VARELA
Engineering & Management

Town of Twisp

WASTEWATER FACILITY PLAN

FUNDED BY:

State of Washington Department of Ecology

Agreement No. WQC-2019-RepcPW-00101

DEPARTMENT OF ECOLOGY
State of Washington

September 25, 2020

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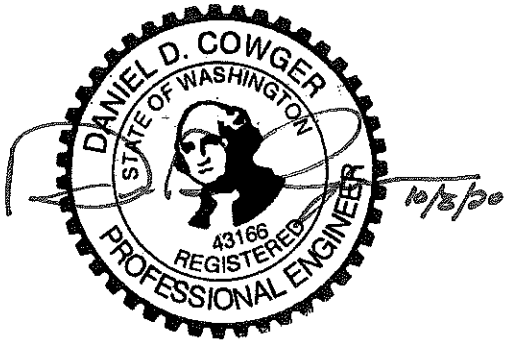
TOWN OF TWISP

Wastewater Facility Plan

September 2020

The technical material and data contained in this Report were prepared under the supervision and direction of the undersigned whose seal as a professional engineer licensed to practice as such in the State of Washington is affixed below.



Professional Engineer

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1.0 Introduction

Varela and Associates, Inc. (Varela) entered into an agreement for engineering services with the Town of Twisp in February of 2020. This agreement authorized Varela to proceed with the preparation of this Engineering Report.

This work is being financed by the Washington State Department of Ecology (ECY), Agreement No. WQC-2020-TwisPW-00073.

1.1 Purpose and Scope

This wastewater facility plan engineering report provides an evaluation and plan to improve the Town's Publicly Owned Treatment Works (POTW) wastewater treatment facilities. The engineering report provides an evaluation of treatment options for residential and commercial growth within the Town's sewer service area for the 20-year planning period. Construction of a brewery and its future expansion is projected to immediately increase organic loading to the plant and combined with residential growth, treatment capacity could be reached within a few years. Planning for treatment improvements is needed to identify improvements and to secure financing for design and construction of these improvements before the POTW reaches treatment capacity.

The goal of Twisp's wastewater facility planning is to evaluate and determine the most cost effective treatment improvements for the Town that are: (1) protective of surface water quality standards for the Methow River; (2) address treatment improvements anticipated to ensure that the system is suitable for the next 20 year planning period; and (3) provide the technical and financial information needed to provide a pathway to project implementation. Preparation of the wastewater facility engineering report conforms to the requirements of WAC 173-240-060.

A General Sewer Plan (GSP) was completed and approved by ECY in 2019. The GSP defines the sewer service area and provides the future 20-year flows and loadings to the POTW. The GSP also includes an evaluation of solids dewatering and of the discharge outfall. Sections of the GSP have been copied, with minor revisions, to this report in order to provide background information and relevant information needed to evaluate wastewater system alternatives in this document.

1.2 Approvals Required

This Plan must be reviewed and approved by the Washington State Department of Ecology prior to implementation.

1.3 Abbreviations and Acronyms

A list of abbreviations and acronyms that have been used in this report are shown in Table 1-1 on the following page.

Table 1-1: Abbreviations and Acronyms

7Q10	Lowest 7 day average flow with a 10% chance of occurring yearly	MCL	Maximum contaminant level
AC	Asbestos cement water main material	MG	Million gallons
ac-ft/yr	Acre-feet per year (a measure of water volume withdrawn from a well)	MHI	Median household income
add'l.	Additional	mgd	Million gallons per day
AKART	All known, available, and reasonable methods of prevention, control, and treatment	mg/L	Milligrams/liter
ave.	Average	MHI	Median household income
BOD5	5 day biochemical oxygen demand	mi.	Mile
CCW	Centennial Clean Water Program	min.	Minimum
CDBG	Community Development Block Grant	NRCS	Natural Resources Conservation Service
CFP	Capital facilities plan	NEPA	National Environmental Protection Act
cfs	Cubic feet per second	NPDES	National Pollutant Discharge Elimination System
CTED	Dept. of Community, Trade, and Economic Development	OFM	Office of Financial Management
CY	Cubic yards	O&M	Operation and maintenance
DCSD	Douglas County Sewer District	pH	The measure of the acidity or basicity of a solution
DFW	Wash. State Department of Fish and Wildlife	PVC	Polyvinyl chloride (plastic) material
dia.	Diameter	PWTF	Public Works Trust Fund
DO	Dissolved Oxygen	RCW	Revised Code of Washington
DOE	Wash. State Department of Ecology	RD	Rural Development (formerly FmHA)
DOH	Wash. State Department of Health	REET	Real Estate Excise Tax
elev.	Elevation	ROW	Right of way
EPA	Environmental Protection Agency	R/R	Railroad
ERU	Equivalent residential user	SBR	Sequencing batch reactor
FCWA	Federal Clean Water Act	SCADA	Supervisory control and data acquisition (i.e., computerized control system)
FEMA	Federal Emergency Management Agency	SEPA	State Environmental Protection Act
FmHA	Farmer's Home Administration, now known as Rural Development	SRF	State Revolving Fund
gal	Gallons	STAG	State and Tribal Assistance Grant
gpad	Gallons per acre per day	suppl.	Supplemental
gpcd	Gallons per capita per day	TDG	Total dissolved gas
gpd	Gallons per day	TDH	Total dynamic head
gpm	Gallons per minute	TDS	Total dissolve solids
GMA	Growth management area	TMDL	Total Maximum Daily Load

GO	General obligation (a type of bond secured by property taxes)
HP	Horsepower
HUD	Housing and Urban Development
IAVMP	Integrated Aquatic Vegetation Management Plan
JARPA	Joint Aquatic Resource Permits Application
LEC	Lake Enhancement Committee
LF	Lineal feet
LID	Local improvement district
max.	Maximum
MBR	Membrane bioreactor
TSS	Total suspended solids
UGA	Urban growth area
ULID	Utility local improvement district
UV	Ultra violet
VOC	Volatile organic chemicals
WAC	Washington Administrative Code
WSP	Water system plan
WTP	Water treatment plant
WWTP	Wastewater treatment plant
WWTF	Wastewater treatment facility
WWF/ GSP	Wastewater Facilities / General Sewer Plan

2.0 Planning Considerations

2.1 Location and Physical Characteristics

2.1.1 *Location*

The Town of Twisp is located adjacent to the Methow River along State Highway 20 in southwestern Okanogan County, Washington. The nearest population centers are Winthrop and Carlton, which are located approximately 9 miles north and 10 miles south respectively. Twisp is located in the eastern foothills of the North Cascade Mountain Range. Officially incorporated on August 6, 1909, the Town developed primarily due to lumber and mining, with agricultural use growing in later years. The opening of State Route 20 in 1972 brought more residents and seasonal recreationalists. Twisp is the largest town in the Methow Valley.

Twisp is located at latitude 48 degrees, 21.8 minutes north and longitude 120 degrees, 7.3 minutes east and in portions of Sections 7, 17 and 18, Township 33 N, Range 22 E. A location map is provided as **Figure 2-1**.

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Mayor: Soo Ing-Moody
Public Works Director: Andrew Denham

2.1.2 *Climate*

The weather is arid with only 29 days of precipitation, totaling 14 inches of rainfall per year on average. However, the area does see nearly 65 inches of snow per year on average. Summers usually see temperatures averaging around highs of 85°F and winters averaging around lows of 18°F[1].

2.1.3 *Geology*

The area is bounded on all sides by the Cascade Mountain Range. Glacial, fluvial, and volcanic events shaped the geology of the area. The soils in the Town of Twisp are almost entirely composed of sandy loam, ranging from fine to extremely stony, and are well-drained. The majority of the soils in the Town of Twisp are classified by the NRCS as OWHI fine sandy loam (0-3% slope), gravelly fine sandy loam (0-8% slope) and extremely stony fine sandy loam (0-45% slope). The soil map from the Comprehensive Plan is included in **Appendix A.**

2.1.4 *Topography and Surface Drainage*

The majority of the sewer service area is relatively flat in the elevation range of 1590 – 1750 feet above sea level. The main area of town is bordered on the north by the Twisp River and on the east by the Methow River which runs parallel to State Route 20 (SR20).

The Methow Valley experiences moderate rainfall and heavy snowfall on well-drained valley soils. The soils are well drained and the majority of surface runoff drains into the ground. The Town has a few locations along SR20 with storm drain systems that collect highway runoff and provide treatment prior to discharging to the ground.

2.1.5 *Surface Water, Wetlands and 100 Year Floodplain*

Surface water features in the town include the Twisp and the Methow Rivers. The Twisp River joins the Methow River at the north side of Town. USGS river gauge (USGS 12449500) is located on the Methow River at Twisp, downstream of the Twisp River confluence. The Twisp River also has a USGS gauge (USGS 12448998) upstream of the Town limits. ECY has a long-term river sampling site (48A140) on the downstream side of the SR20 bridge. The treatment plant discharges to the Methow River near the downstream edge of Town.

Wetlands within the Town limits are associated with the Twisp and Methow River shorelines according to National Wetlands Inventory (NWI) maps. Approximately 3,000 linear feet of levees are located on the Twisp River shoreline, above its confluence with the Methow River. The levees reduce flooding in low laying areas of the Town. **Appendix A** includes the FEMA floodplain map from the Town comprehensive plan.

2.2 Land Use and Public Utilities

The Town of Twisp covers about 735 acres with a population of 956 in 2017. The Town Comprehensive Plan, updated in 2010, provides planning guidance for the future growth of the Town. Maps showing existing land uses and designated future land uses are included in the 2019 GSP.

1 Western Regional Climate Center

2.2.1 *Town Ordinances and Policies*

The Town manages its water and wastewater systems through Title 13 (Public Utilities) of the Twisp Municipal Code. Sanitary sewer regulations are found in Chapter 13.30. Relevant sections of the code require that new developments be connected to the sanitary sewer; that new sewers and service connections are inspected by Town staff; prohibits various substances being discharged to the sewer; and provides a means for pretreatment of high strength wastes and for determining if unusual wastes can be accepted.

