Submitted:	January 2016
OHD Approval:	March 7, 2016
WRD Approval:	September 12, 2016 w/Amendment
City Council Adopted:	October 11, 2016

CITY OF SWEET HOME

WATER MANAGEMENT, CONSERVATION, AND SYSTEM MASTER PLAN

Prepared For:
City of Sweet Home
1140 12th Avenue
Sweet Home, OR 97386

Prepared By:
City of Sweet Home Staff

Engineering Oversite Provided By:
Erwin Consulting Engineering, LLC
33923 Bond Road
Lebanon, OR 97355
(541) 259-2190

Exp 12-31-2017

PUBLIC HEALTH DIVISION
Center for Health Protection, Drinking Water Services
Kate Brown, Governor

Oregon Health Authority

444 A Street
Springfield, OR 97477
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March 7, 2016

Scott Laroque
City of Sweet Home
P.O. Box 750
Sweet Home, OR 97386

Re: **Master Plan (PR#2016-20)**
City of Sweet Home (PWS# 00851)
Final Approval

Dear Scott Laroque:

Thank you for your submittal for plan review for the Water Management, Conservation, and System Master Plan for the City of Sweet Home to the Oregon Health Authority's Drinking Water Services (DWS). On February 23, 2016, our office received the master plan and the plan review fee of $4,125. At this time DWS has determined that the Master Plan submitted is complete and grants final approval.

If you have any questions or would like this in an alternate format, please feel free to call me at (541) 726-2587 x29.

Sincerely,

Rebecca Templin, P.E.
Regional Engineer
Drinking Water Services

cc: Julie Wray, DWS Portland
Betsy Parry, DWS Springfield

BEFORE THE WATER RESOURCES DEPARTMENT
OF THE
STATE OF OREGON

In the Matter of the Proposed Water Management and Conservation Plan for the City of Sweet Home, Linn County	)))	FINAL ORDER APPROVING A WATER MANAGEMENT AND CONSERVATION PLAN

Authority

OAR Chapter 690, Division 086, establishes the process and criteria for approving water management and conservation plans required under the conditions of permits, permit extensions and other orders of the Department.

Findings of Fact

1. The City of Sweet Home (City) submitted a Water Management and Conservation Plan (plan) to the Water Resources Department (Department) on February 16, 2016. The required statutory fee for review of the plan was received by the Department on February 17, 2016. The plan was required by a condition set forth under the City's previously approved plan (Sp. Or. Vol. 77, Pg. 330-332) issued on March 2, 2009.

2. The Department published notice of receipt of the plan on March 1, 2016 as required under OAR Chapter 690, Division 086. No comments were received.

3. The Department provided written comments on the plan to the City on May 17, 2016. In response, the City submitted a revised plan on September 2, 2016.

4. The Department reviewed the revised plan and finds that the revised plan is consistent with the relevant requirements under OAR Chapter 690, Division 086.

Conclusion of Law

The Water Management and Conservation Plan submitted by the City of Sweet Home is consistent with the criteria in OAR Chapter 690, Division 086.

This is a final order in other than a contested case. This order is subject to judicial review under ORS 183.484. Any petition for judicial review must be filed within the 60-day time period specified by ORS 183.484(2). Pursuant to ORS 536.075 and OAR 137-004-0080, you may petition for judicial review or petition the Director for reconsideration of this order. A petition for reconsideration may be granted or denied by the Director, and if no action is taken within 60 days following the date the petition was filed, the petition shall be deemed denied.

Now, therefore, it is ORDERED:

Duration of Plan Approval:

1. The City of Sweet Home's Water Management and Conservation Plan is approved and shall remain in effect until September 2, 2026, unless this approval is rescinded pursuant to OAR 690-086-0920.

Development Limitation:

2. The limitation of the diversion of water under Permit 49959 established in the Final Order approving the City's previous WMCP issued on March 2, 2009 remains unchanged. Subject to other limitations or conditions of the permit, therefore, the City of Sweet Home remains authorized to divert only up to 3.51 cfs (*out of the total permitted 5.5 cfs*) of water under Permit 49959.

Plan Update Schedule:

3. The City of Sweet Home shall submit an updated plan meeting the requirements of OAR Chapter 690, Division 086 within 10 years and no later than March 2, 2026.

Progress Report Schedule:

4. The City of Sweet Home shall submit a progress report containing the information required under OAR 690-086-0120(4) by September 2, 2021.

Other Requirements for Plan Submittal:

5. The deadline established herein for the submittal of an updated Water Management and Conservation Plan (consistent with OAR Chapter 690, Division 086) shall not relieve the City of Sweet Home from any existing or future requirement(s) for submittal of a Water Management and Conservation Plan at an earlier date as established through other final orders of the Department.

Dated at Salem, Oregon this 15 day of September, 2016.

Dwight French
Water Right Services Division Administrator, for
Thomas M. Byler, Director
Oregon Water Resources Department

Mailing date: SEP 23 2016

City of Sweet Home – Water Management, Conservation, and System Master Plan

WMCP Amendment 2016

On or about February 16, 2016, the City of Sweet Home submitted a DRAFT *Water Management, Conservation, and System Master Plan* to the OHA Drinking Water Services (OHA) as well as the Water Resources Department (WRD) for their corresponding State review. Although the document received written **Final Approval** as a "Master Plan" from the OHA as submitted, it was found by WRD to be lacking some information and/or analysis relating to requirements for a complete Water Management Conservation Plan (WMCP) as required by OAR 690-086.

Upon written notification by the WRD of the suspected deficiencies for a complete WMCP, the City corresponded with the WRD and proposed additional information for final review and approval in order to meet the provisions of an approved WMCP for the City of Sweet Home.

The information captured within this WMCP Amendment 2016 and is to become part of the complete "*Water Management, Conservation, and System Master Plan – Appendix J"* for the City of Sweet Home and is to be adopted as such.

The corrected deficiencies identified in the review worksheet provided by the State WRD (see attachments) are listed in each section by page number and section of the review worksheet e.g. DR Pg. 2 #5.

Table of Contents

Section 1 – Introduction

1.1 Background

The City of Sweet Home is located at the East-end of Linn County. Called the "Gateway to the Santiam Playground" the City of Sweet Home lies at the foot of the Cascade Mountains, and is bordered on the North by the pristine South Santiam River. Sweet Home is the third (3rd) largest city in Linn County, encompassing 6.5 square miles and was incorporated in 1893.

The City of Sweet Home owns the public water system (PWS ID 41 00851) which is currently operated jointly by City personnel and contracting partner CH2M. The City relies on the Santiam River for its drinking water source, with the point of diversion at Foster Dam, and has three storage reservoir sites with approximately 4.61 Million gallons storage capacity.

In October 1979, *James M. Montgomery, Consulting Engineers, Inc.* completed an evaluation of the City of Sweet Home's Water Supply Study and Treatment Plant System. The report was later updated in July 1980 by CH2M-Hill. Through this planning effort, various improvements and/or expansions were made to the water system.

In 1982, a Water Distribution Master Plan was prepared by *J.L. Groff Engineering* in which a subsequent update (May 14, 1997) was adopted by the City on February 10, 1998. In March 1999, a Water Treatment Plant Evaluation was completed by *Lee Engineering, Inc*. and in October 1999 a Master Water Plan Amendment was completed by *Erwin Consulting Engineering* and subsequently adopted by City Council as official updates to the City's Water System Master Plan.

The City of Sweet Home completed its current Water Management and Conservation Plan (WMCP) in 2006 which needs to be updated in 2016.

1.2 Authorization

Prior to 2006, the City of Sweet Home received final orders from the Oregon Water Resources Department (WRD) extending the time to complete full beneficial use of all permitted water by October 2050. As a special condition to that order, WRD limited the amount of water the City could use until a Water Management and Conservation Plan (WMCP) prepared per Oregon Administrative Rule (OAR) Chapter 690, Division 86 had been submitted and approved.

A "DRAFT" WMCP was submitted to WRD February 2006 in which a Final Order was received March 2, 2009 approving the City's WMCP until March 2, 2019. The approved final order however required the submittal of an updated WMCP, due by February 21, 2016 to WRD.

Per OAR 333-061-0060(5) community water systems serving 300 or more service connections must maintain a current master plan that has been reviewed and approved by the Oregon Health Authority (OHA). Due to the information overlap required of WMCP's and Master Water Plans, water suppliers are encouraged to consider updating Master Water Plans while creating a WMCP and wrapping the WMCP within the Master Water Plan.

Given the Water System Master Plan for the City of Sweet Home is beyond 20 years old; the subsequent reviews and updates focused primarily on specific aspects and changes to the water system; and the current WMCP is required to be updated; the City of Sweet Home

desires to complete a combined Water Management & Conservation Plan and Water System Master Plan.

1.3 Project Objectives

The purpose of this study is to evaluate the City's water system with respect to its existing and future needs; identify improvements and costs to meet those needs; provide the City with a design guide for future growth of the City's water system; and to document the City's use, management, and conservation of water resources as required to satisfy conservation and management requirements.

It is intended that the information contained herein will assist the City in the management, planning, and implementation of capital improvements to the water system. It will also guide the City in their efforts to manage and conserve water resources. Costs given in this plan are in 2015 dollars.

The main goals of this plan are as follows:

- Create working maps and descriptions of the City's existing overall water system.
- Update population projections and determine present and future water needs.
- Review existing conservation techniques and implement new conservation efforts.
- Implement a water supply curtailment strategy.
- Identify water system deficiencies with associated costs for recommended improvements.
- Evaluate financing options for the City of Sweet Home in order to complete any necessary upgrades.

Section 2 – Regulatory Requirements

2.1 Regulating Agencies (WMCP 690-086-0) 140-2, 170-1

Water use regulations considered under this Master Plan include the Safe Drinking Water Act (SDWA) and amendments as administered by the Oregon Health Authority (OHA) under OAR 333, as well as water rights and water use, management and conservation regulations administered by the Oregon Water Resources Department (OWRD). A brief overview of regulatory considerations and the applicability to the City is presented below. This overview is for reference only and does not include all requirements. Portions of OAR 333-061 covering water systems and the requirements for management and conservation of OAR 690-086 are included as Appendix C of this plan.

- Water Treatment & Distribution Regulations and Standards:

  Congress passed the original Title XIV of the Public Health Service Act, commonly known as the Safe Drinking Water Act, in 1974 with amendments passed in 1986 and 1996. The SDWA are federal water quality regulations affecting all public water systems. Regulations under the SDWA are promulgated by the U.S. Environmental Protection Agency (USEPA) and administered by the OHA. OHA is the primary regulating authority for public drinking water systems. The requirements of the SDWA are implemented by Oregon under Oregon's Drinking Water Quality Act of 1981 (ORS 448 as amended). In practice, the Oregon Drinking Water Standards match the national standards established under the SDWA and OHD has up to two years to adopt each federal rule after it is finalized.

  OAR 333-61 outlines the responsibilities of the water suppliers, maximum contamination levels, treatment requirements, sampling, reporting, public notice requirements, operation and maintenance requirements, and cross connection/backflow standards. It also contains the minimum construction standards and plan review requirements for construction of a new or modification of an existing public water system.

- Water Conservation and Management:

  OWRD is the state agency with the responsibility of making sure that the requirements of OAR 690-086 are met. The rules of OAR 690-086 provide a process to promote efficient use of the state's water resources and to facilitate water supply planning. The WMCP covered by these administrative rules, is intended as a tool OWRD uses to require water suppliers to implement water conservation measures and plan for future demands.

2.2 Compliance

The City strives to maintain high water quality and has had a strong record in complying with drinking water requirements and standards, particularly since 2009. The City was designated as an “Outstanding Performer" following the completion of their 2015 water system survey. The criteria for outstanding performance are: No Maximum Contaminant Level (MCL), Action Level, or Treatment Technique violations in the last 5 years; No more than one monitoring or reporting violation in the last 3 years and the violation must be resolved; No significant deficiencies or rule violations identified during the current water system survey; and has not had a waterborne disease outbreak attributable to the water system in the last five years.

In the past five years, since the construction of the new Water Treatment Plant, the City of Sweet Home has had no violations or been required to issue public notices regarding water quality.

2.3 Future Regulatory Compliance

At this time, there are no expected future regulatory requirements that will affect the Sweet Home Water System or this plan.

Section 3 – Study Area and Planning Considerations

3.1 Study Area

The City of Sweet Home is located in Linn County in the Willamette Valley 50 miles southeast of Salem and 44 miles northeast of Eugene, adjacent to the South Santiam River and Foster Lake. The Willamette Valley is located between the Oregon Coast on the west and the Cascade Mountains to the east. It covers about 3,900 square miles from Eugene in the south to Portland in the north.

Sweet Home is bordered to the north and northwest by the South Santiam River, to the east by Foster Lake, and to the south and southwest by the Chandler Mountains, which serve as a natural Urban Growth Boundary and city limit. Santiam Highway (US 20) is the main access road to the City and it passes through Sweet Home approximately 20 miles east of Interstate 5. The highway connects Sweet Home with the Cities of Lebanon to the northwest and Cascadia to the east. Other access roads to Sweet Home are State Route 228 and Route 3, which connect to Crawfordsville and Brownsville. A main east-west rail line also passes through the City.

