

**WAHKIAKUM COUNTY PUD NO. 1**  
WAHKIAKUM COUNTY WASHINGTON



**WATER SYSTEM  
CONSOLIDATION STUDY REPORT**

**G&O #15269  
SEPTEMBER 2016**



**Gray & Osborne, Inc.**  
CONSULTING ENGINEERS

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## **INTRODUCTION**

Wahkiakum County Public Utility District (PUD) has received a grant from the Washington State Department of Health (DOH) to complete a feasibility study for the potential consolidation of the Puget Island Water System and the Town of Cathlamet Water System. Currently the Town of Cathlamet supplies all water to the Puget Island Water System through an 8-inch diameter intertie. This report identifies and evaluates the benefits and costs of potential consolidation of the Puget Island and Cathlamet Water Systems. The report identifies key technical, administrative, and financial issues that will need to be addressed in a consolidation of the systems. This evaluation assumes that the PUD will take control of operation and maintenance of all facilities and services for the two systems. All customers would become customers of the PUD and would be subject to rates and requirements set by the PUD.

This report documents the information developed in completion of the following six tasks that were identified in the funding agreement.

Task 1: Review and Assess the Cathlamet Water System

Task 2: Identify Projects and Estimated Costs for the Cathlamet System to Meet Current Standards

Task 3: Evaluate Financial, Managerial, and Operational Needs and Impact on Water Rates

Task 4: Conduct Legal Review (by Others)

Task 5: Participate in Public Meeting

Task 6: Prepare Final Report

## **TASK 1: REVIEW AND ASSESS CATHLAMET WATER SYSTEM**

Items included in the funding agreement under Task 1 include the following:

- Obtain and review Town of Cathlamet Water System records including the Water System Plan, water treatment plant Monthly Reports, operating budgets, financial statements, and debt service documentation.
- Assess the condition of system facilities.
- Identify system deficiencies.

- Document findings.

The following sections provide background information and address the above Task 1 items.

## **CATHLAMET WATER SYSTEM FACILITY CONDITION ASSESSMENT**

Following is a brief summary of the condition of the Cathlamet Water System facilities based upon a review of system facilities and the Town's Water System Plan.

### **Source of Supply Condition Assessment**

The Town of Cathlamet relies on the Elochoman River for 100 percent of its water supply. The raw water intake infiltration trench was installed in 1986 and consists of approximately 90 linear feet of perforated 10-inch high-density polyethylene (HDPE) pipe that extends across the width of the Elochoman River.

The two raw water pumps are Floway Model 10JKM four stage line-shaft vertical turbine pumps, with 7.5-hp motors, which were installed in 2012. Each raw water pump is capable of pumping 350 gpm, for a total pumping capacity of 700 gpm. The pumps are in good condition.

According to pumping tests performed by Gray & Osborne in September 2014 and again in July 2015, with the help of Town staff, the estimated maximum sustainable intake capacity is 370 gpm. The raw water intake is the most limiting factor for the Town's source capacity. The intake structure capacity deficiency needs to be corrected as soon as possible as the Town is near its connection limit with the current intake capacity.

### **Treatment and Disinfection Facilities Condition Assessment**

The raw water from the intake is treated by a conventional rapid rate filtration plant located adjacent to the intake. The original plant was built in 1967. The current plant was rebuilt on the same site in 1998-1999, reusing only the original clearwell and raw water intake system. The plant has two filtration trains that each consist of an adsorption clarifier followed by a dual media filter. With both filtration units in operation the plant can treat up to 700 gpm. The original raw water sedimentation basin was eliminated during construction of the current plant in 1998-1999. According to manufacturer information, the water filtration plant is designed to effectively treat raw water with turbidities up to 150 NTU. At higher turbidities, the filter can become blinded with solids. Based on historical raw turbidity data, it is possible that the filter plant could be unable to adequately treat raw water from the Elochoman Intake under some conditions. During these high turbidity events, which occur on average every 2 to 3 years and last 1 to 3 days, the raw water intake pipe and raw water pumps have accumulated sediment severely restricting flow of raw water into the treatment plant. The Town has connected the water

treatment plant air blower to a cleanout on the intake line with flexible hose to periodically flush sediment from the intake.

Disinfection is accomplished with a sodium hypochlorite solution injected into the water before the static mixers, as a pretreatment, and after it has passed through the filters before entering the clearwell. Each filter train has its own sodium hypochlorite disinfection pump and calibration chamber to verify the pumping rate. In addition to disinfection, the Town adds sodium fluoride to the water to improve dental health.

The treatment plant has a 55,000 gallon below grade concrete clearwell. The clearwell includes baffles to enhance chlorine contact time. The existing clearwell is adequately sized to supply backwash water and provide chlorine contact storage. The filters can only be backwashed one at a time. If both filters are online and a backwash is initiated, one filter continues to produce water while waiting for the first filter to complete its backwash. The clearwell has adequate volume to meet backwashing requirements and was designed to meet current CT requirements for disinfection.

Two 30-hp Floway pumps pump finished water from a 12,400 gallon wet well into the distribution system. Each pump is rated for 300 gpm, for a total pumping capacity of 600 gpm. The pumps are in good condition, but should be replaced to match the treatment plant capacity of 700 gpm to make the plant more efficient.

The water treatment plant is generally in good condition. Reviewing water treatment plant monthly reports, the water treatment plant is consistently able to meet water quality requirements. The treatment plant does not have a backup generator in case of emergencies. The plant does have a manual transfer switch and receptacle to allow it to be operated by a portable generator in an emergency. The Town has agreement with a local contractor to supply a trailer-mounted generator during emergencies.

### **Storage Condition Assessment**

The Town has two storage facilities, the Greenwood Reservoir and the Kent's Bridge Reservoir, which provide a total storage capacity of 1.03 million gallons.

The Greenwood Reservoir has a nominal storage capacity of 500,000 gallons. It is a welded steel tank constructed in 1967. It has a 52-foot diameter and is 32-feet high. The overflow elevation is 278 feet, the base elevation is 246 feet. The Greenwood Reservoir sets the hydraulic grade line (HGL) of Pressure Zone 1, which includes the Greenwood Road area below the reservoir, downtown Cathlamet, and Puget Island. This reservoir was repainted in 2007. It is in good condition.

The Kent's Bridge Reservoir has a nominal capacity of 530,000 gallons. It is a glass lined, bolted steel reservoir, constructed in 1998. The existing site has room for a future 500,000-gallon reservoir if needed. Kent's Bridge has a 62-foot diameter and is 24 feet

tall. The overflow elevation is 639 feet and the base elevation is 615 feet. This reservoir sets the HGL for Pressure Zone 4 and provides source water to three additional pressure zones through PRV stations. Two additional PRV stations allow the Kent's Bridge Reservoir to supply fire flow to the downtown area in Pressure Zone 1 when necessary. The Kent's Bridge Reservoir is in good condition.

### **Booster Pump Station Condition Assessment**

The Town of Cathlamet operates one booster pump station located at the Greenwood Reservoir site. This booster pump station pumps water from the Greenwood Reservoir to the Kent's Bridge Reservoir when the water level in the Kent's Bridge Reservoir falls below 22 feet. The pump station is equipped with three 40-hp Cornell pumps rated at 200 gpm each with two pumps running. One pump is always designated as a standby pump. This pump station was completed in 1998 and is in acceptable working condition, according to the Town. The pump station is equipped with a manual transfer switch to allow use with a portable power generator, but does not have an emergency generator on site.

### **Transmission and Distribution System Condition Assessment**

The Town of Cathlamet Water System has approximately 20 miles of water main ranging in diameters from 4 to 12 inches. Approximately 40 percent of the pipe is asbestos cement and over 38 percent is PVC. The majority of the Town's existing distribution system was installed in the 1960s and 1970s. During 1998, over 22,000 linear feet of 8-inch and 12-inch PVC water main were installed to increase fire flow transmission capacity. A summary of pipe lengths and diameters is shown in Table 1.