In early 2019, the Town, working with ECY, agreed to accept discharge from the proposed OSB brewery. This brewery produces a high strength BOD waste that will, in the near future, require the Town to plan for plant upgrades.

2.2.2 *Existing Water System*

The Town of Twisp Water Comprehensive Plan was updated in 2015[2]. The water system includes three active wells (there are a total of four town wells), three reservoirs capable of storing 675,000 gallons, a booster station and approximately 10 miles of transmission and distribution piping. A map of the water distribution system is included in **Appendix A.**

A Water Conservation Program[3] is in place. Twisp's water conservation program has been very successful, reducing water use by about 330% between 1987 and 2013. This has been accomplished by reducing distribution system leakage, implementing an increasing block/seasonal rate structure billing, improved metering, and public education.

2.2.3 *Existing Sanitary Sewer Collection System*

Twisp manages approximately 7.9 miles of sanitary sewer main providing service to Town residents and businesses. Twisp's sewer system was constructed in 1976. The collection system includes three lift stations and one siphon under the Twisp River. The lift stations are located at the south end of Bridge Street and at the manufactured home park located on the west side, immediately south of the Twisp river, and at the treatment plant. The treatment plant is located in the southeast corner of the town's incorporated boundary.

2.2.4 *Existing Wastewater Treatment System*

The Twisp wastewater treatment plant is an extended aeration oxidation ditch plant that was originally constructed in 1976 to replace individual septic tanks, drainfields, and drywells. The principal treatment plant operator is required to have, at a minimum, a Class II operator's license. Treated effluent is discharged to the Methow River at River Mile 38.9.

Biosolids generated by the treatment plant are stabilized in an aerobic digester, dewatered, and land applied as a stabilized liquid on nearby agricultural land to beneficially reuse the biosolids.

2 Water System Plan, Gray & Osborne, Inc., date 2015

3 Water Conservation Plan, A Supplement to the 2007 Water System Plan, Aspect Consulting, 2014

2.2.5 *Nearby Wastewater Treatment Facilities*

The Town of Winthrop operates municipal wastewater lagoons that discharge into the Methow River approximately 11 miles upstream of Twisp's discharge. No other domestic or industrial wastewater treatment plants are located near Twisp.

2.2.6 *Planning Period*

The planning period used in this document for treatment facilities is twenty years, a typical period used for planning these public utilities.

3.0 Wastewater Management Planning Data

The planning data used to evaluate the wastewater management system is presented in this section. This section includes a review of documentation regarding the Town's wastewater system, provides projected flows and loading rates to the treatment plant, summarizes regulatory requirements relevant to this work, and discusses receiving water characteristics.

3.1 History and Planning Documents

The wastewater treatment plant and collection system were constructed in 1976. The wastewater system replaced the septic tanks and drainfields previously used. In 1997, the Town of Twisp prepared a Wastewater Facilities Plan[4] that resulted in the 2001 plant upgrade. The upgrade included improvements to the headworks, the oxidation ditch, construction of a new final clarifier, an aerobic sludge digester, and installation of a UV disinfection system. The plan evaluated the wastewater collection system and treatment facilities. Major findings of the plan included:

- A projected population of 1,331 persons in 2016 was used for facilities planning. The projected plant loads were an average day flow of 149,000 gpd with an average annual BOD load of 190 lb/day with a peak hour flow of 2.0 mgd.
- A mixing zone and dissolved oxygen sag analysis was conducted for the 1997 plan. The analysis concluded that the plant met effluent limits with the permitted mixing zone.
- The sludge drying beds are inadequate for stabilizing sludge produced by the treatment plant. The Town contracts with a local septage hauler to dispose of liquid sludge.

The Methow Basin (WRIA 48) Watershed Plan, dated 2005, prepared by the Methow Basin Planning Unit, provides water resource management guidelines within the WRIA. The purpose of the plan was to document current water supplies and uses and to develop strategies to increase water supply in the basin. The plan notes that domestic consumption is an insignificant portion of total water use and does not identify wastewater reuse or municipal conservation as an important method of increasing water supply.

The 2010 Update to the Twisp Comprehensive Plan provides information on land use, public utilities, and population growth. The Comprehensive Plan identifies an urban growth boundary that serves as the sewer service area and states that treatment plant upgrades may be needed to provide service to the entire UGA.

Documented in a January 2014 letter to the Town, an analysis of the treatment plant was performed by Gray & Osborne, Inc. The issues considered included poor settleability of sludge and winter storage of biosolids. This analysis provided recommendations to improve performance of the oxidation ditch and clarifier as well as identified issues with winter biosolids storage.

The Town was approved by ECY, as part of a 2015 Engineering Report written by Gray & Osborne, to operate a pilot study of diffused aeration in the oxidation ditch and a selector cell in the influent grit chamber. Town staff installed related equipment and have been operating both modifications since 2016, which have improved process control. Results from the pilot study were analyzed as part of the 2020 Wastewater Facilities Planning.

A General Sewer Plan was prepared and approved by ECY in 2019. The GSP addressed three wastewater issues that the Town was experiencing. These issues were:

- Limited information is available regarding the existing sanitary sewer collection system.

4 Town of Twisp Wastewater Facilities Plan, October 1997, Gray &Osborne, Inc.

- Insufficient capacity for winter storage of biosolids at the treatment plant.
- Treatment plant outfall is buried in a gravel bar and may need to be relocated.

The GSP evaluated alternatives and provided a capital improvement plan that:

- Repairs and replaces damaged sanitary sewers and upgrades the lift stations,
- Replaces the biosolids dewatering equipment and changes the method of beneficial reuse,
- Provided alternatives to relocate the discharge outfall as required by the 2015 NPDES permit.

3.2 Service Area and Population Projections

3.2.1 *Service Area*

The sewer service area is the Town UGA as shown in the Town Comprehensive Plan (map included in **Appendix A**). Sanitary sewer and water services are provided to most areas within the 735 acre Town limits. A few areas on the edge of town and the airport are not served by sanitary sewer. The Town provides sewer to 16 services outside the town limits.

The UGA shown in the Comprehensive Plan allows the Town to coordinate with future county developments close to the Town limits, providing the town the opportunity to provide water and sewer utility services to developments within the UGA (after annexation).

3.2.2 *Population, Flows and Load Projections*

Per Twisp's Public Works Director (Twisp PWD), Twisp's current wastewater treatment plant loadings, are shown in **Table 3-1. Table 3-1** includes the Town's current permitted NPDES limits and the projected flows and loadings for the 20-year planning period that were prepared for negotiations and permitting of the OSB brewery in 2018/2019.

Table 3-1: Projected Future Flows and Loadings

Criteria	NPDES PERMIT	Exiting Conditions	Year 2045 (20 Year Design)
Population	1,456	970	1,429
Flow [1]			
Annual Average Flow (AAF), gallons per day	163,000	72,000	125,000
Maximum Month Flow (MMF), gallons per day	182,000	90,000	156,000
Maximum Day Flow (MDF), gallons per day	---	181,000	266,000
5-day Biochemical Oxygen Demand (BOD_5) [2]			
5-Day BOD Loading, Annual Average, pounds per day	220	155	305
5-Day BOD Loading, Maximum Month, pounds per day	300	198	389
5-Day BOD Loading, Maximum Day, pounds per day [3]		301	592
Total Suspended Solids (TSS) [2]			
TSS Loading, Annual Average, pounds per day	220	120	209
TSS Loading, Maximum Month, pounds per day	300	177	308
Total Kjeldahl Nitrogen (TKN) [4]			
TKN Loading, Annual Average, pounds per day	---	32	63
TKN Loading, Maximum Month, pounds per day	---	40	80

(1) Source for current flows: Monthly Discharge Monitoring Reports. Flow projections based on population growth as adopted by City, plus anticipated discharge from new commercial / industrial source Old Schoolhouse Brewery, Inc., (OSB) based on information from OSB provided to the Town of Twisp.

(2) Source for current BOD5 & TSS are Monthly Discharge monitoring Reports. Projections based on per capita loading for population projections adopted by the City, plus anticipated loading (BOD5) from OSB at build-out, 58 pounds per day average, and 70 pounds per day maximum month in 2024 and beyond.

(3) Maximum day BOD5 loading is listed for information only, and is considered in the component sizing for new and upgraded facilities, but is not intended to be included as "design criteria" of the facility.

(4) TKN data for raw sewage not available. Existing conditions based on typical TKN concentrations for "medium-strong" wastewater (based on projected BOD5) from Wastewater Engineering Treatment, Disposal, and Reuse. Table 3-16. Metcalf and Eddy, Third Edition. Growth in TKN loading based on matching growth rate of BOD5). Due to uncertainty of TKN existing conditions, additional 25% loading was assumed for planning purposes. It is critical that the city sample and test for TKN loading prior to designing the planned upgrades to confirm component sizing.

3.2.3 *NPDES Permit*

Discharge from the municipal wastewater treatment plant is regulated by NPDES Permit No. WA0023370 with an Effective Date of March 1, 2015 and an Expiration Date of February 29, 2020. Typical permit conditions apply as shown in the "Summary of Permit Report Submittals" with the addition of an Effluent Study of Temperature (S9) and an Outfall Evaluation (S10). Permitted effluent limits are shown in **Table 3-2.**

Table 3-2: Permitted Effluent Limits

Parameter	Average Monthly	Average Weekly
BOD5	30 mg/l, 45.5 lbs/day 85% removal of influent BOD	45 mg/l, 68.3 lbs/day
Total Suspended Solids (TSS)	30 mg/l, 45.5 lbs/day 85% removal of influent TSS	45 mg/l, 68.3 lbs/day
pH	Daily min of 6.0 Daily max of 9.0	N/A
Fecal Coliform Bacteria	100 colonies/100 ml	200 colonies/100 ml
Mixing Zone Authorization		
Acute Aquatic Life Criteria	62:1	0
Chronic Aquatic Life Criteria	14:1	0

3.2.4 *Biosolids Permit*

Disposal and beneficial reuse of biosolids is regulated under WAC 173-308. The Town's biosolids are permitted under permit BA0023370. The Town is permitted to haul, store, and apply liquid biosolids at their Alder Creek application site. The Class B biosolids are applied to established agricultural fields for the purpose of improving soil characteristics and increasing yields.