The study area for this report is consistent with the Urban Growth Boundary (UGB) established by the City's Comprehensive Plan. Although there are several properties outside the current city limits that receive municipal water service, the City has a current policy of only servicing residents with municipal water that are within the city limits.

The city and surrounding unincorporated rural area, locally known as the Sweet Home Valley, encompass approximately 18 square miles (11,520 acres). Land use and development is governed largely by the local topography. The city is bordered by hills, resulting in the town layout occurring in an east–west orientation.

Approximately 15 percent of the vacant land within the city is unsuitable for development and the majority of the undeveloped land has been designated for urban residential development. The commercial district extends along U.S. Highway 20 and is concentrated in downtown Sweet Home between 18th and 9th avenues. This commercial district is bordered by high- and medium-density residential areas. Industrial land uses are concentrated along the highways through the center of town, but outside of the commercial areas.

The UGB for Sweet Home encompasses approximately 3,689 acres with roughly 3282 acres within the city limits. The land use within the UGB is comprised of approximately 50% residential; 8% industrial; 6% commercial; 25% Planned Recreational; 5% Public; and 6% water.

The planning area for this plan is limited to the land within the present UGB. The improvements recommended in this plan are based on development of land with the UGB in its present location. It is assumed that no significant development will occur within the study area which will require major changes to the existing zoning, and that there will be no significant expansion of the UGB within the study period. Changes in any of these assumptions could change the recommendations contained in this plan. Should significant changes in any of the above occur, this plan should be updated accordingly. The population served by the water system within the UGB is covered in Section 3.5.

3.2 Climate and Rainfall Patterns

Sweet Home generally has a moderate climate, characterized by warm, dry summers and cool winters with abundant rain and some snow. There are brief periods in the summer when temperatures exceed 80 degrees Fahrenheit (°F), as well as brief periods in the winter when temperatures drop below freezing. The coastal mountain range generally breaks the prevailing Pacific storm fronts, causing the mid-Willamette region to receive roughly half of the annual rainfall experienced in the coastal areas. All climate data reported are from the Western Regional Climate Center. The Foster Dam weather station provides data for the region near Sweet Home. Current reported data span 1969 to 2012.

The average annual precipitation at Sweet Home is 54.41 inches. Essentially all of the precipitation is in the form of rain; snow rarely exceeds minor flurries. The average annual snowfall is 1.2 inches. About 65 percent of the rainfall occurs from November through March.

The mean and extreme temperatures recorded at Foster Dam, located at the eastern end of Sweet Home, are summarized in Table 3.1. Maximum and minimum temperatures are fairly mild, although winter temperatures occasionally fall well below freezing. Freezing temperatures have been experienced from September through May. Although subfreezing temperatures may persist long enough to freeze water in aboveground facilities, they do not last long enough to be of concern for buried facilities. The highest summer temperature recorded during the period of record was 106°F.

Table 3.1 – Area Temp Summary

Month	Maximum temperature (F)	Minimum temperature (F)	Average temperature (F)
January	67	0	40.8
February	71	2	43.4
March	79	22	46.4
April	85	22	49.8
May	96	28	55.0
June	102	35	60.2
July	106	39	65.7
August	105	36	65.6
September	102	32	61.1
October	93	20	53.1
November	75	16	45.5
December	69	0	40.7
Annual	106	0	52.3

Note: Temperature data from Foster Dam, 1969–2012. Western Regional Climate Center http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?or3047

3.3 Topography

Figure 3.1 shows the study area and topography. The community of Sweet Home is located in a relatively flat area with a mean elevation of 537 feet above sea level. The elevation changes within the city limits are gradual and decrease from the southern city limit at the northern slopes of Chandler Mountains, towards the north to the South Santiam River. Also, the grade decreases gradually from Foster Lake on the east toward the City center, where it starts to increase toward the western City limit. The total elevation change within city limits is approximately 250 feet.

3.4 Planning 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. For systems that do not lend themselves to economical incremental expansion, short design periods lead to excess expenditures. Water system facilities fall into this category.

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 levels. Such facilities can place economic burden upon the present population and may become obsolete before being fully used.

The OHA has established 20 years as being the proper planning period for water system improvements. This plan will evaluate the anticipated water supply, distribution, and storage needs for the next 20 years.

It should be recognized that projections into the future are subject to many variables and inaccuracies. Accordingly, it is recommended that the City review its water system capabilities and needs at 10-year intervals and update this plan as appropriate.

3.5 Population Analysis (WMCP 690-086-0)170(1)

Forecasts for populations within the Sweet Home service area were made by methodology approved by the Oregon Department of Administrative Service's Office of Economic Analysis (OEA). In 2014, the OEA adopted Division Rule 32 and the population-estimating methodology defined in OAR 660-032-0040 for counties that have not prepared a population forecast for at least 10 years. The last population forecast adopted by Linn County occurred in 1999.

In accordance with OAR 660-032-0040(7), Portland State University certified the 2014 population for the city at 9,060, and concluded that the city accounted for 7.57 percent of Linn County's total population. The 2015 OEA population estimate for Linn County is 121,142. The corresponding Sweet Home population for 2015 is therefore 9,170.

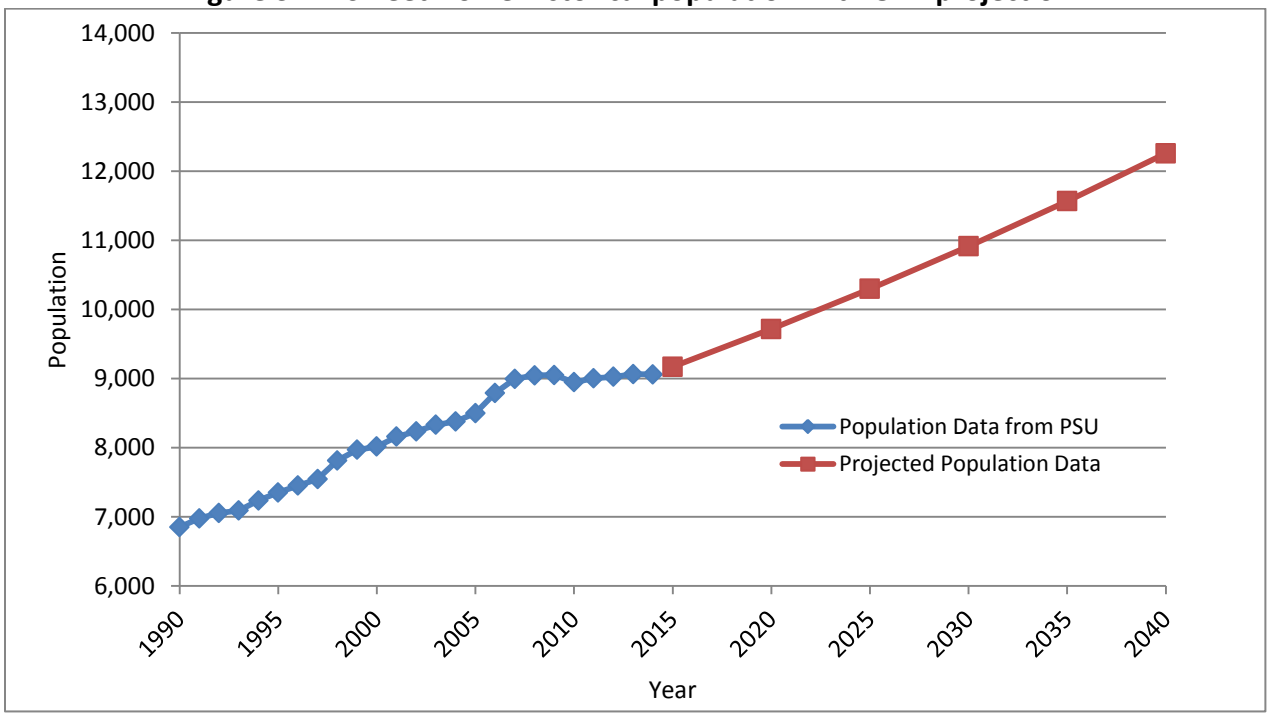
In accordance with OAR 660-032-0040(6), the annual average growth rate (AAGR) predicted for Linn County is 1.168 percent for the period 2015 to 2040; application of this growth rate to the city 2015 population estimate results in the projections as shown on Table 3.2.

Table 3.2 – Existing and Projected Population Data

Year	Total population	Increase from 2015
2015	9,170	0
2020	9,718	548
2025	10,299	1,129
2030	10,915	1,745
2035	11,567	2,397
2040	12,259	3,089

Historical population data for the city from 1990 to 2014 were obtained from the Portland State University Population Research Center. The data are shown graphically on Figure 3.2 along with the OEA population projection for the years covering 2015 to 2040.

Figure 3.2 – Sweet Home historical population with OEA projection



Reasonable growth for purposes of this Facility Plan is defined as the projected growth in the service area over the 20-year planning period in accordance with OEA's Division Rule 32, and the population-estimating methodology defined in OAR 660-032-0040.

Section 4 – Description of Existing System

4.1 Source Water (WMCP 690-086-0) 140-1, 3, 5, 7

The source of water for the City of Sweet Home is Foster Reservoir, a flood control Dam placed on the South Santiam River, a tributary of the Santiam River, which is in turn a tributary of the Willamette River. The South Santiam River runs from east to west and serves as both the northern city limit and the northern Urban Growth Boundary (UGB) for the City of Sweet Home. It is situated in the Willamette Basin of Western Oregon and is recharged by precipitation from a 557-square mile area, which receives drainage for Quartzville Creek, the Middle Santiam River, and South Santiam River, which are high up in the Cascade Mountains. Wiley Creek also flows into the South Santiam River downstream of Foster Dam Reservoir.

The source water provided to the treatment plant property is received from Foster Reservoir through a supply pipe installed in Foster Dam (built by the USACE in early 1960) in which a 42" high capacity raw water intake screen was placed. Water supply then flows via gravity through approximately 5,200 linear feet of supply line to a pump house at the Water Treatment plant located at 1500 47th Avenue, approximately 1 mile to the west of Foster Dam.

The official point of diversion for the raw water supply is described as follows:

NW1/4 NE1/4, SECTION 27, T 13 S, R 1 E, W.M.; 1048 FEET SOUTH AND 697 FEET EAST FROM THE N1/4 CORNER OF SECTION 27.

4.2 Treatment Facility

In April 2008 the City began the official bid process for the construction of a new 6.0 Million Gallons per Day (MGD) water treatment plant including 17,280 sq. ft. building consisting of three (3) 1,400 gallons per minute. filter units; a clear-well, backwash ponds, holding pond and pump station; 2,000 ft. of raw water lines; and 3,150 ft. finished water lines. The project was efficiently and effectively completed and went "on-line" August 2009.

The treatment plant contains 3 filter trains and 3 finished water pumps. Each filter train is independent of one another and each designed to produce 2 MGD. The approved maximum discharge rate into the distribution system is 2600 Gallons per Minute (GPM) as per Oregon Health Authority. This is equivalent to 3.7 MGD and is equivalent to two finished water pumps running continuously.

This "3-Train system" is designed to meet 67% capacity (4 MGD) should one filter train be out of service for repairs or maintenance. This also allows the system to only use enough source water necessary to meet consumer demand.

4.3 Reservoir

There are five finished water storage reservoirs with a total capacity of 4.61 million gallons (MG) available within the City system at three separate locations. Three in-ground type concrete reservoirs are located on 10th Avenue in the southwestern part of the City and in total hold 2.5 MG finished water. The largest of all the reservoirs, with a capacity of 2 MG, is located on 49th Avenue in the southeast part of the City and an above-ground reinforced concrete reservoir. The fifth and smallest reservoir is an above ground steel structure holding 0.11 MG

and is located off of Nandina Street just west of the city limits. Table 4.1 is a summary of the available storage.

Table 4.1 – Finished Water Storage

Location	Reservoir No.	Storage (MG)	Overflow Elevation (ft)
10th Avenue	1	0.30	765
10th Avenue	2	0.70	765
10th Avenue	3	1.50	765
49th Avenue	4	2.00	765
Nandina St.	5	0.11	815
Total		4.61	

The City attempts to perform interior cleaning, maintenance, and inspection on each reservoir site every three (3) years. The last maintenance was completed on the reservoir site at 49th Avenue in 2014 by an underwater diving contractor and included interior cleaning and inspection.

4.4 Distribution (WMCP 690-086-0)170-1

The City of Sweet Home distribution system consists of approximately 288,141 linear feet of waterline which range in size from <=2" to 24". The approximate lengths of each size are shown below in Table 4.2. Two-inch pipes are fairly abundant, but a majority (75 percent of the piping) is sized from 4" through 10" in size.

The distribution system is a combination of polyvinylchloride (PVC), ductile iron, and cast iron but the exact percentage of each type is not yet known. An updated water system map has been included as part of this plan (Figure 4.1). The water system map shows the size and approximate location of waterlines, fire hydrants, valves, blow-offs, and air release valves.

