Section 8 - Recommended Plan

The recommended plan for addressing identified deficiencies and projected demands in the Sheridan wastewater facilities includes priority improvements for the collection system and treatment plant. This section summarizes the recommended plan.

8.1. Introduction

8.1.1. Projected Design Flows

Projected design flows in the Sheridan wastewater system for the year 2032 are 1.54 mgd average day, 3.36 maximum month, 6.98 mgd peak day, and 10.13 mgd peak hour.

8.1.2. Project Cost Summary

Refer to Table 8-1 for a summary of the treatment and collection system improvement costs.

TABLE 8-1: 20-Year Capital Improvement Plan

ID#	Item	Primary Purpose	Total Estimated Cost	SDC Growth Apportionment		City's Estimated Portion
				%	Cost	
Priority 1 Improvements (0-6 years)						
Wastewater Collection System						
1A.1	Main Lift Station Upgrades	Capacity	$ 797,000	7%	$ 56,000	$ 741,000
1A.2	Main Lift Station Force Main Upgrades	Capacity	$ 714,000	14%	$ 100,000	$ 614,000
1B.1	Yamhill Street & E. Main Street 24" Trunkline	Capacity	$ 1,892,000	39%	$ 738,000	$ 1,154,000
1B.2	W. Main Street & Yamhill Street 15" Pipeline	Capacity	$ 591,000	44%	$ 260,000	$ 331,000
1B.3	West Main Lift Station Upgrades	Capacity	$ 176,000	26%	$ 46,000	$ 130,000
1C.1	Bridge Street & Jefferson Street Flow Split Manhole	Capacity	$ 98,000	0%	$ -	$ 98,000
Wastewater Treatment						
1	Pilot Study of Filters	Various	$ 15,000	42%	$ 6,000	$ 9,000
2	Yard Piping and Sitework	Various	$ 339,000	28%	$ 95,000	$ 244,000
3	FCI Pump Station	Operations	$ 312,000	0%	$ -	$ 312,000
4	Headworks Facility	Compliance	$ 607,000	6%	$ 36,000	$ 571,000
5	Lagoons - treatment	Compliance	$ 2,851,000	28%	$ 798,000	$ 2,053,000
6	Biosolids Removal	Capacity	$ 2,500,000	0%	$ -	$ 2,500,000
7	Filter Pump Station	Compliance	$ 641,000	42%	$ 269,000	$ 372,000
8	Filters	Compliance	$ 1,815,000	42%	$ 762,000	$ 1,053,000
9	Disinfection	Compliance	$ 253,000	6%	$ 15,000	$ 238,000
10	Replace Irrigation Pumps	Replacement	$ 62,000	0%	$ -	$ 62,000
		Total Priority 1 Improvements	$ 13,663,000		$ 3,181,000	$ 10,482,000
		Rate Impact (20 yr, 2%)	$ 29.77			
Priority 2 Improvements (6-10 years)						
Wastewater Collection System						
2.1	Yamhill Street 18" & 21" Pipelines	Capacity	$ 691,000	45%	$ 311,000	$ 380,000
2.2	Lincoln Street 12" Pipeline	Capacity	$ 161,000	43%	$ 69,000	$ 92,000
2.3	Sheridan Road 15" Pipeline	Capacity	$ 286,000	32%	$ 92,000	$ 194,000
		Total Priority 2 Improvements	$ 1,138,000		$ 472,000	$ 666,000
		Rate Impact (20 yr, 2%)	$ 2.07			
Priority 3 Improvements (10-20 years)						
Wastewater Collection System						
3.1	Sheridan Road 18" Pipeline	Capacity	$ 932,000	27%	$ 252,000	$ 680,000
3.2	Sheridan Street 15" Pipeline (between Bridge & Schley Street)	Capacity	$ 175,000	32%	$ 56,000	$ 119,000
3.3	Center Street & Hill Street 10" & 12" Pipelines	Capacity	$ 339,000	44%	$ 149,000	$ 190,000
3.4	Monroe Street 10" Pipeline	Capacity	$ 371,000	57%	$ 211,000	$ 160,000
3.5	Evans Street 10" Pipeline	Capacity	$ 236,000	18%	$ 42,000	$ 194,000
		Total Priority 3 Improvements	$ 2,053,000		$ 710,000	$ 1,343,000
		TOTAL WASTEWATER IMPROVEMENTS COSTS (rounded)	$ 16,854,000		$ 4,363,000	$ 12,491,000

8.1.3. Detailed Project Descriptions and Design Data

Collection System

Detailed project descriptions for the collection system are located in Appendix G. Each project summary sheet provides the objective, key issues, cost estimate and project location map. The selected alternative for the Main Lift Station force main is Alternative 2, the single 18-inch force main. The selected alternative for the Yamhill and E. Main Street 24-inch trunk line is Alternative 2, a parallel 24-inch Yamhill River crossing.

Headworks

The recommended treatment alternative would include pretreatment (screening) for all flow ahead of the new lagoon. Since the FCI already has screening, the recommended option is to install a step screen for the City's influent at the location of the new lagoon inlet. The step screen would be installed in a channel approximately 40 inches wide and 5 feet deep. A bypass channel with a manually cleaned screen would also be provided, and the channels would have stop gates for isolation.