3.2.5 *Funding Conditions*

The Town has accepted funding from ECY to prepare this engineering report. The funding agreement requires that the following items, not included in WAC 173-240, be addressed by the Town.

- Fiscal Sustainability Plan - This plan must include the following elements:
  - Critical asset inventory.
  - Evaluation of conditions and performance of critical assets.
  - A plan to maintain, repair, and replace critical assets and how to fund these activities.
  - A process to evaluate and implement water and energy conservation efforts.
- Certification that the Fiscal Sustainability Plan contains at least the minimum required elements described above and is being implemented.
- Cost Effectiveness Analysis for project alternatives that will be integrated into the planning document in accordance with WAC 173-98.

- State Environmental Review Process (SERP) documentation.
- Investment Grade Energy Audit – prepare an analysis of potential energy and water efficiency measures for incorporation into the preferred alternative. The analysis will identify potential efficiency measures, provide cost estimates, and evaluate their cost effectiveness.

3.3 Receiving Water

The Twisp treatment plant is permitted to discharge treated effluent into the Methow River at River Mile 38.9 (In Permit - Latitude: 48.353013, Longitude: -120.105786).

3.3.1 *Methow River Description*

The Methow River flows through the Methow Valley before discharging into the Columbia River at Pateros. Both a USGS flow gauge and an ECY long term sampling location are located within Town limits, upstream of the treatment plant outfall.

River flow varies seasonally with high flows during spring snowmelt and low lows occurring in August and September. Peak flows in the spring typically range between 10,000 cfs and 20,000 cfs, with low summer flows of under 2,000 cfs. The 7Q10 flow, as calculated by ECY in the 2009 Fact Sheet, is 150 cfs[5]. Water quality in the river is generally good according to the Water Quality Index (WQI). Suspended solids and turbidity are noted as moderate for many of the years monitored between 1997 and 2017.

No TMDLS have been prepared for the Methow River. A 303(d) listing for temperature, dioxin, and inadequate instream flows is noted on Ecology's website. One of the temperature listings is located in the Town of Twisp, the second is further downstream, near Pateros. The temperature listing in Twisp notes that there is insufficient data. The dioxin listing is located between Winthrop and Twisp.

3.3.2 *Water Quality Standards*

State water quality regulations provide standards for public health and public enjoyment, and for the propagation and protection of fish, shellfish, and wildlife. Based on use designations, numeric and narrative criteria are assigned to protect existing and designated uses. The Methow River, from the mouth to the confluence of the Twisp River, has the following designations:

- Aquatic Life Use of spawning/rearing,
- Recreational Use of primary contact,
- All Water Supply and Misc. Uses (Table 602 – WAC 173-201A).

Table 3-3 shows the aquatic life uses and the recreational uses for the Methow River at Twisp. Criteria for water supply and miscellaneous uses do not change water quality criteria and are not included in the table.

5 Fact Sheet for NPDES Permit No. WA-002337-0, April 29, 2009

Table 3-3: Designated Uses

	Category
Aquatic Life Uses	
Temperature Criteria – Highest 7-DAD MAX	
Dissolved Oxygen Criteria – Lowest 1-Day Minimum	
Turbidity Criteria	
pH Criteria	
Recreational Uses and Associated Criteria	
Category	
Bacteria Indicator	

(1) Fecal Coliform criteria expires in 12/31/2020 – ECY has started rulemaking to comply with newer EPA requirements. It is not expected that the new requirements will impact Twisp.

3.3.3 *Outfall Description*

The treatment plant discharges treated effluent to the Methow River through an outfall pipe and a buried multi-port diffuser. The diffuser is located in a segment of the river that is migrating downstream and depositing sediment on the diffuser. In 2011, the diffuser was excavated and an exfiltration trench was constructed around it to allow a free flowing discharge. An outfall analysis with recommendations is included in the 2019 GSP.

3.3.4 *Mixing Zone*

The NPDES permit grants a mixing zone for the treatment plants outfall. The mixing zone is an area where treated effluent mixes with the river water; in this limited area, water quality standards can be exceeded.

4.0 Wastewater Collection System

4.1 Introduction

The 2019 General Sewer Plan provided an update to the information documented in the 1997 Wastewater Facilities Plan. Work associated with the project included CCTV inspection of the Town's sanitary sewer collection system, development of a comprehensive capital improvement plan, and updating the Town's sewer collection system mapping in a GIS database. The 2019 GSP also provided recommendation for a capital improvement plan to reduce I/I and rebuild the collection system lift stations.

4.2 Sanitary Sewer Collection System

4.2.1 *Collection System Elements*

The sanitary sewer collection system was originally constructed in 1976. The collection system includes approximately 7.9 miles of sewer main, three lift stations (including the treatment plant influent lift station), and one siphon under the Twisp River. **Table 4-1** shows the wastewater systems major components.

Table 4-1: Existing Sanitary Sewer System Components

	Sewer Main
12-inch concrete	
10-inch concrete	
8-inch concrete	
6-inch concrete	
12-inch plastic	
8-inch plastic	
Size and material not determined	
Total sewer length from GIS Mapping (lf)	
No. of Manholes	

(1) From field reconnaissance performed in 2018 by Varela and Associates, Inc. and Town's 2017 sewer inspection.

4.2.2 *Operation and Maintenance*

For the past ten years, the Town has experienced sanitary sewer overflows and sewer main backups due to blockages in the sanitary sewer system. System reliability issues have been caused by lack of proper maintenance equipment, delinquent maintenance, and system failures. Due to these system deficiencies, the Town secured a CWSRF funding package in 2015 to clean, abate roots, and CCTV inspect the entire

sanitary sewer collection system. The work was completed in 2017 by Town staff using the newly acquired equipment.

4.2.3 *Influent Lift Station*

The Town operates and maintains three lift stations. Upgrading the two collection system lift stations is included as a 2019 GSP project. The influent lift station at the treatment plant is described in the GSP but is updated and included as part of the treatment plant facility improvements.

The existing influent lift station at the treatment plant is located at the northwest corner of the site and was constructed in 1976. The existing lift station consists of a 6' diameter concrete wetwell (14.5' deep with a working volume of 1272 gallons) and dry pit that houses pumps, valving, electrical, and flow metering. Influent flows are dosed to the headworks facility intermittently via two vertical centrifugal pumps (5HP, 370gpm @ 28.3').

Evaluation of existing lift station capacity indicates that the current system can operate at 89% capacity at peak flow conditions with the largest pump out of service. Though the pumps are adequately sized for the 20-year planning period, it is recommended that they be replaced to provide reliable service due to their age. The replacement pumps are recommended to be inverter duty rated with variable frequency drives to allow for the lift station to flow pace influent flows rather than intermittent surge dosing, which is not ideal.

Based on reasonable concerns expressed by the Town, the recommended improvements also include upgrade/modernization of the existing level controls and instrumentation (ultrasonic level sensor or pressure transducer and associated telemetry), and relocating the electrical components from the dry pit to the administration building. The existing controls/instrumentation is becoming dated and having the electrical components in the dry pit requires frequent access to confined spaces for staff. The capital cost (not including additional project costs such as contractor overhead/profit, mobilization, administrative, as well as contingency and engineering) is shown in **Table 4-2.**

Table 4-2: Influent Lift Station Improvements Cost Estimate

Influent Lift Station Upgrade Description	Est. Cost
New pump control panel, VFD drives, and telemetry located in administration building	$45,000
Electrical installation and site electrical	$20,000
New 5HP inverter duty pumps	$25,000
Piping, pluming, valves	$15,000
Pump installation	$10,000
Instrumentation upgrades (ultrasonic level transducer)	$5,000
Bypass pumping	$30,000
Total:	$150,000

4.2.4 *Collection System Improvements*

Collection system improvements were identified in the 2019 GSP. The system improvements were based on video inspection work and discussions with the Public Works Director. Collection system improvements included lining and replacement of approximately 6,000 linear feet of sewer main. **Figure 4-1** is a map of the collection system with the planned system improvements shown.

5.0 Wastewater Treatment

The municipal wastewater treatment plant was constructed in 1976. The original plant included an influent lift station (with two-370 gpm @ 35'TDH pumps), a headworks facility that included a grit chamber, comminutor, and bypass bar screen, a 116,000-gallon oxidation ditch, a 22-foot diameter final clarifier, and a chlorine disinfection system. Three 35 foot x 20 foot x 1 foot deep sludge drying beds were constructed to dry and stabilize sludge pumped from the clarifier.

The operations building includes a laboratory, restroom, storage room, and an office. The 2001 plant modifications removed the original chlorinator room and emergency generator from the building.

The 2001 upgrade to the treatment plant included the following components:

- Installation of a rotary fine screen with a bypass screen at the headworks.
- Aeration improvements to the aerated grit chamber.
- Improvements to the oxidation ditch included a second brush rotor, a horizontal mixer, and an ORP probe and transmitter to control aeration and mixing. A new effluent diversion box was constructed to allow discharge to either clarifier.
- A second final clarifier with the necessary pumping, piping, and diversion boxes needed to operate it, was constructed. The RAS system includes a magnetic flow meter.
- The chlorine disinfection was replaced with a two bank UV disinfection system. An effluent Parshall flume was added.
- The sludge drying beds were replaced with an aerobic digester (two basins), drum sludge thickener, and a thickened sludge handling station (for stabilized liquid sludge); these facilities are contained in the Aerobic Digester and Sludge Handling Building.
- The Sludge Handling Building contains a blower room for the digester blowers, chemical and polymer tanks and pumps, the electrical MCC room for the entire plant, and the auxiliary generator room for the 175 kw generator. Plant improvements also included electrical and control upgrades.

The existing treatment facilities provide good treatment for current flows and loading. Winter storage capacity for biosolids is limited; the 2019 GSP recommended a solution for the biosolids issue that the Town is implementing. The treatment plant evaluation provided in TM-01 **(Appendix C)** showed that capacity upgrades at the treatment plant are needed to adequately treat projected organic influent loads. Recommended upgrades and proposed improvements to the treatment system are discussed below. **Figures 5-1, 5-2** and **5-3** show the proposed treatment plant improvements.