Elevation changes determine the number of pressure zones in any community and the larger the elevation change, the more pressure zones there will be. Given the elevations in the City of Sweet Home gradually increase from east to west, there are only two pressure zones. The first is for elevations between approximately 600 feet to 800 feet with the second zone for those areas below 600 feet. The first zone is supplemented with 2 each 50 horsepower, 500 gallons per minute capacity pumps that operate on low and high level settings on storage reservoir #5.

Table 4.2 – Waterline System Sizes

Waterline Size	Approximate Linear Feet (LF)	% Total
24”	32.00	0.01
16”	15,147.00	5.26
12”	19,991.00	6.94
10”	55,013.00	19.09
8”	75,463.00	26.19
6”	63,223.00	21.94
4”	22,534.00	7.82
3”	5,912.00	2.05
2”	29,241.00	10.15
<2”	1,585.00	0.55
Total	288,141.00	100.00

Major improvements completed in the distribution system previously identified within the Water System Master Plan Update of 1997 include:

Priority Level 1

- Approximately 2,800 linear feet of 16” waterline placement on Airport Road,
- Approximately 1,900 linear feet of 12” waterline on 47th Avenue

Priority Level 2

- Placement of water storage reservoir for the “Strawberry Heights” development area to be used in conjunction existing area pump station.

Priority Level 4

- Placement of new water treatment facility at 47th Avenue.

Priority Level 5

- Approximately 1,600 linear feet of 12” waterline on 47th Avenue.

4.5 Services and Customers Served (WMCP 690-086-0)140-6, 150-4 b

The City of Sweet Home has 2,956 active water services as of November 2015. These services are broken down according to the following classifications:

Table 4.3 – Services

Type of Service	Number Accounts
Residential	2,646
Multi-Family	75
Hotel / Motel	3
Commercial	181
Industrial	12
Medical	6
Government	52
Irrigation / Fire	19
Other	0
Total	2,994

Although the cost of water usage in Sweet Home is the same regardless of the customer "type" as referenced above, the City does breakdown accounts based upon the following classifications. This allows the City to examine usage patterns as desired when examining potential usage and/or user rates. The actual rate charged for service (base & commodity) is described later in Section 7.5 of this report.

- *Residential* – Residential use in the City of Sweet Home is typical for use among small rural communities. Meter sizes for this type of service is normally the ¾" meter and would typically only have larger service meters if plumbing code required based upon the planned usage. Typical outdoor use would normally be for yard and/or vehicle maintenance.
- *Multi-family* – This category is used to identify services used for "residential purposes" as above but is at locations where more than a single family resides; this includes duplexes and apartments. Service meter size will typically be from the smallest ¾" meter up-to 2" meter based upon service need.
- *Hotel / Motel* – Residential type use yet at known service locations.
- *Commercial* – Services in this category include offices, retail, churches/meeting halls, restaurants, hair salons, etc. and may or may not require large amounts of water usage per month.
- *Industrial* – Water users in this category would typically include service types consistent with some sort of manufacturing expectation and/or general need for larger service meters.

- *Medical* – This category could be included within "Commercial" but is separated for general knowledge purposes herein as well as for other report needs.
- *Government* – This category of service includes School District, Municipality use, and all other levels of government in which service is provided within the City including County, State, and Federal accounts.
- *Irrigation / Fire* – Account that is specifically set up for irrigation and/or fire usage; typical assignment of this service type is athletic fields, event centers, parks, etc.
- *Other* – Services that can't be, or hasn't yet been assigned to a particular service type.

Water service readings are conducted monthly by *MeterReaders, LLC* with the readings uploaded electronically into our "Springbrook" billing software system. Water usage is measured per 100 cubic feet (CCF) and recorded into the system. Billing is then generated based upon these readings "rounding down" to the nearest CCF. Table 4.4 below shows the number of accounts per usage range.

Table 4.4 – Accounts per usage level

Usage Range (Cubic Foot)	# Accounts
0-99	360
100-400	1,479
500-1,000	948
1,100-1,500	103
1,600-2,000	35
2,100-2,500	16
2,600-3,000	6
3,100+	47
Total	2,994

4.6 System Leakage (WMCP 690-086-0)140-9

The City has a fully metered system and is able to keep track of monthly water quantities pumped from the water treatment plant as well as the amount of water provided (billed and unbilled) which is the total of all system water meters. Recent yearly totals since 2007 are shown below in Table 4.5. The data within the table also takes into account water the City uses for system/fire hydrant flushing and recorded water used by the local Fire District. The City estimates that at least 600,000 gallons, on average, are used for these items each year although the exact amount is an inexact science due to estimations being made of actual use. On average, the City typically sees yearly water loss of 28% from 2007 – 2014. The overall lost water percentages is considered higher than the 15% or lower of typical acceptance.

There is some concern over lost water as some of the monthly percentages range from negative values to as much as 42%. The best explanation for this large range in percentages is poor record keeping of authorized water use and perhaps timing of meter readings. Another reasonable explanation is the potential for unauthorized water use of fire hydrants. Service meters are typically read and recorded during a seven day period beginning on, or near the 20th of each month while the production meters are read on a calendar month. Therefore, there will be slight discrepancy when comparing monthly production with monthly use, as any use by a customer after the meters are read will be recorded as use in the following months.

Water leakage can come from older small lines, those smaller than 4", predominantly 2" in size, which deteriorate during long periods since construction. The 2" lines in particular have been found to have many slow "pin-hole" style leaks, some of which do not show up at ground level. The City has a quick response to finding and repairing the leaks that become evident on the surface, and a program to replace the older lines over time. The 2" Replacement Program and the Leak Maintenance Repair programs are described in greater detail in Section 6.3 below.

It is important that the City continues to strive to obtain accurate accounts of their water use in order to track the overall water system performance. Consistent high values raise the concern of system leaks, inaccurate metering, and/or unauthorized use.

Table 4.5 – Lost Water

Year		January (MG)	February (MG)	March (MG)	April (MG)	May (MG)	June (MG)	July (MG)	August (MG)	September (MG)	October (MG)	November (MG)	December (MG)	Fire & Flush (MG)	Total (MG)
2007	Raw Wtr	33.97	28.47	23.89	28.64	31.70	36.90	43.00	42.00	33.20	29.90	34.00	36.40		402.08
	Unaccounted Water	12.23	7.41	4.46	6.83	10.99	8.01	7.53	5.63	1.56	0.23	8.14	15.13	0.12	138.86
	% Loss	36.01%	26.02%	18.66%	23.84%	34.66%	21.70%	17.52%	13.40%	4.71%	0.77%	23.95%	41.57%		34.54%
2008	Raw Wtr	28.00	22.70	25.40	26.20	26.50	34.65	57.50	48.60	38.60	28.00	26.60	26.40		389.15
	Unaccounted Water	9.72	(1.00)	5.20	5.33	6.90	8.32	20.74	6.58	7.75	6.63	1.21	0.53	0.61	128.61
	% Loss	34.72%	-4.41%	20.46%	20.34%	26.04%	24.02%	36.07%	13.54%	20.08%	23.69%	4.54%	2.00%		33.05%
2009	Raw Wtr	25.10	21.70	21.16	22.49	23.05	28.54	36.34	28.75	23.79	37.55	23.73	23.17		315.36
	Unaccounted Water	2.66	1.68	1.71	(0.20)	(1.36)	0.17	(3.11)	(12.28)	(7.18)	13.92	(10.75)	(4.32)	1.42	31.57
	% Loss	10.59%	7.74%	8.08%	-0.91%	-5.92%	0.59%	-8.56%	-42.71%	-30.18%	37.07%	-45.29%	-18.66%		10.01%
2010	Raw Wtr	20.95	16.26	19.80	20.33	20.60	21.60	32.80	34.90	22.60	20.20	19.30	19.90		269.24
	Unaccounted Water	(0.42)	(4.07)	(0.15)	(1.44)	0.79	0.15	(3.82)	(3.66)	(4.05)	(0.28)	(3.41)	(1.68)	1.15	28.62
	% Loss	-2.03%	-25.06%	-0.73%	-7.07%	3.84%	0.72%	-11.64%	-10.48%	-17.92%	-1.39%	-17.66%	-8.43%		10.63%
2011	Raw Wtr	18.70	18.30	19.20	18.05	19.01	21.54	27.86	31.84	27.08	20.63	20.09	25.08		267.38
	Unaccounted Water	(4.26)	(3.95)	1.04	(2.83)	(1.88)	(2.35)	2.05	2.41	(9.30)	(1.59)	0.09	1.82	0.37	31.74
	% Loss	-22.79%	-21.59%	5.39%	-15.70%	-9.88%	-10.92%	7.35%	7.58%	-34.35%	-7.70%	0.43%	7.26%		11.87%
2012	Raw Wtr	27.50	25.64	28.12	27.18	29.84	28.45	34.67	39.41	32.70	32.46	29.47	29.70		365.14
	Unaccounted Water	6.67	4.92	7.16	8.25	5.87	3.15	10.32	3.01	2.93	5.93	7.42	8.78	0.34	125.10
	% Loss	24.24%	19.21%	25.48%	30.36%	19.68%	11.07%	29.78%	7.63%	8.96%	18.28%	25.18%	29.57%		34.26%
2013	Raw Wtr	33.68	29.03	32.20	30.08	32.67	31.32	38.68	30.08	30.51	28.41	27.57	34.33		378.56
	Unaccounted Water	13.14	7.13	13.07	10.33	9.56	5.57	11.00	1.30	4.89	7.45	7.14	11.92	0.29	150.36
	% Loss	39.03%	24.55%	40.58%	34.35%	29.27%	17.79%	28.45%	4.32%	16.03%	26.21%	25.89%	34.73%		39.72%
2014	Raw Wtr	31.62	28.91	28.91	28.47	30.95	32.90	32.90	47.60	33.80	30.30	29.20	29.30		384.86
	Unaccounted Water	11.33	6.89	8.75	7.52	9.04	7.44	4.08	13.35	6.64	7.30	8.41	9.27	0.49	150.71
	% Loss	35.84%	23.85%	30.27%	26.43%	29.20%	22.61%	12.39%	28.06%	19.64%	24.10%	28.79%	31.63%		39.16%
2015	Raw Wtr	29.80	28.78	26.37	29.83	30.14	36.74	41.98	42.34	32.20	31.70				329.88
	Unaccounted Water	11.01	6.54	9.05	7.82	10.22	8.49	11.14	4.96	3.75	9.57	0.00	0.00	0.07	84.89
	% Loss	36.94%	22.74%	34.32%	26.23%	33.92%	23.10%	26.53%	11.72%	11.64%	30.19%				26%

4.7 Water Rights Schedule (WMCP 690-086-0)170-2

A water right can be perfected once the user completes construction of the facilities necessary to divert and use the water for the authorized use. Once the user submits evidence showing the water has been used in compliance with the permit conditions, OWRD issues a water right certificate. The City of Sweet Home has water right certificates as described below in Table 4.6

Table 4.6 – Water Rights

Permit #	Certificate #	Certificate - Max Allowable Water Use Cubic Feet per Second (cfs)	Permit - Max Allowable Water Use Cubic Feet per Second (cfs)
S-13151	88300	0.60 cfs	0.60 cfs
S-20525	88301	7.00 cfs	7.00 cfs
S-49959	88302	3.51 cfs	5.50 cfs
	Total	11.11 cfs	13.10 cfs

Although the City holds the three water rights certificates, Certificate #88302 is a partial certificate in which the remaining 1.99 cfs remains unperfected at this time. The Final Order for the Extension of Time for Permit Number S-49959 issued by OWRD sets the deadline for applying water to full beneficial use at October 1, 2050.

Projected water use at the end of the 20 year study period for this plan will not put the unperfected water right to full beneficial use. Therefore, the City of Sweet Home will use the October 1, 2050 date as the target date for applying water to full beneficial use. This schedule will need to be reviewed and revised based upon updated projected water demands revised in the completed 10 year update of this plan.

4.8 Water Quality

The City strives to maintain high water quality and has had a strong record in complying with drinking water requirements and standards, particularly since 2009. Surface water originating from the Central Oregon Cascades is generally of good quality. The hydroelectric impoundments created by Foster and Green Peter Dams both serve as settling basins for Sweet Home's raw water intake thereby improving water quality.

The City was designated as an "Outstanding Performer" following the completion of their 2015 water system survey. The criteria for outstanding performance are: No Maximum Contaminant Level (MCL), Action Level, or Treatment Technique violations in the last 5 years; No more than one monitoring or reporting violation in the last 3 years and the violation must be resolved; No significant deficiencies or rule violations identified during the current water system survey; and has not had a waterborne disease outbreak attributable to the water system in the last five years.

In the past five years, since the construction of the new Water Treatment Plant, the City of Sweet Home has had no violations or been required to issue public notices regarding water quality. The City's goal is to maintain this high level of water quality.

4.9 Water System Map (WMCP 690-086-0)140-8

Figure 4.1, an updated water distribution system plan can be found on the following page(s).