**TABLE 1**

**Town of Cathlamet Water System Pipe Length and Sizes**

<b>Pipe Size</b>	<b>Length (feet)</b>	<b>Percent of Total</b>
2 inch	2,450	2%
4 inch	2,700	2%
6 inch	56,945	52%
8 inch	40,545	37%
12 inch	6,960	6%
<b>Total</b>	<b>109,600</b>	<b>100%</b>

Based on the analysis in the Town of Cathlamet's 2015 Water System Plan, the Town currently has a 3-year rolling average distribution system leakage (DSL) of 21.3 percent. This is above the DOH standard of 10 percent. Since 2008 the Town's DSL has generally decreased, however, it is still more than double the goal of 10 percent. This high DSL could be caused in part by the aging pipes that make up much of the Town's water mains,



especially in the downtown area. Other potential causes could be inaccurate metering due to aging service meters or inadequate accounting of water use during events such as hydrant use or construction.

According to the Town staff, significant leaks or water main breaks occur approximately twice per year. The Town estimates that these leak events might account for about 150,000 gallons per year. Areas of specific concern include the main water line along Elochoman Valley Road, the water main between from St. James Family Center and SR 4, the main on Messinger Hill Drive, and the main along SR 4 from Elochoman Valley Road to DeBriar Logging.

### **Telemetry and Controls Conditions Assessment**

The telemetry and controls for the water system are designed to operate the treatment plant and associated pumps and the Greenwood Booster Pump Station in response to water level monitors at the Greenwood Reservoir and the Kent's Bridge Reservoir. Reservoir levels are transmitted via phone lines and digitally displayed in the treatment plant lab, and are recorded once per day by hand. There are also two pen chart recorders which can record when high head pumps are running and when the Greenwood pumps are running, however this feature is not functioning at this time. The reservoir levels are transmitted to the programmable logic controller (PLC) at the water treatment plant that starts and stops the treatment facilities and associated pumps. There is a personal computer-based supervisory control and data acquisition (SCADA) system at the water treatment plant for monitoring the process and recording data. The SCADA system uses a Cimplicity software. There is an autodialer for alarm callout and operators can use PCAnywhere for remote viewing over a standard phone connection.

The water treatment plant is controlled based on the water level in the Greenwood Reservoir. When the pressure transducer at the Greenwood Reservoir senses low water level in the tank, water treatment plant PLC calls the raw water pumps and filter units at the plant to produce water. The high head finished water pumps operate based on a level transducer in the 12,400-gallon pump well at the treatment plant. When the pump well reaches an upper set point, the water treatment plant PLC calls the high head pumps to begin pumping water to the Greenwood Reservoir. The high head pumps continue to pump until the clearwell reaches a lower level pump off set point and the water treatment plant PLC calls them to stop. The PLC signals the chemical feed system to operate when the raw water pumps are operating. The coagulant pumps are automatically adjusted based on a 4-20 mA signal from the Streaming Current Monitor. The filter aid polymer feed pumps must be manually adjusted by the operators based on filter performance and jar testing. The sodium hypochlorite pumps are also manually adjusted to meet CT requirements and maintain an adequate chlorine residual in the distribution system. The fluoride pumps are manually adjusted to maintain a fluoride level of 0.8 to 1.0 mg/L. The operator interface on the water treatment plant control panel allows the operator to change parameters and set points in the PLC.

The telemetry and control system is out of date and is difficult for operators to use because it requires operators to respond to alarm conditions by making a trip to the plant whenever there is an alarm. This results in longer response times if the problem is not actually at the treatment plant.

### **Service Meters Condition Assessment**

All water service customers are metered at the point of delivery and the Town has a master meter at the water treatment plant. Individual service meters have historically been read manually. Currently about forty percent of the water service meters are being read by a mobile/drive-by radio read system manufactured by Master Meter. The Town has been installing additional radio read meters each year in an ongoing effort to convert all meters to radio read for maximum efficiency in meter reading. We understand that the PUD is standardizing on an Itron meter reading system. Literature from Itron indicates that it has radio read units that are compatible with most Master Meter products. However, the register and radio device are integral to the meter model that the Town has installed. The Itron radio device will likely not be compatible with this register. Further investigation is necessary to confirm compatibility.

## **CATHLAMET WATER SYSTEM CAPACITY ANALYSIS**

The following sections summarize the capacity analysis that was completed in the Town's Water System Plan.

### **Source of Supply Capacity Analysis**

The source of supply capacity has multiple aspects to it. The intake structure, raw water pumps, and water rights are all components of the source of supply capacity.

The intake structure, as discussed previously, has shown limitations over the last 6 years in the rate of water that can be withdrawn through the intake. In a pumping test performed in September 2014, one pump was initially running at 320 gpm before the test began, Town staff then turned on the second pump and together the two pumps achieved approximately 500 gpm for about 1.5 minutes before shutting off due to low wet well levels. The intake was then flushed using air for several minutes and the system was allowed to come back to equilibrium. One pump was then allowed to run and was able to pump about 450 gpm for 5.5 minutes before shutting off due to low wet well levels. At the request of DOH, the Town performed additional raw water pump tests on July 23, 2015 and was able to achieve a sustained pumping rate of 370 gpm for 14 hours. At 375 gpm the pumps shut off after 15 minutes. A sustained pumping rate of 370 gpm represents 532,800 gpd for 24 hours of pumping, and is considered the current maximum sustained capacity of the raw water intake.

The raw water pumps at the treatment plant were replaced in 2012. Each pump has a rated capacity of 350 gpm, for a total withdrawal rate of 700 gpm, or 756,000 gpd based on 18 hours of pumping. Based on a pumping rate of 700 gpm for 18 hours per day, the Town has adequate pumping capacity to meet projected maximum day demands through the 20-year planning period.

The Town has water rights for an instantaneous withdrawal rate of 1.83 cubic feet per second (821 gpm), a maximum of 202.8 acre-feet between May 1 and September 20 each year, and a maximum annual withdrawal of 633.8 acre-feet per year from the Elochoman River. The Town also has water rights for Abe and Cougar Creeks that are not currently being used. Only the Elochoman River water rights will be included in this analysis.

Since the intake pumps and the treatment plant can only handle up to 700 gpm, there will always be an instantaneous water right surplus of at least 121 gpm unless the pumps and filters are upgraded. According to the Town's 2015 Water System Plan, there will be an annual water right surplus of 268.8 acre-feet and a summer water right surplus of 126.1 acre-feet in 2034. The Town is not projected to see any deficiencies in water right during the 20-year planning period.

The intake structure is the limiting factor to the source of supply for the Town. Based on projections made in the 2015 Water System Plan, if distribution system leakage (DSL) remains at its current levels, the intake will be unable to meet maximum day demands by the year 2016. If DSL can be reduced to 10 percent by 2018, as shown in Table 3-17 of the 2015 Cathlamet Water System Plan, the intake may be able to meet maximum day demands through 2020, however a 500 gpd deficit is projected for 2021.

### **Treatment Capacity Analysis**

The treatment plant capacity is dictated by the capacity of the filters. Each filter can treat up to 350 gpm; therefore, with both filters in operation the plant can produce up to 700 gpm. The finished water pumps have a combined capacity of 600 gpm. The finished water pumps should be replaced with pumps to match the 700 gpm capacity of the filters. The treatment plant is projected to have adequate capacity through the year 2034.

### **Storage Capacity Analysis**

The DOH Water System Design Manual identifies the following components of reservoir storage volume:

- Operational Storage
- Equalizing Storage
- Standby Storage
- Fire Suppression Storage
- Dead Storage

Table 2 is taken from the 2015 Water System Plan, and compares the existing capacity of the Town’s reservoirs with projected storage volume requirements. With nesting of standby and fire suppression storage the water system is project to require a storage volume of 839,356 gallons by 2034. As shown in Table 2 the water system is projected to have adequate storage capacity through 2034.