5.1 Wastewater Treatment System – Liquid Processes

The Town of Twisp's wastewater treatment plant treats municipal wastewater with an extended aeration oxidation ditch and clarifiers. Influent flow is screened and grit removed at the headworks. Effluent is disinfected with UV disinfection prior to discharge to the Methow River.

5.1.1 *Existing Liquid Treatment Processes*

The following sections describe the liquid treatment processes and provides a summary of the evaluation and recommendations made in TM-01 "Biological Process Expansion and Upgrade " and TM-02 " Additional Treatment Plant Recommendations ". These technical memos are included in **Appendix C**.

5.1.1.1 Headworks

The existing headworks structure, located near the northwest corner of the site, was constructed as part of the treatment plan upgrades completed in 2001. The headworks provides fine screening and grit removal of influent wastewater pumped from the influent lift station.

The existing fine screen has reached the end of its useful life. Replacement of the fine screen is proposed to be installed in the existing channel without major channel modifications. The screen is located outdoors so the new screen includes a weather protection system similar to the existing protection.

The aerated grit chamber has been in service for 20 years and has likely experienced wear. Proposed improvements to the grit chamber include replacing the grit blower/airlift system, recoating, and installation of bypass piping to allow bypass of the grit chamber. It is recommended that the grit system air piping and grit removal piping be inspected and assessed for repairs.

The estimated capital cost (not including additional project costs such as contractor overhead/profit, mobilization, administrative, as well as contingency and engineering) is shown in **Table 5-2.**

Table 5-2: Summary Headworks Improvements Cost Estimate

Headworks Area Upgrade Description	Est. Cost
Replace existing cylindrical fine screen with like equipment, including weather and freeze protection, controls	$150,000
Installation; including removal of old screen	$20,000
Allowance for modifications and adaption to fit existing	$10,000
Inspect and assess grit system air piping and grit removal piping; allowance to coat and replace sections of pipe as necessary.	$5,000
Yard piping modifications for grit bypass piping	$15,000
Replace grit blower/airlift system	$40,000
Total:	$240,000

5.1.1.2 Aeration Basin/Final Clarifiers

The existing oxidation ditch is nominally 110 feet long, with 10 feet wide channels, currently operated with a depth of 7.5 feet. The structure has a flat bottom and at current depth, a total volume of nominally 119,500 gallons. The 1997 wastewater facility plan indicated that the hydraulic capacity of the oxidation ditch is 155,000 gpd with a BOD treatment capacity of 466 lbs/day. The original aeration system was capable of treating 208 lbs/day of BOD. The 2001 upgrades provided the following design criteria:

- Design MLSS of 3,500 mg/l.
- Design yield of 0.70 lb/WAS/lb/ BOD.
- Maximum month SRT of 17.7 days.
- Expected maximum month WAS of 210 lbs/day.
- Aeration capacity of 72 lbs/hr.

In 2016, the Town added a full-scale pilot diffused aeration system to the oxidation ditch increasing the available air supply.

The original final clarifier is 22 feet in diameter with a 9.5-foot sidewall depth and a volume of 27,000 gallons.

The final clarifier constructed in 2001, is 30 feet in diameter (707 square foot effective settling area) with a 12-foot side water depth and a volume of 63,500 gallons. The design criteria states that the maximum month surface loading rate is 260 gpd/sf (183,800 gpd) with a maximum month solid loading rate of 15.0 lbs-day/sf (10,600 lbs/d). Two sludge pumps are used for both recycle and waste pumping. Each pump has a capacity of 185 gpm at 15 feet TDH.

The existing facilities were evaluated to assess capacity considering the new flow and loading projections presented in Table 3.1. The analysis found capacity upgrades to the biological treatment system are needed to treat projected flows and loadings. The following provides a description of the biological treatment system component upgrades recommended.

Selector Tank

The plant currently makes use of the aerated grit chamber to condition influent wastewater and RAS by providing a "selector" effect for current flows. This plant modification promotes the growth of organisms with good settling characteristics to improve performance of biological treatment and achieve a well-settling sludge. Projected flows will decrease the residence time in the grit chamber to reduce the "selector" effect. New selector basins are proposed to improve treatment performance and maintain the "selector effect" at projected flows.

A new 14'x40' selector tank structure (11.5' liquid depth), north of the west half of the existing oxidation ditch, is proposed with multiple isolatable compartments. The compartments are recommended to be 6,000 to 12,000 gallons each for a total volume of 36,000 gallons to provide adequate residence time for proper function under various loading conditions and operating scenarios. It is recommended that the compartments are primarily utilized as anoxic selectors but at least one compartment is maintained as an aerobic selector with aeration diffusers fed from the aeration basin blower. Plumbing should allow influent and RAS to any cell, and effluent to aeration from any cell.

Aeration Basin

The existing aeration basin, configured as an oxidation ditch, currently operates at approximately 7.5' deep with a design volume of 119,500 gallons. This is less than the volume needed to meet projected flows and loads of 135,000 gallons. If the operating depth can be increased to at least 8.5', the existing basin will have adequate treatment volume and the increased liquid depth will improve oxygen transfer efficiency. Raising the water depth would include removal/salvage of the existing rotor aerators, tank adjustments and patches, and adjustment to outlet weirs and boxes. Further details and other potential modifications would be defined during the engineering design phase.

Divider walls in the modified aeration basin are proposed to provide two isolatable compartments that will address reliability/redundancy issues. The configuration will allow for the two compartments to operate in series, with inlet piping installed to allow taking either compartment out of service while keeping the other in operation. Additional improvements include a submersible mixer in the oxidation ditch to circulate mixed liquor through both compartments (installed to allow operation as a single reactor), upgrades to provide gravity drainage of both compartments independently, and modifications to the outlet box to allow seamless switching of operation configurations to operate both compartments in series or independently.

Aeration Equipment

The oxidation ditch originally used horizontal rotor aerators that experienced ongoing maintenance issues. In 2015, a pilot study was begun to determine the effectiveness of diffused aeration. The pilot study was successful and led to the decision to install a permanent fine-pore EPDM diffused aeration system with the proposed treatment plant upgrades, to provide a reliable aeration system and improve operational capability. The aeration system will be designed to allow isolation of diffuser sections.

Estimated aeration needs for the 2045 design year is 730 scfm with a nominal discharge pressure of 6 psi. A new 730 scfm positive displacement blower is proposed to be installed within a new sound-attenuating addition to the east end of the sludge handling building (adjacent to the existing blower room). The new

blower will include new instrumentation and controls to allow for adjustment of blower speed to match dissolved oxygen demands. The existing aeration blower will be utilized as a redundant blower.

Clarifiers and Sludge Pumping

The treatment plant currently has two clarifiers. Clarifier #1 was part of the original facility and is smaller and older than Clarifier #2. Clarifier #2 was constructed with facility upgrades completed in 2002. Evaluation of the existing facilities for adequacy for the projected flows/loading indicates that Clarifier #2 is large enough to meet projected flows and loadings. Clarifier #1 is large enough to meet reliability/redundancy requirements but is not currently operational. The proposed treatment plant improvements include upgrades to existing Clarifier #1 to make it functional. These upgrades include a complete mechanism replacement, inlet and outlet piping reconfigurations, and Clarifier #1 sludge pumping system upgrades (new pumps with variable frequency drives and associated sludge piping improvements).

The estimated capital cost (not including additional project costs such as contractor overhead/profit, mobilization, administrative, as well as contingency and engineering) is shown in **Table 5-3**.

Aeration Basin/Final Clarifier Upgrade Cost Estimate

Table 5-3: Summary Biological Process Expansion and Upgrade Cost Estimate

	Item	Description	Quantity	Item Cost
1	Selector Tanks	New construction - Tanks, including excavation, concrete, mixer bridges, access grating & stairs	36,000 gal (multiple cells)	144,000
		Process mechanical - gates, valves and piping, etc.		49,000
	Mixers	Vertical shaft bridge-mount, installed	0.5 - 2 hp each cell	78,000
	Aeration	One compartment to increase operational flexibility to respond to specific bulking incidences	Single grid fine pore diffusers	20,000
2	Aeration Basin	Tank modifications to existing oxidation ditch including demo of rotors and turning vane walls, construct divider walls, mods – divider walls, demo rotor aerators, mods to outlet	135,000 gallons, existing volume divided into 2 cells	45,000
	Aeration Equipment	Diffusers and air piping, installed, instrumentation equip. New submersible mixer to allow complete-mix operation through entire basin		135,000
		Process mechanical - gates, valves and in-basin piping		62,000

	Distribution box	Modification to outlet boxes to allow parallel clarifier operation in any mode of operation		30,000
3	Blower Building	Addition to solids handling building		60,000
	Blowers	1 at 730 scfm @ 6 psi, 35 hp, installed	1 ea	90,000
	Process Air piping	In-building, exposed, installed	LS	35,000
4	Clarifier #1 re-hab	New mechanism, installed	1 @ 22' dia.	255,000
		Inlet and outlet piping modifications	center feed	25,000
		Update sludge pumping and piping at Clarifier #1		65,000
5	Process Site Piping, (biological treatment upgrades)			103,000
6	Electrical (biological treatment upgrades) -			192,000
7	Instrumentation and Control (biological treatment upgrades) -			115,000
8	Site work (biological treatment upgrades), paving, etc.			75,000
9	Alternative Comparison Cost Estimate (does not include contractor O&P, taxes, contingency, engineering, administration costs) – see Appendix for alternatives evaluation. See Section 5.4 for project cost estimate.			1,578,000

5.2 Wastewater Treatment System – Solid Processes

Municipal wastewater treatment plants produce waste solids that are known as sludge/biosolids. Biosolids need to be put to beneficial use in accordance with WAC 173-308. For biosolids to be put to beneficial use stabilization is required to meet pathogen and vector attraction requirements. The following sections describe the existing processes and issues and the recommendations made in the 2019 GSP for improvements to the biosolids system.