Section 5 – Present and Future Water Demands

5.1 General **(WMCP 690-086-0)170-3, 4**

Determining present and future water demands is the first step in assessing the City's water facilities. It is critical that current demands are evaluated to determine if existing facilities are able to meet demands. If a system is unable to successfully meet the current needs of the community, system upgrades become a high priority. A determination of the future demand is also a critical step because it establishes the capacity and size of water system components needed in the future. Water demand discussed in Section 5 is presented as the total combined water supplied from the intake structure in order to meet the needs of the City. The total produced water therefore includes all metered use, fire department use, system flushing and other lost water.

5.2 Historic and Present Demand **(WMCP 690-086-0)140-4**

Total water production for the City of Sweet Home from 2008 to September 2015 is shown in Table 5.1 below. The City averages a monthly production of 33.065 MG, with August as the month of the most production with an average of 48.283 MG and February as the lowest month with an average production of 26.833 MG produced.

Please note production numbers for 2015 were excluded from the average monthly production assumptions in the paragraph above as all twelve months have not yet been reported to the State as of the date of this report.

Table 5.1 – Reported Water Production

Year	Jan (MG)	Feb (MG)	Mar (MG)	April (MG)	May (MG)	June (MG)	July (MG)	Aug (MG)	Sept (MG)	Oct (MG)	Nov (MG)	Dec (MG)	Annual Water Production (MG)
2008	30.161	24.321	27.235	27.639	26.501	34.651	60.035	51.230	40.591	28.000	26.599	26.400	403.363
2009	25.100	21.702	21.161	22.490	23.051	28541	36.339	28.750	23.790	37.551	23.728	23.171	315.374
2010	20.949	16.260	19.799	20.330	20.600	21.601	37.000	63.029	22.601	26.501	24.579	23.601	316.850
2011	27.860	22.559	25.061	22.911	31.809	26.329	32.461	42.119	32.578	23.592	23.100	29.991	340.370
2012	34.781	32.311	35.319	35.338	37.160	36.710	41.780	49.669	40.891	42.631	36.137	37.808	460.537
2013	41.227	35.091	39757	35.088	38.063	37.352	47.359	45.899	36.873	35.244	35.544	41.057	468.553
2014	36.749	35.586	38.001	36.013	37.645	39.359	46.786	57.284	40.014	35.104	34.947	34.941	472.430
2015	36.658	32.614	36.153	35.368	38.656	47.336	51.263	44.231	44.208	-	-	-	

To ensure the existing system is adequately sized to handle the existing demand, the Average Daily Demand (ADD) and Peak Daily Demand (PDD) have been examined. A peaking factor of 2.7, *as recommended in Water Management & Conservation Plan: A Guidebook*, was applied to the average daily usage values to account for the peak water use that occurs throughout the day. It is assumed that water demand increases during peak times (i.e., mornings, evenings, and weekends) and the peaking factor adjusts the water use values to account for this timely demand. ADD and PDD from 2008-2014 are shown in Table 5.2. In 2014 ADD for Sweet Home was 1.294 Million gallons per day (mgpd), which equates to an instantaneous production of 899 gallons per minute (gpm,). Applying the peaking factor gives a 2014 PDD of 3.495 mgpd or 2,427 gpm. With a current plant production capacity capability of 4,167 gpm, the City's current PDD is easily met.

Table 5.2 - Average & Peak Demand

Year	UGB Population	Annual Water Production	Average Daily Demand				Peak Daily Demand			
			gpd	gph	gpm	gpcpd	gpd	gph	gpm	gpcpd
2008	9,045	403.363	1,105,105	46,046	767	122	2,983,783	124,324	2,072	330
2009	9,050	315.374	864,038	36,002	600	95	2,332,903	97,204	1,620	258
2010	8,945	316.850	868,082	36,170	603	97	2,343,822	97,659	1,628	262
2011	9,005	340.370	932,520	38,855	648	104	2,517,805	104,909	1,748	280
2012	9,025	460.537	1,261,745	52,573	876	140	3,406,711	141,946	2,366	377
2013	9,065	468.553	1,283,706	53,488	891	142	3,466,007	144,417	2,407	382
2014	9,060	472.430	1,294,330	53,930	899	143	3,494,690	145,612	2,427	386
Average		396.782	1,087,075	45,295	755	120	2,935,103	122,296	2,038	325

Note: gpd — gallons per day; gph — gallons per hour; gpm — gallons per minute; gpcpd — gallons per capita per day; MG/yr — million gallons per year; Est. Pop. — estimated population

5.3 Future Demand

Future demand was determined by establishing an average gallons produced per capita per day (gpcpd) from past years and applying this value to the population projection discussed in Section 3.5. From 2008 to 2014 the average per capita production was 120 gpcpd (Table 5.2).

Table 5.3 shows the estimated population and consumption growth for the City of Sweet Home to the end of the 20-year design period. Using the peaking factor of 2.7 as explained above, the peak daily demands for each year are listed. In 2040 the City will need the capability to produce approximately 1,470,387 gpd or 1,021 gpm to satisfy the average daily demand. Given the current water treatment facility has the capability in its current configuration to produce up to 6 MGD, meeting the future demand will not be a problem. In fact, utilizing the "3-train system" described in earlier Section 4.2, demand will be able to be met in 2040 while still allowing for one train to be out of service if necessary for repairs and/or maintenance.

The values in Table 5.3 should be re-evaluated within the next 10 years to make certain peak demands will continue to be met.

Table 5.3 - Projected Water Use

Year	Est. Population	Average Daily Demand - 120 gpcpd						
		Estimated Average Demand				Estimated Peak Demand (2.7 Peaking Factor)		
		(MG/Yr)	(gpd)	(gph)	(gpm)	(gpd)	(gph)	(gpm)
2015	9,166	401.463	1,099,898	45,829	764	2,969,726	123,739	2,062
2016	9,273	406.152	1,112,745	46,364	773	3,004,412	125,184	2,086
2017	9,381	410.896	1,125,742	46,906	782	3,039,504	126,646	2,111
2018	9,491	415.695	1,138,891	47,454	791	3,075,005	128,125	2,135
2019	9,602	420.550	1,152,193	48,008	800	3,110,921	129,622	2,160
2020	9,714	425.463	1,165,651	48,569	809	3,147,257	131,136	2,186
2021	9,827	430.432	1,179,266	49,136	819	3,184,017	132,667	2,211
2022	9,942	435.459	1,193,039	49,710	828	3,221,206	134,217	2,237
2023	10,058	440.546	1,206,974	50,291	838	3,258,830	135,785	2,263
2024	10,176	445.691	1,221,071	50,878	848	3,296,893	137,371	2,290
2025	10,294	450.897	1,235,334	51,472	858	3,335,401	138,975	2,316
2026	10,415	456.163	1,249,762	52,073	868	3,374,358	140,598	2,343
2027	10,536	461.491	1,264,360	52,682	878	3,413,771	142,240	2,371
2028	10,659	466.881	1,279,127	53,297	888	3,453,644	143,902	2,398
2029	10,784	472.335	1,294,067	53,919	899	3,493,982	145,583	2,426
2030	10,910	477.851	1,309,182	54,549	909	3,534,792	147,283	2,455
2031	11,037	483.433	1,324,473	55,186	920	3,576,078	149,003	2,483
2032	11,166	489.079	1,339,943	55,831	931	3,617,847	150,744	2,512
2033	11,297	494.792	1,355,594	56,483	941	3,660,103	152,504	2,542
2034	11,429	500.571	1,371,427	57,143	952	3,702,853	154,286	2,571
2035	11,562	506.418	1,387,445	57,810	964	3,746,103	156,088	2,601
2036	11,697	512.333	1,403,651	58,485	975	3,789,857	157,911	2,632
2037	11,834	518.317	1,420,045	59,169	986	3,834,123	159,755	2,663
2038	11,972	524.371	1,436,632	59,860	998	3,878,905	161,621	2,694
2039	12,112	530.495	1,453,411	60,559	1,009	3,924,211	163,509	2,725
2040	12,253	536.691	1,470,387	61,266	1,021	3,970,045	165,419	2,757

Note: gpd — gallons per day; gph — gallons per hour; gpm — gallons per minute; gpcpd — gallons per capita per day; MG/yr — million gallons per year; Est. Pop. — estimated population

5.4 Fire Flows

The Insurance Service Office of Oregon (ISO) is responsible for reviewing the firefighting capabilities of various communities and fire districts. This data is needed to help establish basic fire insurance rates and considers not only the area's water system, but many other factors related to the Fire District itself. The data is analyzed using ISO's Fire Suppression Rating Schedule (FSRS) and then a Public Protection Classification (PPC) number is assigned to a community.

In 2009 ISO completed an analysis based upon criteria contained in a Fire Suppression Rating Schedule and upon conditions in Sweet Home during September 2005. The analysis resulted in a PPC of Class 4 within the city. The Class 4 applies to properties within the city and rural areas within 1,000 feet of a fire hydrant, five (5) road miles of a fire station, and with a needed fire flow of 3,500 gpm or less. Class 8 (dwellings) and 9 (commercial) apply to properties within five (5) road miles of a fire station but beyond 1,000 feet of a fire hydrant.

Along with the community's fire department capabilities, a community's PPC is based on fire flows and water supply provided by the water system. The ISO defines these two functions as Needed Fire Flows, which are representative building locations used to determine the theoretical amount of water necessary for fire suppression purposes and water supply, which includes condition and maintenance of hydrants, alternative water supply operations, and the amount of available water compared with the amount needed to suppress fires up to 3,500 gpm.

The 2009 Public Protection Classification summary report for the Sweet Home determined the Needed Fire Flows for nine locations within the city, of which five indicated available flow deficiencies at the time of the survey; four of which was specifically due to existing fire hydrant flow restrictions. The summary of the noted deficiencies are as follows:

Table 5.4 — Needed Fire Flows

Hydrant #	Needed Flow (gpm)	Available Flow @ 20 psi (gpm)	Location	Remarks
094	4500	1200	18th Avenue, N of Santiam Hwy	Hyd. Restriction 3500 gpm also
236	4500	5100	53rd Avenue and Poplar	Hydrant Restriction 2920 gpm
162	3000	6200	S. Santiam Hwy, W of Clark Mill Rd	Hydrant Restriction 2260 gpm
119	5500	2600	951 22nd Avenue	Hydrant Restriction 2170 gpm
302	4500	3700	47th Avenue, S of Nandina St	Hydrant Restriction 1920 gpm

The **Basic Fire Flow** for the community is determined by the review of the Needed Fire Flows for selected buildings in the community. Since the FSRS develops a PPC for properties with a Needed Fire Flow of 3,500 gpm or less, the maximum that the Basic Fire Flow can be is 3,500 gpm. From the locations above the **Basic Fire Flow for Sweet Home has been determined to be 3,000 gpm**.

For maximum credit, the Needed Fire Flows should be available at each location in the City up to 3,500 gpm. Needed Fire Flows of 2,500 gpm or less should be available for 2 hours; and Needed Fire Flows of 3,000 and 3,500 gpm should be available for 3 hours.

In order to meet the maximum credit criteria, the City needs to provide fire storage of 630,000 gallons (3,500 gpm for 3 hours) for fire flows plus the volume to meet peak daily demand. This equates to a 2015 flow requirement of 3,599,726 gallons (2,969,726 gallons + 630,000 gallons) and a 2040 requirement of 4,600,045 gallons (3,970,045 gallons + 630,000 gallons).

To meet the Basic Fire Flow of 3,000 gpm, the City needs to provide fire flow of 540,000 gallons (3,000 gpm for 3 hours) for fire flows plus the volume to meet peak daily demand. This equates to a 2014 storage requirement of 3,509,726 gallons (2,969,726 gallons + 540,000 gallons) and a 2040 storage requirement of 4,510,045 gallons (3,970,045 gallons + 540,000 gallons).

With a current maximum storage capacity of 4,610,000 gallons, the City's reservoirs provide the required volume necessary to satisfy current Basic Fire Flows for three hours plus peak daily demands as well as that expected by 2040.

Section 6 – Water System Improvement Options

6.1 General

The City of Sweet Home uses surface water from Foster Reservoir, a man-made flood control lake on the Santiam River. This source water is used at the water treatment plant with a supply capacity of up to 6,000,000 gallons per day to the distribution system including storage capacity of approximately 4,610,000 gallons. The supply, storage, and distribution system does not currently have any major deficiencies that need to be addressed. However, below are some recommended improvements that will help improve the system and keep it operating at a satisfactory level.

The City uses WaterCAD by Bentley Systems, Version V8i for 500 pipes, for water modeling of the pipe network. The software module is refined and added to every few years. The City also uses AutoCAD Map 3D by Autodesk, Version 2016, for documenting and mapping the pipe network for projects. The City also uses ArcMAP by ESRI, Version 10, for GIS georeferencing and data asset management of the network.

6.2 Storage

The City currently has an annual program to ensure the reservoirs are inspected and cleaned on a rotational basis every 3 years and it is important this program continues and is properly funded and administered in order to maintain longevity of each reservoirs life. It is recommended the City consult with tank manufacturer representatives and/or qualified clean & inspection companies for regularly scheduled maintenance programs.

No additional storage requirements are necessary at this time due to fire flow and/or supply issues. However, due to the age and condition of the two smaller reservoirs located at 10th Avenue, Reservoir # 1 & 2, it is recommended they be replaced with a new reservoir as part of the capital improvement program. The estimated cost for such replacement is $3.3 Million Dollars.