**TABLE 2**

**Storage Analysis Summary**

Year	Vos	Ves	Vsb	Vff	Total w/Nesting	Available Storage	Surplus w/Nesting
2014	76,936	85,707	483,400	540,000	702,643	1,030,000	327,357
2015	76,936	86,811	490,400	540,000	703,747	1,030,000	326,253
2016	76,936	87,924	498,000	540,000	704,860	1,030,000	325,140
2017	76,936	89,047	505,600	540,000	705,984	1,030,000	324,016
2018	76,936	90,181	513,000	540,000	707,117	1,030,000	322,883
2019	76,936	91,475	520,800	540,000	708,411	1,030,000	321,589
2020	76,936	92,629	528,600	540,000	709,565	1,030,000	320,435
2021	76,936	93,943	536,400	540,000	710,879	1,030,000	319,121
2022	76,936	95,119	544,400	540,000	716,455	1,030,000	313,545
2023	76,936	96,455	552,400	540,000	725,791	1,030,000	304,209
2024	76,936	97,652	561,000	540,000	735,588	1,030,000	294,412
2025	76,936	99,011	569,200	540,000	745,147	1,030,000	284,853
2026	76,936	100,381	578,000	540,000	755,317	1,030,000	274,683
2027	76,936	101,612	586,400	540,000	764,948	1,030,000	265,052
2028	76,936	103,005	595,400	540,000	775,341	1,030,000	254,659
2029	76,936	104,410	604,400	540,000	785,746	1,030,000	244,254
2030	76,936	105,827	613,000	540,000	795,763	1,030,000	234,237
2031	76,936	107,257	622,400	540,000	806,593	1,030,000	223,407
2032	76,936	108,698	631,800	540,000	817,435	1,030,000	212,565
2033	76,936	110,153	641,000	540,000	828,089	1,030,000	201,911
2034	76,936	111,620	650,800	540,000	839,356	1,030,000	190,644

- (1) Vos based on 2 feet of operational storage in Greenwood Reservoir and 2 feet in Kent’s Bridge.
- (2) Ves based on peak hour demand as presented in Table 2-17 of 2015 Cathlamet Water System Plan.
- (3) Vsb based on the formula in DOH Water System Design Manual.
- (4) Vff based on providing 3,000 gpm fire flow or 3 hours.

**Distribution System Hydraulic Analysis**

A hydraulic model was used to analyze the hydraulic capacity for the Town of Cathlamet in the 2015 Water System Plan. The Town’s water system was analyzed using Innovyze’s H2ONet hydraulic modeling software, which operates in an AutoCAD computer-aided design and drafting environment. Current and projected six and 20 year demands were used in the model to evaluate the system capacity. Maximum day demands were used to evaluate the system’s ability to meet maximum day demand plus required fire flows at DOH’s required system pressure at 20 psi. Peak hour demands were used to verify that the system is able to meet the DOH standards to supply domestic water at a minimum system wide pressure of 30 psi.

Overall, the model showed that the system is capable of handling peak hour flows through 2034. As shown in Table 3, there are two nodes which show slight deficiencies in all modeled years. These nodes experience pressures below 30 psi because they are located directly downstream of the Columbia Street PRV, which has a 4-inch valve set at 28 psi, and a 1.5-inch valve set at 33 psi. These deficiencies are relatively minor and the model has a margin of error, therefore no capital projects are included in the Water System Plan to address these issues. The area should simply be monitored for low pressures or the utility could consider adjusting the PRV settings slightly.

**TABLE 3**

**Deficient Peak Hour Locations per Hydraulic Modeling<sup>(1)</sup>**

Node ID	Location	Required Pressure	Pressures during Peak Hour Flow		
			2014	2020	2034
J96	Just Downstream of Columbia PRV	30 psi	29.77	29.18	27.96
J97		30 psi	29.77	29.18	27.95

(1) Results based on assumptions stated in Town of Cathlamet 2015 Water System Plan.

The DOH Water System Design Manual states that a water system should be designed to provide adequate fire flow under maximum day demand conditions, while maintaining a minimum system pressure of 20 psi. Commercial/industrial areas must be capable of providing 1,500 gpm, while residential areas must provide 1,000 gpm. While it is possible to provide greater than 1,000 gpm in a variety of locations outside the town limits, fire flow is considered an urban service and is only required within the town limits. Fire flow modeling results indicated that there are several hydrants in the distribution system within the Town limits which may be unable to supply the minimum required fire flow. Table 4 shows the fire flow deficiencies within the Town of Cathlamet.

**TABLE 4**

**Deficient Fire Flow Locations within Town Limits per Hydraulic Modeling<sup>(1)</sup>**

Hydrant ID	Required Fire Flow (gpm)	Available Flow at Hydrant (gpm)			Location
		2014	2020	2034	
<b>Residential within Town of Cathlamet</b>					
J148	1,000	867	865	859	North of 3 <sup>rd</sup> and Maple St.
<b>Industrial/Commercial</b>					
J43	1,500	1,216	1,214	1,209	2 <sup>nd</sup> Street
J44	1,500	1,265	1,265	1,259	2 <sup>nd</sup> Street
J46	1,500	197	197	196	2 <sup>nd</sup> Street

(1) Results based on assumptions stated in Town of Cathlamet 2015 Water System Plan.

Projects for replacing pipes to address the deficiencies are detailed in the 2015 Water System Plan, and summarized later in this report.

**SUMMARY OF CATHLAMET WATER SYSTEM DEFICIENCIES**

**Source of Supply Deficiencies**

The existing Elochoman River intake is projected to have a deficiency by 2016. Additional intake capacity should be constructed as soon as possible.

**Treatment and Disinfection Facilities Deficiencies**

The water treatment plant does not have a permanent emergency generator located at the plant for emergency power outages. The finish water pumps should be upgraded from 300 gpm to 350 gpm pumps to match the capacity of the raw water pumps and the filtration basins.

**Distribution System Deficiencies**

The hydraulic modeling in the 2015 Water System Plan indicated two areas within the Town of Cathlamet that cannot provide the required fire flow; a fire hydrant north of 3<sup>rd</sup> and Maple Street near Wahkiakum Middle School and an area along 2<sup>nd</sup> Street from the marina to Una Avenue. These areas are undersized and should be upgraded to 8-inch pipe to meet minimum fire flow requirements.

Additionally, the Water System Plan identified some deficiencies with the meter system at the Town of Cathlamet/Puget Island intertie and with inadequate valving for isolation in the distribution system. Reducing distribution system leakage should also be a priority for the Town of Cathlamet Water System.

## **Telemetry and Control Deficiencies**

The existing water system telemetry and control system is in need of improvements to allow the operators to efficiently and effectively operate the system. The Town has expressed a desire to have a laptop computer on which they can access the water utility SCADA system to avoid having the drive out to the treatment plant to check alarms and levels.

## **TASK 2: IDENTIFY PROJECTS AND ESTIMATED COSTS FOR THE CATHLAMET SYSTEM TO MEET CURRENT STANDARDS**

### **SOURCE OF SUPPLY IMPROVEMENT PROJECTS**

As discussed under Task 1 of this report, the raw water intake in the Elochoman River does not have adequate capacity to meet projected maximum day demands unless it is upgraded to be able to sustain the capacity of the raw water pumps (700 gpm). In 2003, Gary & Osborne completed a raw water intake evaluation. This evaluation was focused on addressing occasional high river turbidity and assessed five alternatives for replacing/modifying the intake. The highest ranking alternative was based primarily on using water to flush sediment from the infiltration gallery. According to WTP staff, this has proven to be less effective than anticipated. The second highest ranking alternative was construction of a new infiltration gallery to replace the existing intake that employs two infiltration pipes rather than one. A new dual-pipe infiltration system should at least double the capacity of the existing single-pipe intake from 370 gpm to 740 gpm.

The preliminary cost estimate for this project is \$400,000 in 2015 dollars and includes pre-design, design, permitting, construction, and construction administration costs. This project is scheduled to begin in 2016 because under current projections, unless the Town drastically reduces system-wide DSL, the 2015 Cathlamet Water System Plan projects demands to exceed the existing intake capacity by 2016.

As an alternative to constructing another infiltration gallery intake, it may be possible to construct a new surface water intake on the Elochoman River consisting of a bullet-nosed screen attached to the intake pipe. Since the additional production capacity is mainly needed in the summer when water quality is very good, a surface water intake could more cost-effectively provide a solution to the capacity problem. A new surface water intake is estimated to cost \$50,000 and may be quicker to permit and construct than a new infiltration gallery intake.