5.2.1 *Existing Solids Processes*

A dual basin aerobic digester is used to stabilize sludge produced by the oxidation ditch and settled and thickened in the final clarifier. The combined RAS/WAS pumps settled sludge (WAS) to the aerobic digesters. The stabilized sludge (biosolids) is thickened to about 6% solids; a level that allows the stabilized, liquid sludge to be land applied on nearby pasture land from about April 15 to November 1 of each year.

5.2.2 *Proposed Solids Processes*

Modifications to the solids processes proposed in the 2019 GSP are to install a screw press for dewatering and contract with Boulder Park Incorporated (BPI) to beneficially reuse the Town's biosolids, with Town transport of the biosolids to BPI in Mansfield, WA. This modification provides for winter removal of biosolids to improve plant operations, reduces the land area needed at the treatment plant for storage and reduces the Towns management of the biosolids application process. Alternative 3B was the recommended alternative in the 2019 GSP. **Figure 5-1** is excerpted from the GSP and shows the planned improvements.

5.3 Miscellaneous Treatment Plant Improvements

The following plant improvements are recommended. Improvements are summarized in **Figure 5-2**.

5.3.1 *Process Sludge Pumping and Piping*

Modifications to the RAS/WAS pumping and piping are included with this project. Existing sludge pumps are located adjacent to Clarifier #1 and Clarifier #2. The Clarifier #1 pumps are not functional and will be replaced. The sludge pumps in Clarifier #2 have been in service for 20 years and will be replaced. Proposed improvements include piping modifications and plumbing/electrical/control upgrades.

The proposed Clarifier #1 sludge pumps will be designed to automatically recycle and waste sludge using a combination of pump speed control and timer control. Discharge piping from the new pumps will allow either pump to be utilized for either RAS or WAS flows.

Clarifier #2 has two pumps for RAS and WAS. The Clarifier #2 pumps are adequate to handle most normal operations at projected future flows but they are approaching 20 years in service and for non-normal operating conditions (such as prolonged unusually high inflows) higher pumping rates would be helpful. Replacing the Clarifier #2 pumps with variable frequency drives, to allow varied pumping rates, is proposed. Upgrades to the SCADA system will allow control of RAS flow rates allowing more flexibility in managing sludge inventory.

The existing piping in the RAS/WAS valve vault shows some of the paint beginning to fail. Re-coating the valves and piping is included with the proposed improvements.

The estimated capital cost (not including additional project costs such as contractor overhead/profit, mobilization, administrative, as well as contingency and engineering) is shown in **Table 5-4.**

Table 5-4: Summary Process Sludge Pumping and Piping Cost Estimate

RAS/WAS Upgrade Description	Est. Cost
NEW submersible RAS/WAS pumps, rails and appurtenances to replace existing pumps at clarifier #2	$35,000
Pump installation	$10,000
Re-coat RAS/WAS valves and piping in existing RAS/WAS valve vault	$2,000
Variable Frequency Drives for each clarifier #2 RAS/WAS pump	$18,000
Programming upgrades with new SCADA system to allow flow setpoint / feedback control loop in addition to on-off cycle timer operator adjustable setpoints, and volume wasting capability	$8,000
Total:	$73,000

5.3.2 *Plant SCADA & PLC*

The existing treatment plant PLC panel (MicroLogix 1500 by Rockwell Automation) was installed in 2001 and has since been discontinued by the manufacturer and is no longer supported. Replacement of the PLC system is recommended and included in the proposed improvements. The existing plant SCADA system is Wonderware InTouch and has been operating reliably, but some tags/screens require cleanup and additional I/O points are desired. These upgrades, with associated network communication upgrades, are included in the proposed improvements.

The proposed new PLC system should include manufacturer migration support for transition to the new controller system. New relays, auto dialer, touchscreen interface, UPS, etc. is also included in the proposed improvements, allowing all new control panel components to be factory tested along with functional testing of the migrated programming at the control panel manufacturing shop helping ensure minimal interruption to plant operations.

SCADA system improvements include cleanup of some tags and screens and addition of up to 10 I/O points. A list of desired points and labor is currently being developed by plant operations.

Network Communication upgrades to utilize Ethernet IP (Industrial Protocol) over fiber cable is proposed for communication between the main plant PLC and influent pump station control panel PLC, as well as the headworks control panel PLC. This will maximize spare I/O availability at the main PLC and allow functionality to be added in the future without running additional I/O cables. Integration of the two Town remote Lift Stations as well as remote Wells and Reservoir are also included with the proposed improvements (including installation of telemetry radio panels at the main treatment plant, remote I/O stations at 5 locations (6 total), and SCADA integration).

The estimated capital cost (not including additional project costs such as contractor overhead/profit, mobilization, administrative, as well as contingency and engineering) is shown in **Table 5-5.**

Table 5-5: Summary Plant SCADA and PLC Improvements Cost Estimate

Plant SCADA / PLC Upgrades Description	Est. Cost
Clean up existing SCADA program and add up to 10 additional points	$15,000
SCADA integration/programming for biological process upgrades and treatment plant improvements	$80,000
Main plant PLC control panel replacement and programming	$40,000
Fiber PLC Network	$15,000
Option: Remote Telemetry Panels, Radios and programming (Assumes 6 Stations @ $20,000 each)	$120,000
Total:	$270,000

5.3.3 *Plant Water Supply - Cross Connection Control*

DOH and ECY guidance considers wastewater treatment plants "high severity" and requires premise isolation. The treatment facility does not have premise isolation as required by code. The public water supply is protected by use of individual backflow assemblies at various locations throughout the treatment plant.

The Treatment plant uses water for a variety of purposes; some are process related while other uses occur in the lab and for domestic uses. DOH and DOE require protection of the public water system including premise isolation to isolate plant uses from the public water supply and an air gap/repump system to further isolate high severity areas of the plant (i.e. where there is a potential to come in contact with raw sewage).

The Town currently repumps plant effluent to supply some of the treatment plant's water requirements. Reuse water may decrease the required size of the proposed CCC repump system. It is recommended during design the existing reuse system (and any proposed reuse alternatives) be reviewed and consideration be given to which plant water requirements can utilize reuse water so the CCC system can be sized appropriately.

A new reduced pressure backflow assembly for premise isolation with an additional air gap and new repump system to provide water service to the plant is proposed. These cross-connection control systems serve to protect the public water supply from contamination. The proposed air gap system will include duplex pumps with flow pacing via VFD/pressure tank combination with controls integrated into the treatment plant SCADA system. The new air gap system will be located in an approximate 10'x20' addition/expansion to the existing operations building. Proposed improvements include site piping revisions to accommodate the new system, electrical, controls, and SCADA for the CCC system.

The estimated capital cost (not including additional project costs such as contractor overhead/profit, mobilization, administrative, as well as contingency and engineering) is shown in **Table 5-6.**

Table 5-6: Summary Cross Connection Control Improvements Cost Estimate

Cross Connection Control Upgrade Description	Est. Cost
Reduced pressure backflow assembly for premise isolation	$25,000
Building expansion—expand operations building to the north (assume 10'x20' addition at $300/SF)	$60,000
Skid mount cross connection control repump system	$140,000
CCC system installation	$30,000
Site piping revisions to accommodate new cross connection system	$10,000
Allowance for upgrade to plant reuse pump system	$15,000
Electrical, controls, SCADA for CCC system	$40,000
Total:	$320,000

5.3.4 *UV Disinfection System*

The UV disinfection system is about 20 years old. Replacement parts are difficult to find. The Town has been working with a vendor to replace the system with a similar in-channel system.

5.3.5 *Operations/Laboratory Building*

The existing treatment plant operations building is located at the NW corner of the treatment site and was constructed in 1976. It includes a laboratory, an office that includes the SCADA interface, a storage room, and a bathroom, and has a total footprint of 750 SF. The 2001 treatment plant upgrade project included new widows/doors and building mechanical systems improvements to the operations building. The current upgrades proposed include building improvements.

Though the operations building is not in need of immediate upgrade, the laboratory cabinets are original to the building and nearing the end of their service life; cabinets are in poor condition and rusting, which is common with chemical storage. Installation of new cabinetry is included in the proposed improvements. Also, some of the laboratory equipment is outdated and/or at the end of its service life so replacement of this equipment is included with the proposed improvements (budget of $40K is recommended based on discussion with the Town). Finally, given the age of the facility and the possibility that additional items are needed, an allowance for miscellaneous building upgrades/repairs is included as well.

The estimated capital cost (not including additional project costs such as contractor overhead/profit, mobilization, administrative, as well as contingency and engineering) is shown in **Table 5-7.**

Table 5-7: Summary Operations/Laboratory Building Improvements Cost Estimate

Operations / Lab Bldg. Improvement Description	Est. Cost
Replace laboratory cabinets including demo and retrofitting	$50,000
Laboratory equipment budget	$40,000
Misc.	$20,000
Total:	$110,000

5.3.6 *Backup Generator*

The existing backup generator (200 KW) at the treatment plant was installed in 2001 and is located in the solids handing building. It is likely the remaining service life of the generator will be adequate for the next 20 year planning period. Based on an initial estimate of added load the existing generator is adequate to meet anticipated loads. It is recommended that a pre-design review of existing plant electrical load and proposed load calculations for the plant (with new selected equipment), is included with the proposed upgrades to confirm adequacy of the existing generator.

5.3.7 *WWTP Site Improvements*

Twisp's treatment plant is located on the south half of a 4.96 acre parcel owned by the Town (parcel number: 332217.0290). The majority of the existing site is surfaced with gravel with little to no landscaping and a 6' chain link fence around the perimeter. Access to treatment components and structures appears adequate, but the general aesthetics of the site are poor with weeds being an ongoing issue with the current gravel surfacing. The Town would like to improve site aesthetics and reduce site maintenance with surface improvements and some utility upgrades.

Surface improvements with the proposed upgrades include asphalt pavement of driveway areas and selected parking / access areas. Proposed surface improvements also include lawn seeding the interior of the site and providing an associated automatic irrigation system. All other areas are proposed to receive new gravel surfacing.