Because the water system east of Wiley Creek to the Foster “District” is dependent on a single supply line on the highway bridge, it is recommended the City evaluate the feasibility of constructing a new reservoir in Foster to provide emergency water in the event of supply line failure. The average monthly water consumption in Foster is approximately 102,000 cubic feet (based on 2014-2015 meter reads). Storage of 75,000 gallons would provide a 3-day water supply for existing conditions, therefore to provide for future population growth we anticipate a 100,000 gallon storage minimum.

6.3 Distribution System & Pump Station

Given the improvements completed in the distribution system previously identified within the Water System Master Plan Update of 1997, there appear to be no areas in the water system with inadequate flows or pressures. However, there are at least a couple locations within the city with the potential of future subdivisions in the city which will be above the existing main tanks and pressure zones and as such, pump stations and possible tank reservoirs may need to be added, due to the height of the land area being served. Should these locations ever be built,

they will be required to have adequate storage tanks with continuously operating pump stations requiring backup power generation.

In addition to normally expected system improvements of line upsizing of existing 2" water mains as well as leak maintenance/replacement, the City has identified the need to upgrade the system with additional fire hydrants and/or blow-off as well as inter-connectivity improvements. One such inter-connectivity section improvement that should be considered is the continuation of the existing 12" water main on the north side of Hwy 20 about 1,400 feet to the east for connection to the existing 8" water main on Clark Mill Rd. This will complete the connection between Clark Mill Rd and 18th Avenue and should improve reservoir balancing flow between the sites on 49th Avenue and 10th Avenue.

These improvements will also focus on improving the fire flows and corresponding restrictions identified in Table 5.4 of the previous Section.

6.4 Treatment

The raw water inlet structure is located at Foster Dam. The inlet pipe located approximately 12 feet below the low water point on the dam. The structure includes a fine screen for keeping fish and large objects from entering the 24inch line. The screen goes through an air scour twice weekly in order to clear and built up debris. The Air Compressor building nearby is a concrete block building on the top of the Dam, with a buried Stainless Steel pipeline from it to the Intake Structure, through which air is forced to clear any debris that may accumulate. Foster lake allows large particulates to settle before reaching the inlet pipe, therefore the majority of the year the raw water contains less than 5 nephelometric turbidity units.

The Raw Water Intake line consists of two segments feeding the new Water Treatment Plant about 1 mile away. The above ground portion, which is located on the U.S. Army Corps Engineers Foster Dam property, is Ductile Iron and is anchored to the rock abutment from the Intake Portal on the Dam to where it drops underground in the administration office parking lot. The below ground portion from the office to the Plant Intake Pond is HDPE. Both materials are resilient and durable to with stand environmental or manmade contact.

The treatment plant contains 3 filter trains and 3 finished water pumps. Each filter train is independent of one another and each designed to produce 2 Million Gallons per Day (MGD). The approved maximum discharge rate into the distribution system is 2600 Gallons per Minute (GPM) as per Oregon Health Authority. This is equivalent to 3.7 MGD and is equivalent to two finished water pumps running continuously. Due to limitations of the distribution system, three finished water pumps cannot be operated at the same time as it produces too high of pressure.

Eventual breakdown of the filter media requires that a complete media change out will be required approximately every 12-15 years and will cost approximately $20,000 for each filter train. Other system upgrades and approximate costs would be:

- Installation of variable frequency drives on all raw water pumps @ $20,000 each
- Installation of variable frequency drives on a finished water pump @ $20,000

6.5 Sample Stations

The system has 15 Oregon Health Authority approved bacteriological sampling sites. Of those sites, 11 already have a designated sampling tap at the water meter. The 4 remaining sites are at locations that are at a business or public facility and would be open for regular access. At these locations the sampling occurs at a sink inside the facility (most often a bathroom), which leads to additional potential for contaminating the sample. It would be advantageous to install sampling taps at these sites in order to maintain continuous access and reduce potential for contamination. Future regulations will affect the need for additional or new sampling sites for bacteriological or other analytes (pH, Chlorine, disinfection byproducts, etc.).

6.6 SCADA System Upgrade

Maintaining the annual service agreement is essential to keeping the GE Simplicity SCADA program up to date. Though the agreement costs an annual fee of $3,800, the cost replacing the program in its entirety, due to failure, could cost over $30,000. The server computer will need replacement periodically, approximately every 5 years, as computers/electronics in general become outdated quickly.

6.7 Backup Power Generator

Currently there are no generators onsite in order operate the treatment plant in the event of grid power failure. Two generators are required in order to power the treatment plant: One for the raw water building and another for the main operations building. The breakers, receptacles, and cord are onsite to accommodate such connection to a mobile unit. The treatment building generator service breaker is 100 amp and the raw water building breaker is 70 amp. These are sized large enough to operate 1 filter train and 1 finished water pump.

6.8 Leak Detection

A key component to an effective Water Management and Conservation Plan is minimizing the lost water noted in Section 4.5 of this plan. Lost water due to system leaks can be minimized by re-implementing and/or initiating a new leak detection program. Such a program needs to begin with a complete leak detection survey of the entire distribution system, which can be done utilizing existing staff and resources or through a contract services agreement. In order for a comprehensive study to be completed as quickly and accurately as possible, it is recommended the City contract this work with a licensed leak detection contractor such as American Leak Detection. It is anticipated a survey can be completed in about five (5) days at a total cost of approximately $6,250, although actual cost will be dependent on the results of a local procurement process.

A leak detection survey records any leaks, irregularities or defects that may need to be addressed to maintain the integrity of the water system. A comprehensive report will then be submitted upon completion, which will identify leak locations, aid in prioritizing repairs and provide a record for future maintenance. The City will then review the completed leak detection survey and develop a repair schedule by prioritizing fixes based upon the severity of the water loss.

The survey is performed using the acoustic leak sounding survey tool. The survey tool is used to touch and listen to every accessible main valve, hydrant and service as necessary. Sensors are

placed at intervals determined by availability of access and location of contact points. Normally contact points will be at intervals no greater than 350 feet. If good contact is not available, a highly sensitive ground mike device will be used making physical contact to the ground over the pipe at intervals no greater than 6 feet. If ground cover is not of a hard surface, probe rods will be used at intervals of 10 feet. If ambient noise on a certain section during day time hours interferes with survey effectiveness, the work may need to be performed at night. During the survey process, high leak signal areas will be prioritized and reinvestigated before the pinpointing process is started. Pinpointing and verification of leak locations will be completed using a leak noise correlator. Two highly sensitive sensors are placed on either side of the suspected leak position. The sophisticated leak noise correlation process uses basic operator-supplied pipe data to pinpoint the leak location and display the results on screen.

Although City Staff may not have the time, training, and/or adequate resources to complete a comprehensive system survey, the City should continue to invest in their leak detection equipment and training as it will become useful in verifying and/or completing additional investigation of suspected leaks identified in the comprehensive survey.

Section 7 – Water Conservation (WMCP 690-086-0)150-All

7.1 System Meters

The City of Sweet Home's water system is fully metered. All individual water services are metered and are read and recorded on a monthly basis by contracting partner "MeterReaders, LLC" of Lake Oswego, Oregon. Meters manufactured by Sensus have been identified as the standard water service meter to be installed on each service.

7.2 Meter Testing & Maintenance

The City does not have a specific meter testing plan in place for water service meters however City personnel are diligent in replacing service meters that are beyond ten years in service. This replacement is completed through annual replacement program and/or when a meter shows abnormal use.

A service meter can be changed-out at request of City and/or customer. If customer requests the meter be checked for accuracy and the meter is less than ten years in service, the meter can be sent to a certified testing lab for verification. Should the test reflect the service meter reading inaccurately, the customer account is credited accordingly when it is to the customer's benefit to do so.

A significant number of water meters are older than 10 years and are approaching the end of their service lives. These meters are being replaced with new Sensus touch-read meters whenever possible rather than repairing them, as the city has determined replacement is more economical. The new meters are also faster to read, thus reducing costs by allowing a smaller number of meter readers. Potentially the end use data will be more accurate as well with the elimination of hand written notes. The city plans to test large water service meters, all city property service meters, and all production meters every five years and make appropriate repairs or replacement where needed.

7.3 Annual Water Audit

As identified in the WMCP Progress Report of 2010, the City has created and implemented an annual water audit program to track the amount of water diverted as well as to determine the amount of unaccounted-for water more accurately. Although the program is fairly rudimentary, we continue to find it to be effective and easy to modify as better information becomes available. The spreadsheet was created and first used for calendar year 2007 and has been improved annually. The 2014 audit labeled "Billed & Unbilled Consumption – 2014" can be found in the Appendix of this report.

The audit program is an Excel spreadsheet in which values are inputted based upon monthly reports from customer usage, both billed and unbilled consumption, as well as water treatment production records. It also includes data from fire hydrant rental usage including Fire District usage for emergency as well as training purposes, and water utilized for filter "backwash" purposes.

The City's methodology for accounting for un-metered authorized use and unauthorized use (lost water) is as follows:

1) The City utilizes *SpringBrook Utility Billing Software* for its account billing and usage purposes. For each calendar month, a "UB – Summary by Service Rate" report is generated to identify all "billed" consumption. This monthly total is then subtracted from the "UB – Consumption" report to determine the amount of "unbilled" consumption.
2) Monthly water production and run-time reports are generated with relevant information from treatment plant staff and provided in a monthly water read report. This information is also utilized for its annual "Water Use" reporting to the State that is required for water rights purposes.
3) Authorized water use that is metered and unmetered (system flushing, fire district use, City use, etc.) is estimated by the City and/or read from meters where applicable.
4) Information gathered in the above three steps is inputted in columnar form into the audit spreadsheet. Unaccounted for water (lost water) is calculated by subtracting the known usage quantities (billed, unbilled, authorized use, filter backwash, storage, fire hydrant, etc.) from the total amount water produced. The information is calculated on a monthly as well as annual basis.

7.4 Leak Detection Program

Yearly leak detection surveys, using listening equipment will be performed on major pipe mains, fire hydrants and valves. Any service connections, meters and service lines that show any indications of leaks will also be surveyed. Leaks found during the surveys will be repaired as soon as possible.

A large amount of 2-inch galvanized iron piping exists in the distribution system. These pipes are mostly old and are believed to be the cause of significant water leaks in the system. The City has an ongoing program to replace all 2-inch galvanized iron piping. Complete replacement of the pipes is expected in the year 2018.

7.5 Rate Structure & Billing

In 1999, the City of Sweet Home authorized a complete rate analysis for the water and sewer utilities that aimed to determine the revenue requirements for the water and sewer utilities; to determine the cost of the two services; and also to study and help set water and sewer rates. 1997/1998 was used as the base year in which various parameters that affected the three areas of study were determined and costs associated with them were quantified. Water and sewer rates were developed based on the findings of that report and annual rate review procedures were recommended and followed. The City of Sweet Home adopted the results from the report in Ordinance 1100 of the City's Code, which sets the water and sewer rates and the City Council is required to annually review water rates before May and set the new monthly rate for bills sent out each July. Prior to Year 2000, water rates had stayed constant for several years, but have increased almost annually since then to reflect the increasing costs of production.

The rates are based on meter size and water use, as summarized in Tables 7-1a and 7-1b. Water use fees are charged per 100 c.f. for commercial and bulk services and per 100 c.f. that exceed 400 c.f. for residential services within the city limits. A service factor rate of 1.5 times equivalent city rates is assessed for services outside the city limits. The city's water rates result

in larger water bills the more water a service uses. Hence, the rates help discourage water waste since that will lead to water wasters incurring unnecessarily large bills.

Table 7-1a
Meter Charge (Base Rate)

Meter Size	Base Rate
¾ Inch	$17.90
1 Inch	$22.38
1 ½ Inch	$28.35
2 Inch	$44.77
3 Inch	$165.68
4 Inch	$210.46
6 Inch	$314.95
8 Inch	$434.37

Table 7-1b
Water Use Charge (Commodity)

Customer Class	Commodity Charge
Residential (First 400 c.f. is included in base charge)	$7.48 per 100 cubic feet AFTER first 400
Commercial	$6.85 per 100 cubic feet usage
Bulk	$6.01 per 100 cubic feet usage

As demonstrated in the two tables above, the City of Sweet Home's water rates are based in part, on the quantity of water metered at the service connection as required by OAR 690, Division 86 rules. Basing the rest of the charges on the size of the customer service water meter serves as an indirect method of charging larger water users more since larger water meters are usually required by larger water users. This varying charge, based on the meter size, is also seen by the city as a way to vary the water charges according to the amount of water used by water customers.