Additional source development projects were identified in the Water System Plan within the 20-year planning horizon for potentially diversifying the water system's source of supply.

## Treatment and Disinfection Improvement Projects

Two projects are identified for improvement at the water treatment plant. The first project is to install a 300 kW generator at the treatment plant to improve reliability of the system during a power outage. The preliminary cost estimate for this project is \$180,000.

The second recommended project at the treatment plant is to replace the two existing 300 gpm finish water pumps with two 350 gpm pumps to match the capacity of the raw water pumps and the filtration basins. The preliminary cost estimate for this project is \$30,000.

## STORAGE IMPROVEMENT PROJECTS

There are no immediate storage deficiencies identified, as shown in Table 2. Therefore, no projects are recommended for the Town's water storage facilities.

## DISTRIBUTION SYSTEM IMPROVEMENT PROJECTS

Based on modeling results there are two distribution system improvements required to bring the Town's water system up to DOH fire flow standards.

- **2<sup>nd</sup> Street Main Replacement** – Approximately 800 lineal feet of 4-inch AC water main should be replaced with 8-inch PVC water main along 2<sup>nd</sup> Street from the marina to Una Avenue. The preliminary cost estimate for this project in 2015 dollars is \$157,200.
- **Maple Street Replacement** – Approximately 500 lineal feet of 6-inch fiberglass wrapped PVC water main needs to be replaced with 8-inch PVC from the corner of Maple Street and South 3<sup>rd</sup> Street to Wahkiakum Middle School. The preliminary cost estimate for this project is \$105,600.

Additionally, the following improvements have been identified to address deficiencies at the Puget Island intertie and improve valving for isolation in the distribution system.

- **Meter Improvements at Intertie** – The intertie between the Town of Cathlamet and Puget Island is above ground and unprotected. The Town has specified that they would like to enclose the piping and meter in a locked vault and install a strainer upstream from the meter to protect it from damage by occasional debris flowing through the distribution system. The total cost for this project is estimated at \$30,800.
- **Miscellaneous Valve Replacements and Installations** – Install a total of four 8-inch resilient seat gate valves at the locations indicated on



Figure 8-1 of the 2015 Cathlamet Water System Plan. The estimated cost of this project is \$71,500.

A number of other water main replacement/extension projects are included in the Town's 2015 Water System Plan, which address undersized and aging infrastructure in the service area. The following is a summary of other distribution system projects that should be completed in the next 20 years, excluding developer extensions.

- **Front Street Main Replacement** – Replace an estimated 1,240 lineal feet of 6-inch (AC) water main with 8-inch (PVC) water main along Front Street from River Street to the Julian Butler Hansen Bridge to increase fire flow availability. The estimated cost is \$223,800.
- **Greenwood Road Main Replacement** – Replace an estimate 1,350 lineal feet of 6-inch (AC) water main with 8-inch (PVC) water main along Greenwood Road from Cedar Lane to Mattie Street to increase fire flow availability. The project cost is estimated at \$232,100.
- **Una Avenue Main Replacement** – Replace an estimated 600 lineal feet of 4-inch (AC) main with 8-inch (PVC) water main along Una Avenue from 3<sup>rd</sup> Street to Butler Street to increase fire flow availability in the downtown area. The estimated cost for this project is \$112,400.

Reducing DSL should also be a priority for the Town's water system. The following is a summary of projects that could help to reduce DSL in the system.

- **Lead Detection and Repair Program** – Pursue a regular leak detection and repair program. The cost will vary each year depending on how much of the system is covered and the severity of leaks detected. For budgeting purposes, according to the 2015 Water System Plan, the Town has budgeted \$6,000 every three years to be set aside for leak detection and repair, or about \$2,000 per year.
- **Metering** – Improve on record keeping of unmetered water uses and replacement of older, under-registering water meters, and implement a water meter calibration and replacement program.

## **TELEMETRY AND CONTROL SYSTEM IMPROVEMENT PROJECTS**

As described under Task 1 of this report, the existing telemetry and control system requires the operator to spend significant amounts of time at the water treatment plant. The existing system is old and maintenance and repair of the system will become more of a problem over time. Modern control systems provide better system information and control capabilities. The system should be replaced with a SCADA system that links the

water treatment plant to the reservoir levels and can be operated remotely. The estimated cost for a new SCADA system is \$120,000.

**SUMMARY OF CATHLAMET WATER SYSTEM IMPROVEMENT PROJECTS**

Table 5 shows the estimated costs of all projects necessary to bring the Town of Cathlamet Water System into compliance with State and Local regulations and PUD standards.

**TABLE 5**

**Cathlamet Water System Improvement Project Costs**

<b>System Component</b>	<b>Project Title</b>	<b>Cost Estimate</b>	<b>Year Scheduled</b>
Source	Replace Raw Water Intake	\$400,000	2016
Treatment	Install Emergency Generator at WTP	\$180,000	2016
Distribution	Meter Improvements at Intertie	\$10,300	2016
Treatment	Replace Finished Water Pumps	\$30,000	2017
Distribution	Miscellaneous Valve Replacements	\$71,500	2017
Distribution	2 <sup>nd</sup> Street Main Replacement	\$157,200	2018
Telemetry	Replace SCADA Control System	\$120,000	2018
Distribution	Maple Street Main Replacement	\$105,600	2019
<b>Total</b>		<b>\$1,075,000</b>	

**TASK 3: EVALUATE OPERATIONAL, MANAGERIAL, AND FINANCIAL NEEDS AND IMPACT ON WATER RATES**

**OPERATIONAL NEEDS OF CATHLAMET WATER SYSTEM**

The Town currently has four public works employees who dedicate different portions of their time to operating and maintaining the water system. The Public Works Superintendent, along with three utility maintenance workers run the day to day operations of both the water and sewer systems. The Town Clerk-Treasurer and Municipal Services Clerk are in charge of billing and public contact for the water system.

Per Department of Health requirements, the Town of Cathlamet Water System must have a certified Water Distribution Manager (WDM) to oversee the system. The Cathlamet water treatment plant recently received a new rating from the Washington State DOH Office of Drinking Water and will now require a Water Treatment Plant Operator 3 (WTPO-3) certified employee. Shift operators of the water treatment plant must have at least a WTPO-2 certification. The Town’s water system also requires a certified cross-connection control specialist (CCS-1) and a backflow assembly tester (BAT). Currently

the PUD has a WDM, and CCS-1 on staff. The PUD contracts for BAT services. The PUD would either need to hire a WTPO-3 or have an existing employee obtain that certification.

According to Town records, the Public Works Superintendent and one of the maintenance workers each spend approximately 50 percent of their time on operation and maintenance of the water system. The Superintendent typically does the meter reading, which currently takes approximately 12 hours per month. As the Town continues to install AMR capable meters this time decreases. The second utility maintenance worker typically devotes about 20 percent of his time to water utility issues. The third utility maintenance worker is primarily a Wastewater Treatment Plant Operator, but spends about five percent of his time devoted to water system maintenance. According to historical records shown in the Town's 2015 Water System Plan, salaries and benefits for water system personnel total about \$100,000 each year. There is another Town maintenance worker who assists with water system related maintenance as needed. According to the Town Clerk-Treasurer, she spends approximately 30 percent of her time on water system related duties and the Municipal Services Clerk devotes an estimated 60 percent of her time to the water department. The duties of the two clerks include budgeting, account setup, payment reconciliation, managing annual report data, billing, managing work orders, and general customer service related to the water system.

Based on this information, the Town of Cathlamet Water System currently requires approximately 1.25 full-time employees for operations (including meter reading) and approximately 1 full time employee for billing and customer service. The PUD has indicated that they believe that they could operate the combined Cathlamet/Puget Island Water System with one additional employee. Since the PUD does not currently have the required Level 3 certified operator on staff, the PUD would need to hire a Level 3 certified operator. The PUD believes that it could complete administrative and billing activities for the combined Cathlamet/Puget Island Water System with its current administrative staff since the PUD already sends an electric bill to each of the Town's water customers.