Other site improvements proposed with these upgrades include installation of 3 new hose bibs and fencing modifications to accommodate the new anoxic basins. One of the new hose bibs is proposed to be located at the new anoxic basin and 2 are proposed at the existing oxidation ditch (one at each end). See attached **Figure 5-3** showing preliminary design layout of site improvements. The estimated capital cost (not including additional project costs such as contractor overhead/profit, mobilization, administrative, as well as contingency and engineering) is shown in **Table 5-8.**

Table 5-8: Summary WWTP Site Improvements Cost Estimate

Site Improvements Description	Est. Cost
New asphalt driveway and parking area including grading, subgrade prep, and crushed surfacing (2,800 SY @ $45/SY)	$126,000
Landscape/lawn areas with the irrigation system	$15,000
Gravel surfacing (2,200 SY @ $8/SY)	$18,000
Additional hose bibs or hydrants (3) connected to plant reuse water system; located at new anoxic basis and each end of the existing oxidation ditch	$15,000
Fencing modifications to accommodate anoxic basins	$10,000
Total:	$184,000

5.3.8 *Reclaimed Water*

As required by RCW 90.48.112, the engineering report must address the feasibility of using reclaimed water as defined in RCW 90.46.010.

Producing reclaimed water is not considered a reasonable option for the Town. The treatment system will require additional upgrades to provide filtration, disinfection, pumping and a distribution system to provide reclaimed water to potential customers. No sites have been identified as needing reclaimed water. This engineering report was not scoped for and does not include the feasibility analysis and evaluation of downstream water rights required by WAC 173-219. In addition, ECY has indicated that reclaimed water is not a feasible alternative for small community wastewater systems due to the need to hire a Class 3 treatment plant operator.

5.4 Treatment System Discussion and Summary

In order to provide treatment that meets effluent quality limits for the projected wastewater flow and loads, the treatment plant capacity needs to be increased. The plant was last upgrade in 2001, about 20 years ago and it is time to upgrade many of the plants systems. The treatment facility utilizes “extended aeration” activated sludge biological treatment. A cursory consideration of other treatment configurations was performed. Other biological treatment configurations considered for the treatment plant upgrades included conventional activated sludge, sequencing batch reactors, membrane bioreactors, and moving bed biofilm reactors. Comparison of alternative configurations resulted in the recommendation to continue using extended aeration activated sludge treatment.

The extended treatment evaluation looked at options for each of the treatment components. The improvements to the treatment system recommended in this report were discussed and accepted by the Town. The project includes:

- Rebuilding the influent lift station
- Construction of a new selector tank
- Headworks improvements to replace the fine screen and grit removal mechanism
- Increasing the capacity and flexibility of the oxidation ditch by raising the sidewalls, dividing the basin, adding a diffused aeration system with new blowers
- Replacing the mechanisms in the old secondary clarifier #1 so it can be used a redundant clarifier

- Replacing RAS and WAS pumps to provide operational flexibility
- Replacing the plants control system (SCADA and PLC's)
- Upgrading the domestic water system's cross connection control system to meet current health codes
- Replacing the UV disinfection system
- Providing needed improvements equipment at the operations and lab building
- Site improvements to reduce site maintenance and improve aesthetics

The following tables summarize the cost estimate for the project. **Table 5-9** is the cost estimate, in 2020 dollars for the biological treatment upgrades and **Table 5-10** is the cost estimate for the additional plant improvements presented above.

Table 5-9 Biological Treatment Cost Estimate

Biological Treatment Improvements Description	Est. Cost [1]
Selector and Appurtenances	$291,000
Aeration Basin and Appurtenances	$272,000
Blower Upgrade	$185,000
Clarifier #1 Rehabilitation	$345,000
Secondary Process – site piping	$103,000
Secondary Process – site electrical	$192,000
Secondary Process – instrumentation and controls upgrades	$115,000
Site Work – Associated secondary process upgrades only	$75,000
Sub-Total:	$1,578,000
Contractor mob/admin/overhead/profit (15%)	$237,000
Sub-Total Construction:	$1,815,000
Tax (8.7%)	$158,000
Contingency (25%)	$454,000
Construction Total:	$2,427,000
Eng, admin, const mgt, insp (30%)	$728,000
Total:	**$3,155,000**

(1) Costs rounded to the nearest thousand dollars.

Table 5-10 Additional Plant Improvements Cost Estimate

Additional Plant Improvements Description	Est. Cost [1]
Influent lift station upgrade	$150,000
Headworks area upgrade	$240,000
RAS/WAS pumping and piping upgrade	$73,000
Cross connection control system	$320,000
Plant SCADA/PLC upgrades	$270,000
Operations / lab building improvements	$110,000
Site improvements	$184,000
UV Equipment Replacement [2]	$210,000
Sub-Total:	$1,557,000
Contractor mob/admin/overhead/profit (15%)	$234,000
Sub-Total Construction:	$1,791,000
Tax (8.7%)	$158,000
Contingency (25%)	$486,000
Construction Total:	$2,435,000
Eng, admin, const mgt, insp (30%)	$730,000
Admin/Environmental/Funding	$40,000
Total:	**$3,205,000**

(1) Costs rounded to the nearest thousand dollars.
(2) Estimated cost is preliminary and represents replacement of the in-channel UV equipment without channel modification or building addition. An evaluation of the UV system with recommendations and costs is being completed by the Town and manufacturer. Costs will be updated after evaluation is complete.

6.0 Ecology Funding Requirements

The proposed projects included in this plan are improvements to the influent lift station and to the treatment plant. The ECY funding agreement requires that the following items be addressed for the proposed projects in this engineering report.

6.1 Fiscal Sustainability Plan

The Fiscal Sustainability Plan must include the following elements:

- Critical asset inventory.
- Evaluation of conditions and performance of critical assets.
- A plan to maintain, repair, and replace critical assets and how to fund these activities.
- A process to evaluate and implement water and energy conservation efforts.

Critical assets of the systems included in the projects presented in this report include the following:

- Influent Lift Station
    - The Influent lift station is considered a critical asset.
- Treatment Plant
    - The entire treatment system is considered a critical asset

This engineering report evaluates the conditions and performance of the wastewater systems critical assets identified above. The engineering report provides a plan to maintain, repair, and replace these critical assets for the planning period. **Section 7, "Implementation and Financing"** describes options to fund the capital improvements and with projected sewer rates, how to finance operation and maintenance of the system.

Water and energy conservation efforts are considered during project development. One of the major energy conservation improvements associated with these projects is the replacement of older pumps and motors with, in most cases, variable speed drives (VFD). The VFD's will allow the plant to more closely match energy use with influent flows and with internal plant process flows like WAS and RAS. The use of VFD's is expected to decrease energy use when compared to non-VFD pumps.

The plant PLC and SCADA system will also be upgraded. Upgrading the internal plant monitoring and control systems is expected to allow the plant to be operated more efficiently, with less energy than currently.

6.2 Cost Effectiveness Analysis

A cost effectiveness analysis for project alternatives have been integrated into the planning document in accordance with WAC 173-98-730, "Uses and Limitations of the Water Pollution Control Revolving Fund" included below:

(1) Funding will only be considered if a project is shown to be the cost-effective alternative/solution to a water quality problem and that the project maximizes the potential for energy conservation and efficient water use, reuse, recapture, and conservation. The cost-effective alternative is determined using a cost-effectiveness analysis.

(2) A cost-effectiveness analysis must include a comparison of the life cycle costs of alternatives considered for the planning period taking into account:

(a) The cost of constructing the project or activity;

(b) The cost of operating and maintaining the project or activity over the life of the project or activity; and

(c) The cost of replacing the project or activity.

(2) Applicants proposing alternative public works contracting for projects must demonstrate that this approach is the cost-effective alternative for procurement.

The cost estimates provided in this engineering report provide life cycle costs of the alternatives considered. The selected alternative for each of the project categories has been selected based on a cost effectiveness analysis.

6.3 State Environmental Review Process

The state environmental review process is discussed in **Section 8, "Public Involvement**" of this engineering report and the documentation is included in **Appendix F.**

6.4 Investment Grade Energy Audit

The Investment Grade Energy Audit requires preparation of an analysis of potential energy and water efficiency measures for incorporation into the preferred alternative. The analysis identifies potential efficiency measures, provides cost estimates, and evaluates their cost effectiveness.

An investment grade energy audit has not been prepared for this wastewater facility plan. An energy audit will be performed by the Town on the treatment facilities during the design phase of the project.

7.0 Implementation and Financing

7.1 Summary of Projects

Costs are estimated in the preceding sections for project elements. **Table 7-1** provides a summary of costs used to develop funding scenarios in this section for design and construction of improvements.

Table 7-1 Summary Estimated Project Costs

Description	Estimated Cost
Wastewater Treatment Plant Biological Process Expansion and Upgrade (per TM-01)	$3,155,000
Additional Wastewater Treatment Plant Improvements and Upgrade (per TM-02)	$3,205,000
Total	$6,360,000

The estimated improvements costs are based on 2020 dollars. **Table 7-2** estimates the project costs at the time of the anticipated construction (i.e. 2023) and is used for funding budgeting and planning purposes.

Table 7-2 Estimated Project Budget for Funding

Description	Estimated Cost
Estimated Capital Cost [(1)]	$6,360,000
Estimated Rate of Annual Inflation	4.00%
Years of Inflation [(2)]	3
Total Inflation Contingency	12.5%
Total Estimated Cost For Funding Purposes	$7,150,000

(1) Estimated in 2020 dollars per earlier sections of report.
(2) Assumed 2023.

For project funding and estimated inflation purposes, an estimated timeline is shown in **Table 7-3**. Two timeline pathways are shown. One timeline pathway assumes ECY funding only is utilized, and the second pathway assumes ECY used for design only funding and the construction phase funded using RD funding. Utilizing RD funding reduces the overall project duration by about one year.