7.6 Public Education Program

Continuing in 2015 and beyond, the City of Sweet Home will continue with a public education program that will be targeted toward water customers, particularly residential customers, in order to help in the City's conservation effort. The program will include the following and is summarized in the "Conservation Benchmarks" located in Appendix H:

- Attempt to make regular visits to schoolchildren at local schools, making presentations and/or providing material on the importance of water conservation. This program shows children simple ways to conserve water at home and at school by turning off the faucet while brushing their teeth in the morning, not using the toilet as a garbage disposal unit, taking short instead of long showers, and avoiding frequent use of the bath tub. It is expected that these visits to schools, plus the literature they take home, will help meet immediate conservation needs and develop better lifetime water use habits in children.
- Conservation messages on the City website. Simple to implement conservation practices and tips will continue to be available in a "Conservation Tips Newsletter" that can be found on the City website at www.ci.sweet-home.or.us/index.aspx?nid=181 Information on how to obtain conservation brochures will be included in the messages. The messages will be regularly updated.
- Distributing the water Conservation Tips Newsletter (See Appendix H) at least two times a year with customer water bills. These brochures will emphasize the importance of water conservation and list some simple steps that can be used to conserve water in the home. The brochures will include a simple demonstration of how customers can check for water leaks in their service meters and report them to the water utility. These mailers will remind water customers about the need to conserve water and demonstrate how simple conservation steps can go a long way in reducing water use.
- Comparison of current water use with the previous year's water use on customers' bills. This should help customers determine if their water conservation efforts are in fact helping them reduce the overall amount of water they use. Hopefully water use comparisons will encourage customers who notice significant hikes in their water use to want to conserve water.

The City believes that public education will be an important tool in its effort to encourage responsible water use among its water customers. Children who are exposed to education that encourages conservation are more likely to be responsible water users when they grow up. In addition, coordination with the local watershed council may be a method to expand educational opportunities.

7.7 Water Use Measurement and Reporting

The City of Sweet Home complies with OAR Chapter 690, Division 85 by recording monthly water production at the water treatment facility and submitting this information to Oregon Water Resources Department. The City submits the data online annually via the department's website online www.wrd.state.or.us for the previous water year (October – September).

7.8 Conservation Summary

This plan is intended to be the updated water management and conservation plan for the City of Sweet Home as required per Final Order. The City intends to use this plan as a continuing guide to implement conservation techniques discussed in this section and will institute the public education program, leak detection program, and source meter testing upon the acceptance of this plan. The City will continue to record production and use monthly and audit for lost water annually, submit water production to Oregon Water Resources Department, and use the existing rate structure that encourages water savings.

Section 8 – Water Supply Emergency Curtailment Plan

8.1 General

The City of Sweet Home currently has an emergency plan for dealing with water shortages that relies on one of six different conditions to trigger activation of various responses. The six conditions are:

1. Loss of portability
2. Water contamination event
3. Major system damage
4. Chlorine release
5. Water use restrictions
6. Power outage

Each of the conditions has specific responses to help the city handle the emergency situation. The City recognizes some shortcomings in the existing plan, as follows. The triggers listed above lack a clear definition of the point when a condition can be called an emergency in relation to the ability of the City to provide water to customers. The existing plan also centers on the event of declaring an emergency, but does not include any process to provide water subsequent to declaration of the emergency. Acknowledging the above-mentioned shortcomings of the existing plan, the City recognized the need for an improved emergency/curtailment system and plans to present this report to the City Council so that it can be used as the basis for a City water emergency curtailment ordinance.

Under the new emergency plan summarized in Table 8-1, any condition including the six listed above that is expected to prevent the city from providing water to 40 percent of the population for the duration of six hours or more shall be declared as an emergency by the city manager. The emergency shall be declared a Category A or a Category B, based on whether the condition is expected to cause a total or partial outage in the water system.

Category A –

All emergencies that a water supplier such as the City of Sweet Home is likely to experience fall under two categories. Category A involves the loss of potability of the supplier's water, or a failure of the system to supply water. The supplier's ability to produce water may remain, but due to certain circumstances, the water is not high enough quality to be supplied to the water customers for use. Category A emergencies are more likely to render most, if not all, of the water unusable. They include contamination events and over-chlorination of the water supply. Adding excessive amounts of other treatment agents may also cause this kind of emergency. In such a situation, where a total outage is expected, the city manager shall authorize public radio and television announcements of the emergency condition and request the State Emergency Management Division to provide water from external sources by tank trucks. In that event water will be distributed directly to customers at schools, the City Hall, the fire station, and other public areas. The U.S. Army Corps of Engineers resources may also be requested by the City Manager, depending on the extent of the emergency. If a complete failure of the water system occurs, severe rationing may result.

Category B –

Category B emergencies include situations such as power outages, major system damage, multiple equipment failures, or fire emergencies at the water treatment plant. These emergencies may or may not cause total system outages, and may only be expected to last for a day or two at most. In cases where they cause overall system outages for a long period, these emergencies will be treated just like category A emergencies. If total outage is not expected, then the following curtailment steps will be implemented.

Table 8.1 – Summary of Emergency Response Plan

EMERGENCY	RESPONSE
Any condition that prevents the City from being capable of providing water to 40 percent of the water customers for six or more hours.	Category A or Category B emergency is declared.
Category A: Full Service Outage Causes may include: 1. Water Contamination 2. Over Chlorination 3. Extreme situations of Category B Emergency 4. Massive equipment failures 5. Flooding 6. Earthquakes	1) Inform resident by posters, radio and television about emergency conditions. 2) Request state emergency division to provide water from external sources by tank trucks. 3) If necessary, request more water from the U.S. Army Corps of engineers. 4) Distribute the water to city residents at schools, City Hall, Fire Station and other public areas.
Category B: Reduction of Service Capacity Causes may include: 1. Power Outages 2. Major System Damage 3. Multiple Equipment Failure 4. Flooding	1) Inform residents by posters, radio and television about emergency conditions and the curtailment actions needed. 2) Based on how much water consumption is as a percentage of treatment plant capacity, implement conservation alert, moderate alert or critical alert as appropriate.

8.2 Assessing Water Supply and Storage **(WMCP 690-086-0)160-1**

No major emergencies that prevented the City of Sweet Home from supplying potable water to its residents have occurred within the last 10 years.

8.3 Curtailment Strategy **(WMCP 690-086-0)160-2, 3, 4**

The intention of this plan is to lay out a framework of actions to implement in an emergency situation that does not render the total of Sweet Home's water distribution system unusable. The course of action will depend on the extent and severity of each emergency situation and be based on the ability of the water utility to provide sufficient potable water for customers. The three emergency stages are:

- Conservation Alert
- Moderate Alert
- Critical Alert

A conservation alert is aimed at reducing the water use within the City through voluntary actions of the residents. Its goal is to reduce water use to less than 80 percent of the water treatment plant's capacity, hence frequent declarations of this alert signify the need for the expansion of the water treatment plant. A moderate alert is intended to further reduce water consumption, with a goal of 10 percent reduction of water use within the City. A critical alert calls for drastic reduction in the water use within the City.

The trigger for this stage of alert occurs when water usage reaches 80 percent of treatment plant capacity for three consecutive days. The City Manager shall declare a conservation alert emergency and request voluntary conservation measures by customers. A State-declared drought for the Sweet Home area will also be considered a trigger for the conservation alert stage. The response for this stage will require the city manager to:

- Distribute brochures that encourage conservation;
- Request customers to water lawns every other day instead of daily;
- Request customers north of Highway 20 to irrigate lawns in the morning and those south of Highway 20 to irrigate lawns during the evening;
- Request irrigation time to be limited between 7:00 a.m. and 7:00 p.m.;
- Turn City fountains off and post signs explaining the reason;
- Request customers to postpone non-essential hosing of sidewalks, walls, driveways, parking lots, open grounds, streets and roofs except when required before painting; and
- Request voluntary reduction in car, boat, and trailer & recreation vehicle washing except in facilities that recycle wash water.

A moderate alert stage is triggered when water consumption reaches 90 percent of treatment capacity for two consecutive days. The City Manager shall at this stage call for a continuation of the conservation measures listed in the conservation alert stage. However, the City Manager shall declare several of those measures as compulsory during the moderate alert stage. Compulsory measures during this stage include:

- Prohibiting lawn irrigation between 7:00 a.m. and 7:00 p.m.;
- Mandatory adherence to every other day watering schedule;
- Mandatory adherence to evening or morning irrigation schedule, depending on whether customers live north or south of Highway 20; and
- Restrict other non-essential outdoor water use as determined by the City Manager.

A critical alert shall be declared by the city manager when water consumption reaches 95 percent of treatment capacity, when total production capability is lost, or when deemed necessary by the City Manager. The following will be prohibited during the alert:

- Watering, sprinkling or irrigating lawns without explicit City approval in writing. The City will approve watering, sprinkling or irrigating of lawns, grass or turf only in the following situations:
    - New lawns, turf and grasses that were seeded before issuance of the critical alert and are less than 12 months since first planting.
    - Such grass, turf and lawn shall only be watered until established.
    - Grass, turf and lawn that are part of a commercial sod farm.
    - Golf course greens and tees.
    - Other areas that may be deemed to be essential by the City.
- Use of City-supplied water for filling private swimming pools.
- Use of City-supplied water for washing, hosing and spraying of walls, roofs, sidewalks, driveways and other hard surfaces, except where deemed necessary for health and safety reasons by the Oregon Department of Human Services - Drinking Water Program and Oregon Department of Environmental Quality and where necessary prior to painting during repairs, reconstruction and remodeling of buildings.
- Washing boats, land vehicles, including but not limited to cars, buses, trailers, and trucks, except where public health, safety and welfare depend on frequent vehicle cleaning, such

A severe loss of water production which is expected to last more than two days may include more drastic water restrictions, such as the following:

- Prohibition of all unauthorized water use, including any irrigation, swimming pools, or any form of car or truck washing.
- Restrictions on taking showers or baths.
- Restrictions on flushing toilets.

Water contamination events may also result in boil water notices.

8.4 Staff Responsibilities

The following staff members will have the tasks listed in a water curtailment event.

- Public Works Director:
    - Coordinate staff and effort to improve emergency situation. Coordinate all direct and indirect media outreach.
- Superintendents, Public Works Department:
    - Coordinate with major water users to reduce consumption.
- Police Chief, Police Department:
    - Enforce water curtailment measures.

8.5 Summary

OAR 690, Division 86 rules require that all public water suppliers such as the City of Sweet Home have an emergency curtailment plan. The City recognizes the need for such a plan to improve its preparedness and help it cope with an emergency condition. Conditions that are likely to cause a water emergency shortage in Sweet Home include a fire emergency or equipment failure at the treatment plant, water contamination events, major system damage, and multiple equipment failures. All these situations are highly unlikely to occur, but if one of them does, the City may not be able to provide water to customers in an acceptable manner. In that case, the City of Sweet Home will rely on its emergency plan summarized in Table 8.1.

Section 9 – Improvement Financing

9.1 General

There are a variety of funding programs available for improvements to drinking water systems. Both loans and grants are available to public water systems needing to design, construct, expand, or improve a system. Although these funding sources exist, each has its own particular requirements of applicants to receive funding.

The following is a brief description of available funding programs for public water systems with particular requirements to receive funding.

9.2 Oregon Infrastructure Finance Authority

Community Development Block Grant Program

The Oregon Community Block Grant (CDBG) Program receives annual grants from the U.S. Department of Housing and Urban Development. The State usually distributes funds under these categories: Public Works, Housing Rehabilitation, Community Facilities, New Affordable Housing/Regional Strategies, Economic Development, community Crisis, and Technical Assistance.

Project objectives are to increase business and employment opportunities, improve availability and adequacy of water supplies, and to resolve serious and imminent threats to community health and welfare.

All funding for Economic Development activities must meet the Low/Mod Income Jobs National Objective subcategory under 24 CFR 570.483(b)(4). This requires that funded activities create or retain permanent, full-time equivalent jobs, primarily for low and moderate-income persons. To comply with the federal requirements, at least 51% of the jobs created or retained must either be held by or be available to Low/Mod income persons. Projects must principally benefit low to moderate income people in non-entitlement cities and counties: cities less than 50,000 and counties less than 200,000 in population. Projects must serve primarily residential need and not be for capacity expansion.

“Low Income” and “Moderate Income” are defined in the federal Housing and Community Development Act of 1974, as amended. A Low-income person is a member of a family with a gross income of no more than 50 percent of the area median income. A Moderate-income person is a member of a family with a gross income of no more than 80 percent of the area median income. The “area” is either the county or the non-metropolitan portion of the state, whichever has the higher median income. The 2014 estimated median family income for non-metropolitan counties in Oregon is $60, 700 and the estimated median family income for Linn County is $5 1,600. Therefore, the City of Sweet Home would fall into the non-metropolitan median family income category because the median income is the greater of the two. With a median family income in Sweet Home, per U.S. Census data, of $45,000, Sweet Home would be considered as a Moderate income area because $45,000 is less than 80 percent of $60,700. It may be necessary for the City to conduct an income survey for the specific area to be served by a project to make certain it will benefit Low/Mod households, as required by the CDGB program.

Special Public Works Fund

The Special Public Works Fund (SPWF) provides loan and grant assistance to eligible applicants for the construction of publicly owned infrastructure needed: 1) to support economic development projects that will result in a firm business commitment and the creation and retention of jobs: or 2) to build infrastructure capacity in order to improve the community's ability to keep or attract business and industry.