## **MANAGERIAL NEEDS OF CATHLAMET WATER SYSTEM**

Currently the Town of Cathlamet water system is managed by the Town's Public Works Superintendent. The Public Works Superintendent reports to the Mayor and Town Council who establish the budget and set policy direction for the water system. If the PUD were to take over water system, the PUD's General Manager would manage the water system and would report to the PUD Board of Commissioners who would establish budgets and set policy direction as they currently do for the PUD's two existing water systems.

Currently the Cathlamet Water System is governed by the Town Council who are elected by the citizens of the Town of Cathlamet. If the PUD were to take over the water system,

the water system would be governed by the PUD commissioners who are elected by all residents of Wahkiakum County including the residents of Cathlamet.

### FINANCIAL NEEDS OF CATHLAMET WATER SYSTEM

Tables 6-8 show the Town of Cathlamet's Water Fund revenues, expenditures, and a summary of the cash flow from 2009 through 2014.

**TABLE 6**

#### Summary of Historical Water Revenues for Cathlamet Water Fund

Description	2009	2010	2011	2012	2013	2014
Water Service	\$477,954	\$442,527	\$451,306	\$457,817	\$444,107	\$422,730
Excess Consumption <sup>(1)</sup>	-	-	-	-	-	\$56,883
Connections	\$31,553	\$20,352	\$26,729	\$3,458	\$2,171	\$9,352
Late Fees	\$6,047	\$6,254	\$6,465	\$9,585	\$9,951	\$9,514
Miscellaneous Revenue	\$3,802	\$1,761	\$1,403	\$1,645	\$3,443	\$6,117
Investment Interest	\$208	\$1,055	\$693	\$580	\$78	\$81
<b>Total Water Revenues</b>	<b>\$519,564</b>	<b>\$471,949</b>	<b>\$486,596</b>	<b>\$473,085</b>	<b>\$459,750</b>	<b>\$504,677</b>

(1) Category was added in 2014 to track the usage fee charged for water use over the 350 cubic feet included in the base rate.

**TABLE 7**

#### Summary of Historical Water Expenses for Cathlamet Water Fund

Description	2009	2010	2011	2012	2013	2014
Audit Costs	\$98	\$969	\$962	\$4,015	\$2,337	\$6,299
Prof Services - IT	\$2,113	\$2,138				\$1,048
Advertising	\$58			\$393	\$331	\$87
Op Rentals and Leases	\$431	\$646	\$569	\$538	\$538	\$383
Insurance	\$11,056	\$12,268	\$15,435	\$15,558	\$12,770	\$14,633
Excise Tax	\$19,912	\$25,374	\$22,224	\$20,814	\$22,893	\$18,349
Training-Travel	\$1,497	\$1,571	\$373	\$311		\$843
Training-Fees		\$360	\$473	\$333	\$248	
Repairs/Main-Contract	\$14,180	\$4,141	\$9,851	\$3,929	\$15,880	\$8,703
Salaries and Wages	\$98,317	\$101,818	\$101,197	\$101,428	\$96,938	\$97,868
Benefits	\$35,482	\$37,403	\$36,744	\$36,608	\$40,211	\$37,233
Telecomm & Postage	\$3,136	\$3,572	\$4,619	\$4,268	\$3,884	\$3,757
Supplies & Parts	\$30,964	\$23,270	\$27,727	\$27,291	\$37,194	\$56,107
Fuel	\$1,601	\$2,235	\$2,282	\$1,939	\$1,828	\$1,705
Small Tools and Equip	\$613	\$603	\$679	\$497	\$80	\$556
Prof Services	\$8,250	\$12,540	\$8,182	\$9,202	\$25,141	\$8,912
Op Rentals and Leases	\$35			\$1,406	\$1,381	\$1,194

**TABLE 7 – (continued)****Summary of Historical Water Expenses for Cathlamet Water Fund**

<b>Description</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>
Utilities	\$28,952	\$24,580	\$23,035	\$33,217	\$26,591	\$29,947
Repairs/Main		\$240				
Miscellaneous	\$2,566	\$3,197	\$2,593	\$1,115	\$2,102	\$2,405
Debt service - Interest	\$37,516	\$53,172	\$51,848	\$49,964	\$48,206	\$46,319
Debt service - Principal	\$104,372	\$110,690	\$111,076	\$112,022	\$106,613	\$113,792
Prof Services-Comp Plan						\$38,401
Other Improvements		\$49,460	\$4,990			
Other Impr/Meters	\$516	\$341,031	\$44,880	\$42,910		
IT replacement		\$3,316	\$724			
<b>Total Water Expenses</b>	<b>\$401,664</b>	<b>\$814,596</b>	<b>\$470,463</b>	<b>\$467,759</b>	<b>\$445,169</b>	<b>\$488,540</b>

As shown in Table 8, the water system ending fund balance increased each year except 2010 when the Town spent \$341,031 on meters and other improvements to their distribution system. This capital expense was partially funded by a USDA Loan for \$278,507. The remaining portion of the project was paid for using water reserves.

**TABLE 8****Summary of Historical Cash Flow for Cathlamet Water Fund**

<b>Description</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>
Beginning Fund Balance	\$253,941	\$369,932	\$303,419	\$319,123	\$323,302	\$351,203
Total Revenues	\$519,564	\$471,949	\$486,596	\$473,085	\$459,750	\$504,677
Total Expenses	\$401,664	\$814,596	\$470,463	\$467,759	\$445,169	\$488,540
Net Revenue	\$117,901	(\$342,646)	\$16,133	\$5,326	\$14,581	\$16,137
Transfer to Bond Reserves	\$1,910	\$2,373	\$2,292	\$2,292	\$2,292	\$13,296
Other Financing Sources		\$278,507				
<b>Ending Fund Balance</b>	<b>\$369,932</b>	<b>\$303,419</b>	<b>\$317,260</b>	<b>\$322,156</b>	<b>\$335,591</b>	<b>\$354,044</b>

Table 9 shows the projected cash flow for the Town of Cathlamet Water System including planned capital improvements from Chapter 8 of the 2015 Water System Plan.

**TABLE 9**

**Projected Cash Flow for Cathlamet Water Fund (Including Capital Improvements)**

Item	2015	2016	2017	2018	2019	2020
Beginning Balance	\$354,044	\$374,258	\$324,250	\$359,401	\$400,978	\$433,024
Projected Revenues	\$512,246	\$519,929	\$527,726	\$535,641	\$543,675	\$551,828
Projected Expenditures	\$492,032	\$495,637	\$405,561	\$410,334	\$415,226	\$420,230
Net Revenue	\$20,214	\$24,291	\$122,166	\$125,308	\$128,449	\$131,598
CIP		\$74,300	\$87,014	\$83,731	\$96,403	\$88,922
Ending Balance	<b>\$374,258</b>	<b>\$324,250</b>	<b>\$359,401</b>	<b>\$400,978</b>	<b>\$433,024</b>	<b>\$475,700</b>

With current water rates and projected expenses, it appears that the Town’s water system can be adequately operated and necessary improvements to the system can be made over the next 6 years.

The Town is currently paying off three loans related to the public water system. The Town’s debt service schedule for the next 10 years is shown in Table 10.

**TABLE 10**

**Town of Cathlamet Debt Service Schedule**

Year	USDA Water Rev Bond 406-3 <sup>(1)</sup>	USDA Water Rev Bond 406-2 <sup>(2)</sup>	Public Works Trust Fund 401-1 <sup>(3)</sup>	Total
	Water Main Replacement Columbia St. SR 4	Water Tank, Water Lines, Water Treatment Plant	Water System Improvements	
2015	\$22,910	\$40,590	\$95,670.60	\$159,170.60
2016	\$22,910	\$40,590	\$94,732.71	\$158,232.71
2017	\$22,910	\$40,590		\$63,500.00
2018	\$22,910	\$40,590		\$63,500.00
2019	\$22,910	\$40,590		\$63,500.00
2020	\$22,910	\$40,590		\$63,490.00
2021	\$22,910	\$40,590		\$63,500.00
2022	\$22,910	\$40,590		\$63,500.00
2023	\$22,910	\$40,590		\$63,500.00
2024	\$22,910	\$40,590		\$63,500.00
2025	\$22,910	\$40,590		\$63,500.00

(1) Scheduled to be paid off in 2049.