Table 7-3 Implementation Timeline Scenarios

Task/Description	Estimated Timeline
Submit Facility Plan to ECY	Oct 2020
Facility Plan review and ECY approval	Sep – Dec 2020
Potential Timeline with ECY Funding:	
ECY funding application for design phase *Note: if project < $5 million, a combined design + construction project* *project application can be submitted and results in a shorter timeline*	Oct 2020
Design Phase	
ECY Funding available (July 2021) / ECY & City contract / proceed	Oct 2021
Design phase / ECY approval	Nov 2021 – Apr 2022
Construction Funding Procurement	
ECY funding application for construction	Oct 2022
ECY funding available	Jul 2023
Construction Phase	
Commence construction	Late summer 2023 or spring 2024
Construction completion	2024
All improvements operational	Summer/fall 2024
Potential Timeline with RD Funding (ECY for design phase only):	
ECY funding application for design phase	Oct 2020
Design Phase (same as above scenarios with ECY funding)	
ECY Funding available (July 2021) / ECY & City contract / proceed	Oct 2021
Design phase/ ECY approval	Nov 2021 – Apr 2022
Construction Funding Procurement	
Initiate RD funding application process	May - Dec 2021
Potential CDBG grant application	May – Jun 2021
RD funding approved	Mar 2022
Construction Phase	
Commence construction	Jun 2022
Construction completion	Late 2022 or spring/summer 2023
All improvements operational	Summer 2023

7.2 Funding Sources

There are several funding sources available to municipalities for financing public works projects (some specifically directed at wastewater improvements) through grants and low interest loans (and forgivable loans – equivalent to grant). The favorability of each program varies from community to community, and project to project depending on several factors (e.g. $ size of project; need; potential health and safety threat; impacts to water quality; anticipated sewer rate impacts to customers; and other funding criteria).

Three potential funding agencies with likely the most favorable funding packages for Twisp are:

- WA Department of Ecology
  - Centennial Clean Water Program (CCWP), and
  - Clean Water State Revolving Fund Loan Program (CWSRF)
- US Department of Agriculture – Rural Development (RD)
  - Water and Waste Disposal Loan and Grant Program
- WA Department of Commerce
  - Community Development Block Grant (CDBG) Program

Further information on the three programs is included below and a subsequent section with potential funding scenarios likely to result from the three funding agencies and other variations. In addition, other funding sources are listed that are not specifically considered at this time.

7.2.1 *WA Department of Ecology*

- Centennial Clean Water Program (CCWP) (grants)
- Clean Water State Revolving Fund Loan Program (CWSRF) (loans and forgivable loans)

Both programs are administered by the WA State Department of Ecology (ECY). The programs fund planning, design, and construction costs associated with wastewater facilities and the implementation of non-point activities. To be eligible, projects must be water quality projects that prevent and control pollution of ground and surface waters.

Although the two programs are listed separately and have specific criteria unique to each, they are accessible through a single application process through ECY. Following application submission, ECY reviews and determines the most applicable funding source and amount to be applied from each program, depending on eligibility and other criteria specific to the project.

Interest rates for loans are based on a percent of tax-exempt municipal bonds. For hardship communities, interest rates are lower, depending on the degree of hardship. Forgivable loan (i.e. equivalent to grant) may also be offered to applicants depending on funds available and depending on financial hardship criteria of the community.

Limited grant subsidy is available to applicants that can demonstrate financial hardship. Hardship interest rates and grant subsidy eligibility are shown in **Table 7-4.**

Table 7-4 ECY Hardship Interest Rates and Hardship Grant Eligibility [1]

Sewer Rate [2] ÷ MHI [3]	< 2%	≥ 2% but < 3%	≥ 3% but < 5%	≥ 5%
Hardship Designation	Non-hardship	Moderate Hardship	Elevated Hardship	Severe Hardship
5-year Loan Rates	0.6%	0.4%	0.2%	0.0%
20-year Loan Rates	1.2%	0.8%	0.4%	0.0%
30-year Loan Rates	1.6%	1.2%	.08%	0.4%
Grant Eligibility	Not eligible	50% (up to $5M)	75% (up to $5M)	100% (up to $5M)

(1) Based on December 2020 MHI information.
(2) "Sewer Rate" for this calculation is the potential future sewer that would result if no grant funding was provided.
(3) MHI – Median Household Income for the community (Twisp MHI = $44,180 per 2020 ACS data).

ECY requires user rates include an annual 20% reserve to be collected during the first five years, equivalent to at least one annual debt service on the loan.

The application cycle for FY 2022 will be between August-October 2020, with an application deadline in October 2020 and a Final Offer List generally published by early summer of 2021 and funds available thereafter. Dates could change.

7.2.2 *US Department of Agriculture – Rural Development (RD)*

- Water and Waste Disposal Loan and Grant Program

The USDA Rural Development (RD) – Water and Waste Disposal Loan and Grant Program funds projects for small (less than 10,000 people) financially distressed communities to extend and improve water and waste treatment facilities. The program is primarily a loan program; however, grants are also offered on projects where sewer rates become excessive as compared to sewer rates being paid in other similar communities in the region.

Applicants must demonstrate effort and subsequent inability to finance the project through their own resources or commercial credit, and demonstrate the financial feasibility of the project, including ability to repay the loan. Loan security is normally a revenue bond ordinance, with loan repayment from utility rates, although repayment from taxes can also be used for RD loans.

- Applications for funding are accepted year-round with award typically within 3 to 6 months of application submittal.
- Interest rates vary – Currently RD's rates are at an all-time low at 1.5%, for the intermediate rate; and, lower rates (currently 1.125%) can apply if "poverty level" can be shown and there is a "health and safety threat" due to the need for the project.
- 30 to 40-year loan terms. To obtain grant funding, applicant must accept 40-year term. No prepayment penalty for early repayment.
- Application requirements:

- Approved environmental assessment
- Preliminary engineering report
- Financial feasibility and cost analysis

RD requires that the utility user rates provide for an annual 10% reserve income in addition to annual debt service. Each loan agreement is individual to the applicant. RD funds may be used for all phases of project costs (i.e. planning, design, construction, some operation) including costs incurred prior to application to RD (including costs for the current facility planning effort). The governing stipulation is that RD funds for reimbursement of early phase costs do not become available for reimbursement until project construction is initiated via a construction contract award.

7.2.3 *Community Development Block Grant (CDBG)*

The WA Department of Commerce administers the CDBG program. These Federal Department of Housing and Urban Development (HUD) funds are available for water and sewer projects for areas with at least 51% low to moderate income (LMI) residents, which have public health and safety or economic development issues.

The maximum grant amount is $900,000. Applications are typically due early June (1st week) each year. Recipients are usually announced in September, and funding contracts executed within three to six months following that.

The CDBG program is highly competitive and funds projects which primarily serve at least 51% LMI residents. Twisp is eligible for this funding due to meeting or exceeding the 51% LMI threshold. Cities can conduct independent income surveys in an effort to demonstrate at least 51% LMI. Twisp has been successful utilizing CDBG funding in the past, including recent notification of CDBG award for Twisp's current collection system upgrades and treatment plant dewatering upgrades.

7.2.4 *Other Funding Programs*

There are other funding programs and mechanisms available that were not considered in depth at this time, but that may have future applicability depending on available funding, aggressiveness of Twisp in pursuing funding, or other factors that may emerge as planning moves forward. The following list is not exhaustive but represents the more common funding programs that can be pursued.

7.2.4.1 Public Works Board - PWB (formerly Public Works Trust Fund)

This state program, administered by the WA Department of Commerce, has provided low interest loans for the repair, rehabilitation, and reconstruction of municipal infrastructure. The PWB (originally the Public Works Trust Fund) was established 30 years ago and historically has been a sought-after source of low interest loans due to the simplicity and flexibility of the program. The program is loan only and does not offer grant funding. Loan maximum is $10 million for construction; no matching funds required; very low interest rates, with up to 20-year loan term and no loan fee. Interest rates vary, depending on loan term and degree of financial distress of the communities as measured by the affordability index. Currently the application cycle is closed and the PWB has not announced when their next application cycle will be.

7.2.4.2 Line Item – State Budget

A small number of communities have sought assistance from their state representative and/or state senator to obtain funding for their public works project directly from the legislature.

This approach generally requires significant time and involvement and connections with the area's State Senator and/or Representatives. Usually a person either part of city government or influential resident that can spend time and effort is needed. A strong case needs to be made by the community and buy-in by the Senator and/or Representatives such that the project request makes it onto the State budget, and through the budget process successfully.

7.2.4.3 Revenue Bonds / General Obligation Bonds

Revenue bonds and general obligation bonds have historically been a means of funding public works projects by some communities. These funding mechanisms will likely not be needed due to the high likelihood Twisp will qualify favorably for the other loan/grant programs previously discussed. These funding mechanisms can be considered further if other more advantageous sources cannot be obtained.

7.2.4.4 City / Utility Reserve Funds

Accumulated local reserve funds are usually insufficient to fund large scale capital improvements without considerable supplemental funding. Communities are encouraged to budget sufficiently to be able to save and accumulate local reserves for responsible operation, future improvements, and emergency reserves for the utility. In the case where large capital projects are anticipated, local reserves are generally used as seed money to match or leverage funding sources to obtain more favorable funding consideration and funding offers. Communities are encouraged to begin accumulating reserves well ahead of project implementation and set utility rates accordingly.

7.3 Equivalent Residential Units (ERUs), Revenue, O&M Costs, and Cost of Service

A summary of Twisp's customer connections is shown in **Table 7-5**.

Table 7-5 Sewer System Customers

Sewer Customers	Connections
Single Family Residential Connections	355
Commercial and Other Non-Single Family Connections	182
Total Sewer Connections	537

(1) Number of sewer connections per June 2020 Rural Development funding application supporting data.

A summary of Twisp's 2018 and 2019 actual and 2020 budgeted revenue and expenditures are included in **Table 7-6**. Also shown is the calculated cost of service for both years and the estimated rate ERUs for use in the funding scenarios included in a subsequent section.

Twisp's wastewater rate charges are based on Equivalent Residential Units (ERUs). For billing purposes, one ERU is defined as a single-family residence and is invoiced at the residential customer rate. Commercial and other non-residential customers are assigned an ERU count that is intended to represent the relationship to a residential ERU.

For the purposes of evaluating funding scenarios in a subsequent section, "rate" ERUs are calculated. The significance of a "rate" ERU count is it represents the invoicing weight of each customer and therefore translates to revenue charged to customers and received by the City.