Eligible applicants include cities, counties, county service districts (per ORS 451), tribal councils of Indian tribes, the Port of Portland, and districts as defined in ORS 198.010.

The proposed project must be owned by a public entity that is an eligible applicant. Eligible projects costs can include costs incurred in conducting feasibility and other preliminary studies, in the design and construction engineering costs, as well as actual construction costs. The type of projects may include but are not limited to the following:

- Purchase of rights of way and easements necessary for infrastructure;
- Roadways, bridges, etc.;
- Storm drainage systems;
- Wastewater systems;
- Water source, treatment, storage and distribution facilities.

The total loan amount per project ranges from less than $100,000 to $10 million. 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.

Grants, when awarded, are subject to applicant need as well as other restrictions. It is not possible to determine how much, if any, grant funds might be awarded prior to analysis of the application and financial information. If a grant is offered it cannot exceed $500,000 or 85% of the project cost, whichever is less, and are based on up to $5,000 per eligible job created or retained.

The SPWF also offers “Technical Assistance” financing for municipalities faced with the costs of studying and/or engineering an eligible project. The technical assistance funds can be used to finance preliminary planning, engineering studies and economic investigations that are related to an existing or potentially eligible public infrastructures project.

For an application or additional information contact the Oregon Infrastructure Finance Authority Salem office, at 503-986-0130 or review program details at www.orinfrastructure.ore

Water/Wastewater Financing Program

The Water/Wastewater Financing Program (WWFP) was created by the Oregon Legislature in 1993 and capitalized with lottery funds appropriated each biennium and with the sale of state revenue bonds. The purpose of the WWFP is to provide financing for the design and construction of public infrastructure needed to ensure compliance with the Safe Drinking Water Act or the Clean Water Act.

Eligible applicants include cities, counties, tribal councils of Indian tribes, port authorities, and districts as defined in ORS 198.010.

Eligible projects included projects within a system that has received or will likely receive a Notice of Non-Compliance, by the appropriate regulatory agency, with the Safe Drinking Water Act or the Clean Water Act and/or a project required to meet other state or federal water quality statues and standards. The type of projects may include but are not limited to the following:

- Purchase of rights of way and easements necessary for infrastructure;
- Water source, treatment, storage and distribution facilities;
- Storm drainage systems;
- Wastewater systems;
- Design and construction engineering;
- Planning/technical assistance for small communities

The WWFP guidelines, project administration, loan terms and interest rates ace similar to the Special Public Works Fund program. The maximum loan term is 25 years or the useful life of the project whichever, is less. The maximum direct loan amount is $1.0 million when financed with lottery funds and the maximum bonded loan, when funded through the sale of State Revenue Bonds is $10 million. Loans funded through sales of State Revenue Bonds are given only to "credit worthy" borrowers. Loans are generally repaid with Utility Revenues or voter approved bond issues.

The maximum grant through the WWPF is $750,000, in addition to the cost of issuance and debt service reserve, in the case of a bonded loan. The grant/loan amounts are determined by a financial analysis or the applicant's ability to afford additional loans.

Technical assistance grants and loans may finance preliminary planning, engineering studies and economic investigations to determine project feasibility. The basis for eligibility is similar to construction projects, those needed to assist local governments in meeting the Safe Drinking Water Act and the Clean Water Act. Up to $20,000 in grant funds and $50,00D in additional loan funds may be awarded to eligible applicants of under15,000 in population.

For an application or additional information contact the Oregon Infrastructure Finance Authority Salem office, at 503-986-0130 or review program details at www.orinfrastructure.org

Safe Drinking Water Revolving Loan Fund

The Safe Drinking Water Revolving Loan Fund (SDWRLF) is managed by The Oregon Health Authority Drinking Water Services and the loans are managed by the Oregon Infrastructure Finance Authority. The SDWRLF program is available to communities that must correct noncompliance with current or future state and federal drinking water standards, address serious human health risk, or intend to create drinking water system improvements that will substantially benefit public health.

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. The SDWRLF lends up to $6 million per project with a favorable, fixed interest rate and the possibility of a subsidized interest rate and principal forgiveness for disadvantaged communities. The standard loan term is 20 years or the useful life of the project assets, whichever is less. The term may be extended to 30

years for disadvantaged communities. Interest rates are only 80 percent of state/local bond index rate.

An eligible borrower is any water system (publicly, nonprofit or privately owned, but never federally owned or operated) that serves year-round residents numbering at least 25, or via 15 or more service connections. The following are the main types of eligible activities and expenses:

- Engineering, design, upgrade, construction or installation of system improvements and equipment for water intake, filtration, treatment, storage, transmission and metering.
- Acquisitions of property, easements or the like, as needed to site, build, operate or protect facility or water source.
- Planning, surveys, legal/technical support, environmental review and so forth, arising from or attendant to improvement.
- Investments to enhance the physical security of drinking water and associated facilities, as well as water sources.
- Projects can include the cost to add or improve security measures to protect drinking water facilities.

Community water systems are eligible for loans up to $ l00,0O for source water protection measures to carry out elements of a Source Water Protection Plan.

Those costs that are not eligible for the SDWRLF loan program include dams, water rights, administration, ongoing operations, or a project that doesn't not directly address noncompliance or health risks, or is primarily intended for fire suppression, or is intended to serve future community growth beyond that justified using conventional population projections over project life

Drinking Water Protection Loan Fund

The Drinking Water Protection Loan Fund (SDWRLF) is managed by The Oregon Department of Human Services Drinking Water Program and the loans are managed by the Oregon Infrastructure Finance Authority. The DWPLF program is designed for the protection of drinking water sources.

The DWPLF lends up to $100,000 per source protection project which can include acquisitions of property, easements or the like, as needed to protect water source or investments to enhance the physical security of drinking water sources.

The application process for the DWPLF loan program begins with the submittal of a letter of interest, which may be submitted annually, generally beginning in January. The format for this letter can be obtained from the Oregon Infrastructure Finance Authority, 775 Summer St. NE, Suite 200, Salem, Oregon 97301 or on their website, www.orinfrastructure.org.

For additional information contact the Oregon Infrastructure Finance Authority Salem office, at 503-986-0130 or review program details at www.orinfrastructure.org

9.3 Water Resources Department

Water Development Loan Fund

The Water Development Loan Fund (WDLK provides long-term financing to fund water supply projects which will be used for drinking water, fish protection, watershed enhancement, and the drainage or irrigation of agricultural lands.

Eligible applicants included individual residents, entities with principal income from farming, water-related districts, cities, counties, local soil and water conservation districts, and organizations formed for the purpose of distributing water for community water supply.

To be eligible for WDLF loan, projects must meet one of the following:

- Drainage protection: facilities installed to provide for the removal of excess water to increase soil versatility and productivity.
- Irrigation project: facilities designed to provide water to land for the purpose of irrigation.
- Community water supply project: an undertaking, in whole or part, in Oregon for the purpose of providing water for municipal use. A community is an incorporated or unincorporated town or locality with more than three service connections and a population of less than 30,000.
- Fish protection project: an undertaking, in whole or in part, in Oregon for the purpose of protecting fish or fish habitat.
- Watershed enhancement project: an undertaking, in whole or in part, in Oregon for the purpose of watershed enhancement.
- Multi-purpose project: a water development project in Oregon which provides more than one use. The primary use of the project must be one of the uses listed above. Secondary uses may include other water uses which are compatible with the primary use compatible with the primary use.

The application process begins with a pre-application conference between the applicant and a WDLF loan officer. The loan officer answers any questions regarding the WDLF program and application process. Another conference is held to review the completed application to ensure it is adequate for submission. Upon submission of the application an engineering analyst conducts a technical review and prepares a project report while the loan officer prepares a written loan recommendation. The Loan Advisory Board then reviews the report and recommendation and makes a recommendation to the Director.

All costs to operate the WDLF are paid by borrowers, not taxpayers. Borrowers pay a non-refundable application fee of $100 and a loan processing fee of $lO00 or one percent (1%) of the loan request, whichever is greater, up to $10,000. Additionally, borrowers pay closing costs and bond issuance costs.

For more information on the WDLF contact Oregon Water Resources Department, 725 Summer St. NE, Suite A, Salem, Oregon 97301, (503/986- 0900)

9.4 U.S. Department of Agriculture – Rural Development

The goal of the U.S. Department of Agriculture Rural Development (USDA- RD) is to encourage the commercial financing of essential community development services of rural communities in order to strengthen rural infrastructure, develop and improve health care, public safety, and public service facilities, and improve the economic and environmental climate.

USDA-RD offers financial assistance in the form of the Water and Waste Disposal Direct Loan program for water supply and waste disposal facilities in rural areas and towns of up to 10,000 people. USDA-RD funds may be used for the development of storage, treatment, purification, or distribution of water or for the collection, treatment, and disposal of waste in rural areas.

Applicants must be unable to obtain sufficient credit elsewhere to finance actual needs at reasonable rates and terms. Loans made in areas where: 1) the median household income of the service area falls below the higher of 80 percent of the Statewide Non-Metropolitan Median Household Income (SNMHI) or the poverty level; and 2) the project if needed to meet applicable health or sanitary standards, bear interest not in excess of 5 percent.

Loans are repayable in not more than 40 years or the useful life of the project, whichever is less. As of October 1, 2014, three interest rates exist and are based on the Median Household Income (MHI) or the applicant's service area compared to SNMHI. These rates are included only for reference and USDA- RD should be contacted to obtain the most current interest rates.

Name of Rate	Interest Rate	Description
Market Rate	4.000%	The market rate is paid by those applicants whose MHI of the service is greater than the SNMHI.
Intermediate	3.250%	The intermediate rate is paid by those applicants whose MHI of the service area is 80% to 100% of the SNMHI.
Poverty Line	2.375%	The lowest rate is paid by those applicants whose MHI of the service area is below 80% of the SNMHI and the project is needed to meet regulatory agency health and sanitary standards.

The Community Facility Grants program was authorized under the Federal Agriculture Improvement and Reform Act of 1996. In most cases, the grant program is used in conjunction with the USDA-RD loan programs to make essential community facilities affordable for the neediest communities, which often cannot afford even direct loans without additional subsidies. To be eligible for grants through USDA-RD, communities must have 75% of the

population with a MHI below the higher of the poverty line or 80% of the SNMHI and be in violation of health and sanitary standards requirements.

For applications and/or further information on the USDA-RD loan/grant programs contact USDA Rural Development state office, 1201 NE Lloyd Blvd., Suite 801, Portland, Oregon 97232, 503-414-3360.

9.5 U.S. Department of Commerce

The U.S. Department of Commerce's Economic Development Department (EDA) has a Public Works Grant Program. The EPA's Public Works Grant Program was designed to provide jobs and to remove impediments to economic development in distressed communities.

Eligible applicants include cities, counties, municipalities, domestic water supply districts, and metropolitan service districts, except Portland, Salem, and Benton County. Preference is given to rural areas, and to county or regional economic development projects.

EPA receives annual congressional appropriations for grants to help Finance economic development in Oregon. Grant awards vary, but typically only fund only 50% to 80% of the project depending on the area's level of economic distress. A local match by the applicant is required, but state or federal loan funds can be used for the matching funds.

Eligible activities include drinking water supply infrastructure projects as long as they are directly tied to job creation or removing serious impediments to area economic development.

For application or other information contact the Oregon regional representative, David Porter, One World Trade Center, Suite 244, 121 SW Salmon Street, Portland, OR 97204, 503-326-3078.

9.6 Rural Community Assistance Corporation

The Rural Community Assistance Corporation (RCAC) is a private non-profit organization serving 13 states in the western United States. The RCAC assists rural communities achieve their vision and goals through training, technical assistance, and access to resources. ROAC in Oregon works with funding and regulatory agencies and partners to address compliance issues for lower income rural communities by helping with water and wastewater infrastructure projects.

The RCAC Loan Fund provides intermediate term and construction loans for water, wastewater, solid waste and storm facilities that primarily serve low income rural communities. Eligible applicants include non-profit organizations, public agencies, and tribal governments serving rural areas with populations of 50,000 or less, or 10,000 if using USDA Rural Development as the primary loan source.

Short term construction loans up to $2 million are available for 1-3 year terms at interest rates of 5.5%. Construction loans must include a commitment letter for permanent financing and also include a 1% loan fee. Eligible projects for the intermediate term loans are typically smaller capital needs projects. Intermediate term loan amounts generally to not exceed $100,000 and have a loan term of up to 20 years at an interest rate of 5%.

Loan applications are accepted at any time during the year. For more information or a loan application contact Josh Grill, 720-898-9463 or Jgriff@rcac.ore The RCAC website, www.rcac.org also has information and application forms.

9.7 Oregon Department of Energy

The Small Scale Energy Loan Program (SELP) finances energy conservation and renewable resources energy projects in Oregon. Renewable resources would include projects involving water, wind, geothermal heat, solar radiation, biomass, and waste heat. SELP can help identify cost effective projects through its Public Energy Package (PEP) program.

Eligible applicants include public and private entities, cities, counties, special districts, school districts, state agencies, Indian tribes, corporations, cooperatives, non-profit corporations, and residences.