(2) Scheduled to be paid off in 2039.

(3) Scheduled to be paid off in 2016.

Table 11 shows the projected budget for the PUD if it were to acquire the Cathlamet Water System. For the purposes of this analysis, it has been assumed that water rates would remain as currently planned for all customers. Therefore, projected revenue is

simply the sum of projected revenue for each of the individual systems (from their respective Water System Plans), with the exception that the PUD's payment to the Town for Puget Island water purchase has been removed. The projected expenditures are the sum of the projected expenditures for each of the individual systems (from their respective Water System Plans), with the exceptions that the PUD's payment to the Town for Puget Island water purchase has been removed. In addition, the combined operations cost salaries has been reduced by \$30,000 to reflect the fact that the PUD anticipates operating the combined system with its existing billing staff. The PUD estimates that they would only need to employ one additional full time employee (FTE) for operations and maintenance, as opposed to the existing 1.25 FTEs utilized by the Town currently. It is assumed that one PUD FTE equals 1.25 Town FTE, and the total has been split evenly between Operations and Maintenance in Table 11.

**TABLE 11**

**Combined Projected Revenues and Expenses for Consolidated System (Without Capital Improvements)**

<b>Revenue Category</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>
Utility Sales and Service Fees	\$771,907	\$790,361	\$801,788	\$813,378	\$825,134	\$837,058	\$849,150	\$861,415	\$873,855	\$886,471
System Development Charges	\$17,593	\$17,735	\$17,880	\$18,026	\$18,175	\$18,326	\$18,480	\$18,635	\$18,793	\$18,954
Other Operating Revenues	\$9,289	\$9,382	\$9,477	\$9,573	\$9,670	\$9,769	\$9,869	\$9,971	\$10,075	\$10,180
Interest Income	\$274	\$274	\$274	\$274	\$274	\$274	\$275	\$276	\$277	\$279
Miscellaneous Non-Operating Income	\$663	\$663	\$663	\$663	\$663	\$663	\$663	\$663	\$663	\$663
<b>Total Revenues</b>	<b>\$799,725</b>	<b>\$818,415</b>	<b>\$830,081</b>	<b>\$841,914</b>	<b>\$853,917</b>	<b>\$866,090</b>	<b>\$878,437</b>	<b>\$890,961</b>	<b>\$903,663</b>	<b>\$916,546</b>
<b>Expense Category</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>
Operations <sup>(1)</sup>	\$170,573	\$172,690	\$174,858	\$177,079	\$179,353	\$181,682	\$188,248	\$195,052	\$202,106	\$209,419
Maintenance <sup>(1)</sup>	\$102,965	\$105,671	\$108,440	\$111,272	\$114,170	\$117,136	\$120,170	\$123,275	\$126,452	\$129,703
Depreciation	\$41,356	\$42,183	\$43,027	\$43,888	\$44,765	\$45,660	\$46,574	\$47,505	\$48,455	\$49,424
Customer Accounting	\$31,034	\$31,655	\$32,288	\$32,934	\$33,593	\$34,265	\$34,950	\$35,649	\$36,362	\$37,089
General Administration	\$80,048	\$81,610	\$83,206	\$84,835	\$86,499	\$88,199	\$90,167	\$92,180	\$94,241	\$96,351
Taxes	\$34,410	\$35,193	\$35,993	\$36,811	\$37,650	\$38,506	\$39,383	\$40,280	\$41,197	\$42,135
Interest Expense on Long-Term Debt	\$44,703	\$42,894	\$41,048	\$40,101	\$39,113	\$38,073	\$38,073	\$38,073	\$38,073	\$38,073
Miscellaneous/Other	\$171,759	\$172,854	\$80,196	\$81,378	\$82,605	\$83,882	\$86,068	\$88,339	\$90,696	\$93,144
Payment to Town of Cathlamet	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000
Capital Improvements	\$19,900	\$173,900	\$133,690	\$145,707	\$154,146	\$146,665	\$173,165	\$153,165	\$153,165	\$153,165
<b>Total Expenses</b>	<b>\$746,748</b>	<b>\$908,650</b>	<b>\$782,746</b>	<b>\$804,005</b>	<b>\$821,895</b>	<b>\$824,068</b>	<b>\$866,797</b>	<b>\$863,518</b>	<b>\$880,748</b>	<b>\$898,504</b>
<b>Net Income</b>	<b>\$52,977</b>	<b>(\$90,235)</b>	<b>\$47,336</b>	<b>\$37,909</b>	<b>\$32,021</b>	<b>\$42,021</b>	<b>\$11,640</b>	<b>\$27,443</b>	<b>\$22,915</b>	<b>\$18,043</b>

(1) Employee salaries and benefits are split between Operations and Maintenance categories.



**Water Rate Comparison**

The Town of Cathlamet’s current water rates are summarized in Table 12.

**TABLE 12**

**Town of Cathlamet Water Rates**

<b>Meter Size</b>	<b>In-Town Base Rate<sup>(1)</sup></b>	<b>In-Town Usage Rate<sup>(2)</sup></b>	<b>Out-of-Town Base Rate<sup>(1)</sup></b>	<b>Out-of-Town Usage Rate<sup>(2)</sup></b>
5/8 inch	\$31.77	\$2.17	\$46.41	\$2.91
3/4 inch	\$37.58	\$2.17	\$58.16	\$2.91
1 inch	\$50.36	\$2.17	\$72.91	\$2.91
1-1/2 inch	\$66.94	\$2.17	\$96.33	\$2.91
2 inch	\$85.59	\$2.17	\$122.63	\$2.91
3 inch	\$113.58	\$2.17	\$161.90	\$2.91
4 inch	\$148.75	\$2.17	\$211.78	\$2.91

- (1) Monthly minimum charge, includes up to 350 cubic feet of water.
- (2) Cost per 100 cubic feet of water for consumption exceeding 350 cubic feet in any one month.

Multiple-family dwelling units using only one meter are billed as follows: billed as a 5/8-inch meter for single-family, as a 3/4 inch for two to three units, as a 1-inch meter for four to six units, as a 1-1/2-inch meter for seven to ten units, as a 2-inch meter for 11 to 20 units, as a 3-inch meter for 21 units and up, and as a 4-inch meter for schools.

In addition to the fees above, the Town charges a water hookup fee for new construction. New hookups are \$3,000 plus cost of installation within Town limits, and \$5,000 plus cost of installation outside Town limits.

Table 13 shows the current Wahkiakum County PUD No. 1 water rates.

**TABLE 13**

**Wahkiakum County PUD No. 1 Water Rates**

<b>Meter Size</b>	<b>Base Rate<sup>(1)</sup></b>	<b>Usage Fee<sup>(2)</sup></b>
5/8 inch	\$40.95	\$2.10
3/4 inch	\$40.95	\$2.10
1 inch	\$48.32	\$2.10
1-1/2 inch	\$55.69	\$2.10
2 inch	\$60.61	\$2.10

- (1) Monthly minimum charge.
- (2) Cost per 100 cubic feet of water consumption.

To compare the Town and PUD water rates, billing totals for a 5/8-inch meter for a selection of water usage volumes ranging from 100 to 1,000 cubic feet are shown in Table 14.

**TABLE 14**  
**Comparison of Town and PUD Water Rates**

<b>Consumption (cubic feet)</b>	<b>Cathlamet In-Town Bill</b>	<b>Cathlamet Out-of- Town Bill</b>	<b>PUD Bill</b>	<b>Percent Difference in Bill (In-Town)</b>	<b>Percent Difference in Bill (Out-of- Town)</b>
100	\$31.77	\$46.41	\$43.05	36%	-7%
200	\$31.77	\$46.41	\$45.15	42%	-3%
300	\$31.77	\$46.41	\$47.25	49%	2%
400	\$32.86	\$47.87	\$49.35	50%	3%
500	\$35.03	\$50.78	\$51.45	47%	1%
600	\$37.20	\$53.69	\$53.55	44%	0%
700	\$39.37	\$56.60	\$55.65	41%	-2%
800	\$41.54	\$59.51	\$57.75	39%	-3%
900	\$43.71	\$62.42	\$59.85	37%	-4%
1,000	\$45.88	\$65.33	\$61.95	35%	-5%

As shown in Table 14, the water bill for a residential customer inside the Town limits would increase by about 40 percent, on average, if billed at current PUD water rates. The bill for a residential customer outside the Town limits would not change significantly. The number of connections inside the Town limits is approximately equal to the number of connections outside the Town limits. Therefore, revenue generated from water sales inside the Town limits would increase approximately 40 percent (\$84,000), and revenue generated from water sales outside the Town limits would not change significantly if billed at current PUD rates. Assuming that expenses remained the same, the utility would see about a 20 percent increase in revenues from water sales if the PUD acquired the system and implemented the PUD’s current water rates. For this transfer to be accepted by customers, it is likely that some adjustment to the PUD’s rate structure would need to be made for current Town customers. We understand that the PUD would likely keep the current rate structure in place and would only adjust the rate structure in the future based on a cost of service study.