Table 7-6 Sewer Rates, Revenues, Expenses, ERUs and Cost of Service

Description	2018 (actual)	2019 (actual)	2020 (budget)
SEWER REVENUE:			
Revenue From Sewer Rates	$450,652	$459,705	$465,773
Misc. Revenues	$3,824	$1,691	$2,890
Total Revenue	$454,476	$461,396	$468,663
CALCULATION OF RATE ERUs:			
Revenue From Sewer Base Rate Only (see above)	$450,652	$459,705	$465,773
Residential Sewer Base Rate During Period	$55.42	$56.39	$57.24
Calculated Number of Rate ERUs	678	679	678
Rate ERUs Used In Funding Scenarios (1)	670 Rate ERUs		
SEWER EXPENSES:			
Sewer Operation and Maintenance	$354,092	$365,511	$377,929
Existing Debt Service (2)	$20,755	$20,755	$20,730
Capital Expenditures	$12,222	$22,999	$24,501
Reserve Fund Transfers	$41,468	$46,593	$44,708
Total Sewer Expenses	$428,537	$455,858	$467,868
CALCULATION OF COST OF SERVICE:			
Total Cost of Service (from above)	$428,537	$455,858	$467,868
Est. Equiv. Cost of Service per ERU per month (2)	$52.70	$55.92	$57.50

*(1) See **Table 7-7 & 7-8**; funding scenarios based on conservative lower 660 ERUs.*
(2) Existing debt service costs and existing s cost of service does not include additional recent loans for: ECY loan for GSP ($105,002 loan); ECY loan for FP ($56,405 loan); and RD loan awarded Aug. 2020 ($915,000) for collection system and biosolids dewatering improvements.

7.4 Funding Scenarios and Estimated Sewer Rate Impacts

As indicated in the preceding Sections, there are several funding sources available to municipalities for financing public works projects through grants and low interest loans. Three potential funding agencies that will likely result in the most favorable funding packages for Twisp are:

- WA Department of Ecology
  - Centennial Clean Water Program (CCWP), and
  - Clean Water State Revolving Fund Loan Program (CWSRF)
- US Department of Agriculture – Rural Development (RD)
  - Water and Waste Disposal Loan and Grant Program
- WA Department of Commerce
  - Community Development Block Grant (CDBG) Program

Table 7-7 provides a summary showing the estimated rate impact ranges that may be expected for the three programs for loan and grant scenarios. The subsequent detailed table – **Table 7-8** augments and provides the detailed assumptions and references for developing the scenarios.

Table 7-7 Funding and Rate Impacts Summary

Description / Assumptions:	Ecology (ECY) Funding	
	Scenario #1	*S*
	ECY Loan Only	ECY Loan +
Wastewater Treatment Plant Upgrades		
Approximate loan / grant ratio	100% / 0%	
Loan terms (interest varies)	1.6%, 30 years, 20% payment reserve	
Approx sewer rate req'd ($/mo/ERU) (1) (2)	**$45**	
Current (2020) Sewer Rate ($/mo/ERU) (1)	$57.24	

(1) Rate impact does not include additional debt costs for recent Twisp loans for: ECY loan for GSP ($1.0/mo/ERU); ECY loan for FP ($0.5/mo/ERU); and RD loan awarded Aug. 2020 ($3.9/mo/ERU) for collection system and biosolids dewatering improvements. Approximate total rate impact is $5.4/mo/ERU.

(2) Rate impact does not include additional rates associated with utility tax. Twisp's 2020 utility tax rate is 9%.

Funding through Ecology (ECY) and/or the USDA – Rural Development (RD) both have the potential for funding offers for Twisp with loan and grant funding. For this project RD appears to be more favorable. Adding CDBG grant funding may further increase chances of favorable funding and reduced rate impacts. One of the challenges (or disadvantages) of ECY grant funding (i.e. hardship grant) is that the program is very competitive with many more applications submitted than there is hardship grant available. Therefore, a very strong water quality "benefit" is necessary to be well documented and well presented in the application to have the best chance of receiving hardship funding. In contrast, an advantage of USDA-RD funding is the greater Town involvement in the funding procurement process and application process, and the resulting assurance of knowing the loan/grant combined funding that will likely be offered by USDA-RD ahead of time. Regarding augmenting the funding package with potential CDBG grant funding, CDBG is also a very competitive funding program and one that Twisp has been successful with in the past. Approximately three times the dollar amount of applications are submitted each year than can be funded by CDBG. Strong CDBG applications that document health and safety benefits of the project and benefit to the community's low and moderate income (LMI) population are essential to securing CDBG funds.

Ecology's funding applications are received once per year in October and funding is then awarded the following spring and summer. RD's funding program receives applications on a continuous year-round basis. The most favorable funding windows for RD are at the first of the year in January (i.e. following the previous October start of their fiscal year), and before late summer (August during their national pooling of

funding) of each year. CDBG's funding applications are received once per year in early June and funding results are generally announced the following September.

Generally, the most successful funding strategy is to inquire and pursue funding from the primary funding agencies that are likely to result in favorable funding packages (or partial funding package) for the community's project. In the case of Twisp, the likely primary funders included ECY, USDA-RD, and CDBG. Then, after receiving results on the applications and/or following discussions with the agencies, make a decision on the most advantageous funding offer or funding plan approach. The final most advantageous plan may include funding from a single agency or could include partial funding from all the agencies.

Table 7-8 Funding and Rate Impacts (Expanded)

Description / Assumptions:	Ecology (ECY) Funding		Rural Development (RD)			RD + CDBG
	Scenario #1	*Scenario #2*	*Scenario #3*	*Scenario #4*	*Scenario #5*	*Scenario #6*
	ECY Loan Only	ECY Loan + 50% Hardship Grant	RD Loan Only	RD Loan + RD Grant	RD Loan + 75% RD Grant (health & safety)	Scenario #5 + CDBG Grant
Total Estimated Project Cost	$7,150,000	$7,150,000	$7,150,000	$7,150,000	$7,150,000	$7,150,000
Assumed Funding Source:						
RD Loan			$7,150,000	$3,932,500	$1,787,500	$1,562,500
SRF/CCW Loan	$7,150,000	$3,575,000				
RD Grant				$3,217,500	$5,362,500	$4,687,500
CCW Hardship Grant [1] or Forgivable Loan		$3,575,000				$900,000
CDBG Grant						
Local Contribution	TBD	TBD	TBD	TBD	TBD	TBD
Estimated Loan Portion of Project	$7,150,000	$3,575,000	$7,150,000	$3,932,500	$1,787,500	$1,562,500
% Loan	100%	50%	100%	55%	25%	22%
% Grant (+Local)	0%	50%	0%	45%	75%	78%
Estimated Additional Debt Costs	$362,300	$181,200	$262,900	$144,600	$61,300	$53,600
Estimated Number of ERUs [2]	670	670	670	670	670	670
Estimated Approx. Rate Impact ($/mo/ERU) [3][4]	**$45**	**$23**	**$33**	**$18**	**$8**	**$7**
Current (2020) Sewer Rate ($/mo/ERU) [3][4]	$57.24	$57.24	$57.24	$57.24	$57.24	$57.24

(1) *Estimated Twisp ECY financial hardship index, with project, approximately 2.6%. Thus, potential hardship eligibility up to maximum 50% grant, up to $5 million max. Design phase is 50% eligible.*

(2) *See ERU discussion / determination in Section 7.3 and **Table 7-6**.*

(3) *Rate impact does not include additional debt costs for recent Twisp loans for: ECY loan for GSP ($1.0/mo/ERU); ECY loan for FP ($0.5/mo/ERU); and RD loan awarded Aug. 2020 ($3.9/mo/ERU) for collection system and biosolids dewatering improvements. Approximate total rate impact is $5.4/mo/ERU.*

(4) *2020 residential rate does not include utility tax rate of 9%.*

7.5 Recommended Funding Steps and Timeline

The following target funding process is recommended for Twisp:

- Submit an ECY funding application during the 2020 funding cycle for design phase with application deadline in October 2020.
- Subsequently, in late 2020 or January 2021, a Tech Team meeting is suggested to be scheduled with Twisp, Varela and with the following funding/regulatory agencies: ECY, RD and CDBG. The purpose is to collaborate with the agencies to further develop and confirm the funding plan for the project and action steps for funding procurement.
- Subsequent to, and depending on recommendations and conclusions of the Tech Team collaboration, the following funding steps are anticipated:
    - Initiate RD funding application process in spring 2021
    - Submit CDBG grant application in June 2021

Other funding scenarios and pathways may emerge as Twisp moves forward and can be reviewed and considered at that time. Also, as indicated in preceding sections, there are other more aggressive approaches through the legislative process (line item in State budget) if the Town decides to pursue this approach.

7.5.1 *Value Engineering (VE) and Potential Project Phasing*

The cost of needed treatment plant improvements outlined in this Facility Plan are significant for a community the size of Twisp. Coupled with the recent and ongoing economic impacts to the community due to COVID19, the Mayor and Town Council are looking to exhaust every opportunity to reduce project cost and unnecessary improvements, where possible. In addition, elected officials are taking steps to reduce Town ongoing operating costs.

Toward this end, Twisp has indicated a desire to incorporate a value engineering (VE) step into the design phase of the project following completion of the design plans and specifications, or during the in-progress design phase (e.g. say 60% design completion). The VE stage typically employs an independent value engineering firm/team to analyze the completed, or in-progress design plans and specifications. The VE process is a systematic approach of examining process function, systems, equipment and material selections, and evaluating potential alternatives for cost reductions and overall cost efficiency of the proposed improvements.

In addition, depending on the favorability of project funding packages from the funding agencies, the Town may explore potential phased construction as part of the VE in order to defer or postpone feasible project costs until potential affordability improves and/or until more favorable funding can be procured.

8.0 Public Involvement

The general sewer plan allowed for public input at Town council meetings when the project and funding applications were presented and discussed by the Council. The public has been invited to comment on the planning process.

SEPA and SERP forms have been prepared and will be sent to the various agencies, advertised in the local newspaper and posted in Town Hall. After agency consultation, a DNS was determined by the Town and published in the local newspaper with a 20 day public comment period. The SEPA, SERP and DNS are included in **Appendix F**.