SELP is funded through the sale of State of Oregon general obligation bonds (GO) bonds. Interest rates vary depending on the bond market, term of the loan, the timing of the project, and the availability of funds.

Eligible activities include any energy related projects, including drinking water system improvements, which result in energy production or conservation.

Loans typically require a security interest in the project, a lien on project revenues, if applicable, and a pledge to repay the loan. Loans can cover most project-related costs and range in amounts from $20,000 to $20 million with loan terms ranging from 5-20 years. A SELP loan can be used in conjunction with other financing programs, including acting as local match for grants.

9.8 Local Funding

User Fees/Connection Fees

Monthly user rate fees and one time connection fees are the main source available to the City to finance operation and maintenance of the water system. The current rate fee schedule and connection fees are listed in Appendix G. Any/all change in the base and/or commodity charges are calculated annually and typically become effective July 1 of each year.

Along with routine maintenance, small water system improvement projects are ideal for utilizing cash reserves generated by the user rates and connection fees. Additionally, annual rate reviews and adjustments play a factor in the City's ability to secure loans for larger projects.

General Obligation Bonds

General obligation (GO) bonds are municipal bonds that can be utilized to fund municipal water system projects. GO bonds are typically repaid through an increase in property taxes based on an equitable distribution of the bonded obligation across the City's assessed valuation. GO bonds do require voter approval for issuance.

Revenue Bonds

Revenue bonds differ from GO bonds in that they rely on the sales of the utility (user rates) to repay the bond. The security for the bond is the City's commitment to charge user fees sufficient to pay all operating costs and debt service. One advantage of revenue bonds is that the do not require voter approval, however, they typically have higher interest rates than GO bonds.

Local Improvement Districts

Local Improvement Districts (LIDs) are utilized to fund projects that benefit a limited area. Improvement costs are therefore distributed to customers only within the LID who utilize the improvement.

Local Loan Centers

Local financial intuitions are often able to offer municipalities reasonable loans for improvement projects at competitive interest rates. Often times these institutions require less administrative restrictions and paperwork that the public funding agencies.

9.9 Recommended Financing

For smaller maintenance and improvement projects, the City should consider the use of City funds generated by user rate fees and connection fees to finance the work. Using City funds will eliminate interest payments, decrease administrative requirements, and speed up the overall project process.

For large scale projects, the City should consider the use of public funding agencies. The available loans, and possibly grants, through Oregon IFA and U.S. Department of Agriculture — Rural Development are sources that should be considered first. A good first step in learning what financing is available from these agencies is to schedule a One-Stop meeting to present a project to the IFA, USDA-RD and other funding agencies. One-Stop meetings are held regularly in Salem each month, or can be scheduled in the water system's community. The City will be given an opportunity to discuss a proposed project, receive information about potential funding scenarios and learn about program requirements of the funding agencies.

Section 10 – Summary and Recommended Improvements

10.1 General **(WMCP 690-086-0)125-5**

The goals of this plan were to determine the amount of water required to meet the City of Sweet Home's current and future needs, determine if upgrades are required to provide reliable water supply to all areas of the city, and to document the City's current and proposed water management and conservation techniques required to satisfy conservation and management requirements.

The City of Sweet Home, Oregon is the local government that is affected by this plan, and although it is not required, notice of this plan will be provided to Linn County for their review and comment.

10.2 Summary of Findings

- **Growth** – The projected population growth for water system planning was determined to be 1.168% annually in this Plan. This results in a projected population for the City of 12,259 residents in 2040, the end of the 20 year planning period. Based on this growth, the resulting peak daily water demand in 2040 was found to be 2,757 gallons per minute (gpm) or 3,970,045 gallons per day (gpd).
- **Supply** – The perfected water rights for the City to date allows for up to 4,986 gpm of raw water for municipal use. The combined maximum available supply flow at the City water treatment plant is 4,167 gpm. Combined, there is sufficient supply to meet the current peak daily demands of 2,086 gpm in 2016 and 2,757 gpm in 2040, and as such, supply is adequate for the planning period and additional sources are not required at this time.
- **Storage** – The City's current storage capacity of 4,610,000 gallons is more than adequate than the amount the City needs to provide to meet the 4,510,000 gallons for fire flow and peak daily demands. Although there is limited storage room available for additional growth beyond that projected by 2040, the proposed storage replacement/improvement identified within this plan will provide some further additional growth capabilities.
- **Distribution** – The distribution system has few deficiencies and provides adequate flows and pressures throughout. Minor improvements to maintain and/or enhance the system are noted in Section 10.3.
- **Water Conservation** – Water conservation awareness has been implemented in the past by the City however it can be improved. The City should continue conservation efforts highlighted in this plan, which include:
    - A public education program
    - Customer service meter testing
    - A leak detection program
- **Curtailment** – The review of the water system revealed several built in features to help minimize the effects of source water issues. These include separate well sites and a

sizable storage reservoir. To further prepare for emergency situations, the City will update their water conservation ordinance. The updated ordinance, which provides stages for alert, is included as Appendix I.

- **Improvement & Planning Projects** – The system improvement and planning projects discussed below and outlined in Table 10.1 will assist the City in maintaining a viable water system throughout the 20-year planning period and beyond.

10.3 System Improvements

The City has various programs are in place for water pipeline and reservoir replacement/enhancements. The mainline replacement program will continue along with some new transmission mainlines will be constructed for regional network efficiencies. Additional reservoirs are considered for different locations, i.e. particularly serving the areas east of Willey Creek, and storage in the center of town. Most locations are dependent on local property owner approval due to the limited availability of lands. Meter systems and reading will be upgraded to provide increased user access, and city knowledge of usage, leaks, and responsiveness to customer requests.

The City has one 16" water main attached to a bridge that crosses Wiley Creek that serves the Foster "District" east of 49th Avenue. This water main had an above-ground line break in the summer of 2014, leaving the Foster neighborhood out of water until a temporary storage tank and system pressure pump could be temporarily installed. The City has identified some preliminary options to provide water across Wiley Creek to the east side with parallel mains that should be evaluated further:

- One option is placing an additional 8" mainline on the north side of the existing bridge, as a redundant backup to the existing 16" mainline. The new line would run from across Main Street (US Hwy 20) near 49th Avenue, and run eastward to 53rd Avenue with an extension to 54th Ave, and back across the highway to the south side at 53rd for network connectivity.
- A second option would be to run an 8" waterline across the existing railroad bridge downstream of the highway bridge as it crosses Wiley Creek.
- Thirdly would be the potential boring of a water line under Wiley Creek parallel to the existing Raw Water Supply Line that currently provides raw water to the Water Treatment Plant.

10.4 Recommended Financing

For smaller maintenance and improvement projects, the City should consider the use of City funds generated by user rate fees and connection fees to finance the work. For large scale projects, the City should consider the use of public funding agencies. Scheduling a One-Stop meeting to present a project to Oregon IFA, USDA-RD and other funding agencies will give the City an opportunity to discuss a proposed project, receive information about potential funding scenarios and learn about program requirements of the funding agencies.

10.5 Water Conservation

The City has a rate structure in place that attempts to create awareness that usage cost increase as more water is used. The water system is fully metered which allows the City to compare the amount of water produced and sold on a monthly basis. This allows the City complete an annual audit to review the amount of water that goes unaccounted for. To further conservation efforts it is recommended that with the approval of this plan, the City implement the Public Education Program outlined, source meter testing, and a leak detection program.

10.6 Curtailment

The City of Sweet Home has had a historically reliable system with the only known significant disruption occurring during a severe winter storm that reduced power availability to the old water treatment plant for about three consecutive days, in which no back-up power generation was available. During this time, the 4,610,000 gallons available within the storage reservoirs provides necessary protection during this short-term outage.

The *DRAFT* City Ordinance No. for 2016 (Appendix I) addresses the possibility that source water may become limited but does not give specific triggers for alert or actions to be taken. With the approval of this plan the City will formally adopt the proposed Ordinance with the three stages of alert and the associated conservation actions to be taken as outlined in this plan.

10.7 Plan Update **(WMCP 690-086-0)125-6**

The City of Sweet Home proposes to submit an updated plan ten (10) years from the submittal of this plan, approximately 2026. The City will evaluate progress on water curtailment and water conservation efforts set forth in this plan at that time. No major improvements to the City's water system or source water supply are anticipated prior to the end of this 10 year period.

10.8 Rate Study

In 1999, the City of Sweet Home authorized a complete rate analysis for the water and sewer utilities that aimed to determine the revenue requirements for the water and sewer utilities; to determine the cost of the two services; and also to study and help set water and sewer rates. In 2013, when considering financial issues related to a separate municipal utility, ECONorthwest reviewed the existing rate structure, program and methodology and determined that it continues to function as intended and is still functional.

In considering the existing local political environment, it may be beneficial for the City to consider completing a comprehensive water rate study in order to help fund the recommended projects within this plan. Rate studies typically review revenue requirements, funding options, analysis of alternate rate structures, and rates and fees by customer class. An outline of these items will assist the City with long term planning goals associated with the recommended projects. Estimated rate impacts are shown in Table 10.1 for each project phase. The rates are based on 3,000 accounts and 20 year project loan repayment.

10.9 Recommendations

In conclusion, it is recommended the City of Sweet Home:

1. Approve and adopt the Water Management, Conservation, and System Master Plan.
2. Submit this Plan to Oregon's Health Authority – Drinking Water Section and Oregon Water Resources Department for approval.
3. Make plans to complete the recommended water system improvements shown in Table 10.1.
4. Adopt and implement Conservation elements and set forth in this plan including;
    a. Public Education,
    b. Source and customer meter testing & calibration,
    c. Leak detection program.
5. Adopt Curtailment Plan by City Resolution/Ordinance to include the triggers and curtailment actions detailed in this plan.
6. Develop a policy in which City's Water Management, Conservation, and System Master Plan is evaluated every ten (10) years in order to update the contents of the plan and review growth, water demand, plant production, storage capacity, and project priority.
7. Complete Rate Study review based upon the recommended projects shown in Table 10.1.

By adopting the above list of improvements, the City of Sweet Home will continue to provide adequate water supply, storage, and distribution for many years to come as well as work to conserve water and be better prepared for a water supply emergency should one arise.

Table 10.1 – Recommended Projects

	Water Supply & Operations	Phase 1 0-5 Years	Phase 2 5-10 Years	Phase 3 10-20 Years
	Filter Media replacement (every 20 Years)	$ 20,000.00	$ 20,000.00	$ 20,000.00
	VFD on finished Water	$ 20,000.00	$ -	$ -
	SCADA System & Computer	$ 45,000.00	$ -	$ -
	WTP Backup Power (2 each)	$ 100,000.00	$ -	$ -
		$ -	$ -	$ -
	Water Distribution			
	AMR Meter Replacement	$ 1,500,000.00	$ -	$ -
	2" waterline replacement per plan	$ 332,000.00	$ 250,000.00	$ 445,000.00
	TGE Waterline per plan	$ 65,000.00	$ 305,000.00	$ -
	LMR Waterline plan	$ 350,000.00	$ -	$ -
	12" water main extension - Hwy 20	$ -	$ -	$ 200,000.00
*	12" waterline (15th Avenue) Nodes 80-25	$ -	$ -	$ 25,000.00
*	12" waterline (Green River) Nodes 57-65	$ -	$ -	$ 950,000.00
*	12" waterline (Yucca St) Nodes 28-62	$ 650,000.00	$ -	$ -
*	12" waterline (24th Avenue) Nodes 37-83	$ -	$ 300,000.00	$ -
	Secondary watermain to Foster District	$ 400,000.00	$ -	$ -
		$ -	$ -	$ -
	Water Storage			
	10th Avenue Reservior replacement	$ -	$ 3,300,000.00	$ -
	Foster District Reservior - New	$ -	$ -	$ 250,000.00
		$ -	$ -	$ -
	Water Conservation			
	Leak Detection (every 5 years)	$ 6,250.00	$ 6,250.00	$ 6,250.00
	Public Education Program ($1,000/Yr)	$ 5,000.00	$ 5,000.00	$ 5,000.00
		$ -	$ -	$ -
	Planning			
	Water Rate Study	$ 30,000.00	$ -	$ 35,000.00
	Update WMCSMP and review demand, storage, and pumping every 10 years.	$ -	$ 35,000.00	$ 35,000.00
	SCADA and BU Power pre-design	$ 15,000.00	$ -	$ -
		$ -	$ -	$ -
	Totals	$ 3,538,250.00	$ 4,221,250.00	$ 1,971,250.00
			$/Month/Account	
	Estimated Water Rate Impact/acct/month - (**Based on 3,000 acounts and 20 year loan payback**)	$ 4.91	$ 5.86	$ 2.74

* Orginal to Table 4-4 CIP 1997-2017

Section 11 – Appendix

A. City of Sweet Home Zoning Map
B. Oregon Water Resources - Final Order Approving Water Management and Conservation Plan
C. Oregon Administrative Rules
D. WRD Water Use Report
E. Water Rights Summary and Documentation
F. Water System Computer Modeling
G. City of Sweet Home Water Rate Fee Schedule
H. Public Education Program Flyer & Benchmarks
I. "*DRAFT*" City Ordinance
J. WMCP Amendment 2016