**Estimated Value of the Cathlamet Water System**

The value of the Cathlamet Water System was estimated using a methodology that estimates the original cost of the system assets and then estimates the current depreciated value of each asset. This assessment was completed based upon the inventory of facilities

and estimated year of construction from the Cathlamet Water System Plan. Details of the valuation are included in Appendix A.

To estimate the original installation cost for each facility, a 2016 replacement cost was determined and was then adjusted back to the estimated date of installation using the *Engineering News Record* (ENR) Construction Cost Index (CCI) to adjust the replacement cost to the original installation cost. The 2016 depreciated book value was then calculated using a straight-line depreciation of the calculated original installation cost from the year of installation to the present.

Construction costs include local sales tax (7.6%) and contractor’s overhead and profit (15%). The estimated engineering, construction management, and administrative costs (25%) were added to the construction cost to yield the replacement cost.

Table 15 provides a summary of the replacement and original costs for the Cathlamet Water System.

**TABLE 15**

**Estimated Water System Facility Value**

<b>Water System Facility</b>	<b>Replacement Costs</b>	<b>Original Costs</b>	<b>Depreciated Book Value</b>
Water Treatment Plant	\$2,606,000	\$1,311,000	\$717,000
Reservoirs	\$1,717,000	\$615,000	\$434,000
Booster Station	\$234,000	\$144,000	\$50,000
Valves	\$374,000	\$154,000	\$80,000
Hydrants	\$310,000	\$38,000	\$3,000
Water Services	\$452,000	\$345,000	\$172,000
Water Mains	\$7,739,000	\$2,474,000	\$1,683,000
Land			\$45,000
<b>Total</b>	<b>\$13,432,000</b>	<b>\$5,081,000</b>	<b>\$3,184,000</b>

(1) All costs are rounded to the nearest one thousand dollars.

The Cathlamet Water System currently has \$1,135,000 in outstanding debt on improvements that have been made to the water system. The value of the water system should be reduced by this amount.

Previously in this report several capital improvements were identified that are necessary to bring the Cathlamet Water System into compliance with current standards. These improvements are summarized in Table 5 and total \$1,075,000. The value of the Cathlamet Water System should also be reduced by the cost of these improvements. Subtracting outstanding debt and required system improvements from the depreciated

book value of the system provides an estimated system value of \$974,000 as summarized in Table 16.

**TABLE 16**

**Estimated Water System Value**

<b>Component</b>	<b>Value</b>
Facility Book Value	\$3,184,000
Outstanding Debt	\$1,135,000
Cost of Required Improvements	\$1,075,000
<b>Total Estimated Value</b>	<b>\$974,000</b>

**Strategies to Offset Lost Town Revenue**

If the PUD were to take over the Cathlamet Water System, the Town would lose a source of revenue that has historically been used to help pay for the services of the public works and administration staff. Although these staff members would have less duties to perform, there would be a loss of efficiency and economy of scale. For this transfer to be attractive to the Town of Cathlamet, there would likely need to be an alternative source of revenue developed to offset this loss of efficiency and economy of scale.

One existing source of revenue that the Town of Cathlamet could continue to collect would be the Town’s utility tax. The Town currently levies a six percent utility tax on the water bills for its in-Town customers. Revenue from this utility tax goes into the Town’s General Fund. Table 17 shows revenues raised by the Town’s existing utility tax.

**TABLE 17**

**Historical Water Utility Tax Revenue from 2009 through 2014**

<b>Utility Tax Revenue</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>
Total Tax Revenue	\$13,780	\$13,286	\$13,470	\$24,805	\$26,445	\$28,848
Puget Island Tax Revenue	\$2,231	\$2,207	\$2,231	\$4,592	\$4,264	\$4,454
Town Tax Revenue	\$11,549	\$11,079	\$11,239	\$20,213	\$22,181	\$24,394

(1) The utility tax was increased from 3 percent to 6 percent on February 1, 2012.

One option for providing new revenue for the Town would be for the Town to create a franchise agreement with the PUD. With the franchise agreement the PUD would agree to pay the Town an annual fee in return for allowing the PUD to operate water facilities within the Town right-of-way and provide water service within the Town Limits.

Another option for reducing the impact to the Town of the PUD acquiring the Town water system would be for the PUD to take over billing for the Town’s sewer services. If

the PUD is already billing Town customers for water and power services, it could be more cost effective for the PUD to also bill the Town's customers for sewer services on the same bill. Further economies of scale might also be able to be achieved if the PUD were to acquire the entire Cathlamet sewer system.

## **LEGAL ISSUES**

A review of legal issues associated with the PUD acquiring the Town water system has been completed by the PUD's attorney. This review of legal issues is included in Appendix B.

**APPENDIX A**  
**SYSTEM VALUATION**

## **Cost Estimating Methodology:**

In general, the following cost estimating methodology was used. Deviations from this methodology are noted below.

1. The system inventory was established using the 2015 Cathlamet Water System Plan.
2. 2016 Replacement cost was estimated for individual items or on a per linear foot basis based on past bid estimates.
3. Estimated Engineering, construction management, and administrative costs were included.
4. The total replacement cost in today's dollars was estimated based on the unit cost and quantity of the item.
5. The ENR CCI and the date of installation was used to adjust the 2016 replacement cost to an estimated original cost.
6. Straight line depreciation was used to obtain the 2016 Original Cost Less Depreciation (OCLD).
7. The sum of the OCLD of all inventory items and any debt the system holds results in the system value.

## **Treatment Plant**

The value of the treatment plant was broken out into several line items. These individual line items include the existing treatment plant structure and piping and filtration. The raw water intake, chemical feed system, and finished water were further broken out into smaller components.

The value of the existing treatment plant was calculated using the original 1967 plant structure and piping construction value and updating that cost using the ENR CCI to estimate the 1999 construction value.

## **Storage**

The value of the Greenwood Reservoir and Kent's Bridge Reservoir were estimated using the G&O cost curve that estimates a cost per gallon based on historical construction costs.

## **Pipe**

From the 2015 Cathlamet Water System Plan it is known that the system contains approximately 38% PVC and 40% AC pipe. Based on this and a breakdown of pipe sizes from GIS mapped system, an inventory of pipe was developed to match the known quantities and conform to engineering practices.

Years of installation were assumed based on the GIS mapped system and the development history of the system. For example, Water main connecting to and from the Kent's Bridge Reservoir was assumed to be constructed the same year. Small diameter water main was assumed to have been constructed when the original system was developed.

**Valves**

Valve sizes were established using the existing GIS maps. Ages were determined based on the assumed year of installation of the connecting pipe.

**Hydrants**

The inventory of hydrants was established based on the existing GIS maps and year of installation was based on the connecting pipe.

**Meters**

The number of service meters was assumed based on the number of services of the system. The age of the meters was assumed to be halfway through their existing item service life based on a rotating schedule of replacement and the year of installation was determined accordingly.

**Debt**

The value of system debt was determined based on the value listed on debt payment schedules as of January 25, 2016.



