boundaries. Second, the Yachats voters recently required a vote if any city owned property if sold. The City Council is required to manage the assets of the City and thus can not "give" the property to the District.

duff

The Council would like to have the fire hall/trucks/equipment stationed within the City limits. With the renovated water system and additional storage capacity the fire rating for the City should go down. If the fire station were to move the rating may go up. A question that has not been answered is what are the Districts plans for a new fire station? If the District is going to renovate the existing building and stay "forever" then what difference does the split or number of years make?

A new possibility is the City will "sell" for \$1.00 the property to the District so long as the District maintains a working fire station including fire truck and equipment within the City limits. You can't beat that - no cash (we can all help raise the construction funds) and all you have to do is fulfill the purpose of the District and maintain a working fire station in the City.

There is a September 5 deadline for the November ballot. However this is an important issue. The ballot could also be the focal point to kick off the construction funding. You may want to take the opportunity of the election to show people plans for the new building. If you have any other ways to structure the transaction please let me know. Give me a call if you'd like to proceed.

Sincerely,

Jim Ruggeri

cc: City Council