Item	Size	Quantity	Unit	ENR CCI	Approx. Year Installed	Existing Unit RCN (2016)	Existing Total RCN (2016)	Original Total Cost Per CCI	Existing Item Service Life	Age In 2016	Original Cost Less Depreciation (OCLD) 2016
<b>Treatment</b>											
Building		1	Each	7137	1999	\$ 150,000	\$ 150,000	\$ 94,387	50	17	\$ 62,296
Piping, Valves, and Appurtenances		1	Each	7137	1999	\$ 200,000	\$ 200,000	\$ 125,850	50	17	\$ 83,061
<b>Raw Water Intake</b>											
Intake Pumps	Floway 7.5 hp 4-Stage 10JKM, rated at 350 gpm each	2	Each	10143	2013	\$ 41,934	\$ 83,869	\$ 75,000	25	3	\$ 66,000
Intake Pipe	10" polyethylene pipe	90	LF	1074	1967	\$ 2,000	\$ 400,000	\$ 37,875.64	75	49	\$ 13,130
Influent Turbidimeter	Hach Surface Scatter 6	1	Each	7137	1999	\$ 7,000	\$ 7,000	\$ 4,405	15	17	\$ -
Influent Flow Meter	Siemens Sitrans FM Magflo Mag 5000/Mag 5100W	1	Each	7137	1999	\$ 3,000	\$ 3,000.00	\$ 1,888	15	17	\$ -
<b>Chemical Feed System</b>											
Streaming Current	Chemtrac SCM2500, located under filters	1	Each	7137	1999	\$ 19,634	\$ 19,634	\$ 12,354	15	17	\$ -
Polymer Pumps	Jesco MAGDOS 1.6 gph (one for coagulant, one for filter aid)	2	Each	7137	1999	\$ 2,000	\$ 4,000	\$ 2,517	20	17	\$ 378
Chlorine Pumps	Stenner 85 MHP5	2	Each	7137	1999	\$ 1,500	\$ 3,000	\$ 1,888	20	17	\$ 283
Fluoride Pumps	Stenner 85 MHP40	2	Each	7137	1999	\$ 1,500	\$ 3,000	\$ 1,888	20	17	\$ 283
Static Mixer	Tah 3-Stage Process Mixer	1	Each	7137	1999	\$ 2,992	\$ 2,992	\$ 1,882	25	17	\$ 602
Clearwell	Concrete, 55,000 gallons	1	Each	1074	1967	\$ 256,509	\$ 256,509	\$ 24,289	75	49	\$ 8,420
<b>Filtration</b>											
Filter Unit	USFilter, Trident 210A, rated for 350 gpm	2	Each	7137	1999	\$ 559,124	\$ 1,118,247	\$ 703,655	40	17	\$ 404,601
<b>Finished Water</b>											
Chlorine Pumps	Stenner 85 MHP5	2	Each	7137	1999	\$ 1,500	\$ 3,000	\$ 1,888	20	17	\$ 283
Chlorine Analyzer	Hach CL17	1	Each	7137	1999	\$ 4,000	\$ 4,000	\$ 2,517	15	17	\$ -
Finished Turbidimeter	Hach Low Range 1720D	1	Each	7137	1999	\$ 3,000	\$ 3,000	\$ 1,888	15	17	\$ -
Wet Well	12,400 gallons	1	Each	7137	1999	\$ 114,750	\$ 114,750	\$ 72,206	75	17	\$ 55,840
Finished Water Pumps	Floway, 30 hp, 300 gpm	2	Each	7137	1999	\$ 15,000	\$ 30,000	\$ 18,877	20	17	\$ 2,832
Electrical and Controls		1	Each	7137	1999	\$ 200,000	\$ 200,000	\$ 125,850	20	17	\$ 18,877
<b>Booster Station Facilities</b>											
Greenwood Pump Station Pumps	40 hp Cornell pumps, 200 gpm	3	Each	6958	1998	\$ 15,000	\$ 45,000	\$ 27,605	20	18	\$ 2,760
Building	14'x14' CMU, Composition Roof	1	Each	6958	1998	\$ 39,200	\$ 39,200	\$ 24,047	75	18	\$ 18,275
Electrical and Controls		1	Each	6958	1998	\$ 100,000	\$ 100,000	\$ 61,343	25	18	\$ 17,176
Piping and Valves	8", pump control, pressure relief	1	Each	6958	1998	\$ 50,000	\$ 50,000	\$ 30,672	30	18	\$ 12,269
<b>Storage</b>											
Greenwood Reservoir	500,000 gallons, 52' diameter, 32' high	1	Each	1074	1967	\$ 844,793	\$ 844,793	\$ 79,993	75	49	\$ 27,731
Kent's Bridge Reservoir	530,000 gallons, 62' diameter, 24' high	1	Each	6958	1998	\$ 871,797	\$ 871,797	\$ 534,790	75	18	\$ 406,441



**APPENDIX B**  
**LEGAL REVIEW**

## **TASK 4: LEGAL REVIEW**

The following is a brief summary of the Washington state statutes and codes applicable to the transfer of ownership of the Town of Cathlamet (“Town”) Water System to Public Utility District No. One of Wahkiakum County (“PUD”).

### **PUD’s Authority to Acquire Water System**

Public utility districts are municipal corporations authorized to own and operate domestic water systems. The statutory authority for a public utility district to acquire and operate a water system is contained in RCW Chapter 54.16.

RCW 54.16.020 provides that a public utility district “may...purchase, acquire, maintain, operate, develop and regulate...plants, plant facilities, and systems for developing, conserving, and distributing water for domestic use and irrigation....”

RCW 54.16.030 states, “A district may construct, purchase, condemn and purchase, acquire, add to, maintain, conduct, and operate waterworks and irrigation plants and systems, within or without its limits, for the purpose of furnishing the district, and the inhabitants thereof...with an ample supply of water for all purposes...with full and exclusive authority to sell and regulate and control the use, distribution, and price thereof.”

RCW 54.16.050 states, “A district may take, condemn and purchase, purchase and acquire any public and private property, franchises and property rights...and property and littoral and water rights, for any of the purposes aforesaid...”

### **Town’s Authority to Convey Water System**

The statutory authority for a town to convey or otherwise dispose of a water system is contained in RCW Chapter 35.

RCW 35.27.010 authorizes a town to “purchase, lease, receive, hold, and enjoy real and personal property and...convey, or otherwise dispose of the same for the common benefit.”

RCW 35.27.370(2) gives the town council the power to “purchase, lease, or receive such real estate and personal property as may be necessary or proper for municipal purposes, and to control, dispose of and convey the same for the benefit of the town....”

RCW 35.94.010 authorizes a city to “sell and convey any public utility works, plant, or system owned by it or any part thereof, together with all or any equipment and appurtenances thereof.”

## **Transfer Terms**

In addition to the authority contained in the governing statutes for PUDs and towns, RCW 39.33.010 provides that governmental entities can sell or transfer property to other governmental entities “on such terms and conditions as may be mutually agreed upon by the proper authorities of the...subdivisions concerned.” A public hearing and notice thereof are required by RCW 39.33.020.

In addition, RCW 35.27.370(3) authorizes a town council to “contract for supplying the town with water for municipal purposes....”

## **Procedure and Permitting**

Washington Administrative Code Chapters 246-290 and 246-294 provide the procedure for notification of transfer of ownership and compliance with permitting requirements of a Group A public water supply.

Under WAC 246-290-035(2), an owner of a public water system who is proposing to transfer or has transferred ownership (in this case, the Town of Cathlamet) must do the following:

- (a) Provide written notice to the department and all consumers at least one year prior to the transfer, unless the new owner agrees to an earlier date. Notification shall include a time schedule for transferring responsibilities, identification of the new owner, and under what authority the new ownership will operate;
- (b) Ensure all health-related standards pursuant to WAC Ch. 246-290 are met during transfer of the utility;
- (c) Inform and train the new owner regarding operation of the utility; and
- (c) Comply with the operating permit requirements pursuant to WAC Ch. 246-294.

When the department is notified of the transfer of ownership as set forth above, it then sends an application to the new owner who, pursuant to WAC 246-294-060, is required to apply for and obtain a new operating permit before taking possession of the system being transferred.

The new owner then proceeds with the permit process under WAC 246-294-030.

## **Financing Considerations**

If the Town’s water system is financed through revenue bonds, bond counsel would need to be consulted.