The screen would have a washer compactor to clean and compact the screenings, and the screenings would discharge to a bagger system to reduce odors. The bagged screenings would be deposited into a dumpster for disposal by the garbage service to a landfill. The screening equipment would be installed outdoors and would be insulated and heat traced. Water supply is required to wash the screenings. The water pipe would be insulated and heat traced as well. The screening equipment would be provided with a control panel in a NEMA 4X panel (rated for outdoor service), and installed outside the Class I Division I area (at least 18 inches above and 10 feet out from the channel).

The existing magnetic meter for the City's flow would be relocated to the pipeline to the new headworks.

The screen at the FCI would continue to be utilized. However, a new pump station would be installed at the FCI to pump their screened influent to the new headworks. The FCI flow would be re-screened prior to discharge of the combined influent to the new lagoon system. It is assumed that the discharge from the FCI would be rescreened at the City's new headworks due to staff reports that the FCI headworks is frequently bypassed by FCI staff/inmate operators. If the pump station interferes with the existing Parshall flume at the FCI, a magnetic flow meter would be installed in the force main to provide the FCI influent flow data. The pump station would have two submersible pumps, each sized for the design maximum month flow of 0.4 mgd (278 gpm). An overflow pipe would be connected to the existing pond inlet pipe to provide an outlet for flows that exceeded 0.8 mgd (both pumps running).

Lagoon

The recommended alternative includes a new treatment lagoon constructed west of the existing City primary lagoon. The new treatment lagoon would include an upflow anaerobic (AN) cell with an internal fermentation pit, followed by a complete mix (CM) aerated cell, a partial mix (PM) aerated cell, and a facultative (Fac) cell. The AN, CM, PM and Fac cells would be designed with a 10-foot water depth, and would be sized to provide detention times (based on the maximum month design flow of 3.36 mgd) of 1, 0.3, 2.7, and 4 days respectively. Floating baffles would be utilized to separate the CM, PM and Fac cells. The anaerobic cell would be covered to retain heat and ensure anaerobic conditions. Surface aerators would be used to aerate and mix the CM and PM cells.

Assuming irrigation during the summer on the existing land application site at historical (low) irrigation rates, summer flows in excess of crop usage (an estimated 122.1 MG from May through October) would need to be stored for discharge during the winter. With a total volume of 154.4 MG, the existing City and FCI lagoons would provide this storage volume plus a safety factor in the event that discharge needs to be postponed due to low river flows in early November. The 154.4 MG storage volume assumes that the existing accumulation of biosolids will be removed.

The new treatment lagoon would be at a higher elevation than the existing lagoons to allow the effluent from the new lagoon to flow by gravity to the existing lagoons. Flow routing through the existing lagoons would be reconfigured, and new control structures would be necessary to allow full utilization of the available volume.

<u>Suspended Solids (TSS) Removal</u>

The recommended alternative includes a treatment process to remove additional suspended solids from the lagoon effluent before discharging to the river. The proposed TSS removal system is continuous backwash upflow sand filters. A lift station would be required to transport effluent from the storage lagoons to the new filters.

The filter lift station would be utilized during the winter discharge season to pump the lagoon effluent to the filter inlet channel. From there the effluent would flow through the filters, the new chlorine contact channel, and to the river by gravity. The filter lift station would be installed adjacent to the existing chlorine contact channel, and would use it as the wet well. This allows continued use of the existing outlet control to control the effluent flow rate.

The filter lift station pumps would be self-priming centrifugal pumps, each pump sized for the 2032 maximum month flow rate of 3.36 mgd (4,840 gpm). The pumps would have VFDs, and would be controlled by setting the flow rate with overrides by the level controls in the wet well/contract chamber. A magnetic meter would be installed on the outlet piping for pump control. The inlet valve would be controlled by the level floats to maintain supply to the pumps. The pumps would be installed in a building for freeze protection.

The filter system would include eight filters, each approximately 8-foot square, installed in a row in a concrete basin divided into eight cells. An inlet channel along one side of all the filters would receive the flow from the filter lift station and distribute the flow to the eight filters via pipelines. Each inlet pipe should have a valve to isolate the associated filter. Filtered flow would discharge from each filter over a weir into an outlet channel; the bottom of the channel would be sloped to an outlet pipe. The filters would be installed outdoors and have grating over the top for access.

An air compressor is required to provide the air to the air lift pumps that pump the sand from the bottom of the filters to the separation box at the top of the filters. The clean sand is distributed across the filters and the backwash water is directed to a backwash lift station. The backwash lift station would be a submersible pump lift station with two pumps, each sized for the peak flow of 500 gpm. The backwash would be pumped back to the new screen channel.

A coagulant, either polymer or alum, would be added to the influent flow to the filters as needed to flocculate the solids and improve the filter performance. The chemical storage and pumping equipment would be installed in the filter lift station building.

Disinfection

The recommended disinfection option is to construct two new chlorine contact channels (as required for redundancy) adjacent to the new filtration facilities, and to continue using the existing chlorination and dechlorination facilities. Flow from the filter outlet would enter a center chamber where chlorine solution would be added. Sodium bisulfite solution would be pumped into the end of the active channel at a mixer for dechlorination just prior to entering the piping to the outfall.

Each of the two new contact channels would be sized for a 20-minute detention time at a peak flow of 6.4 mgd (based on DEQ criteria). Slide gates would be used to isolate the contact channels and determine which channel receives the flow.

Chlorine contact channel dimensions would meet DEQ's required minimum length-to-width ratio. Each channel would reverse direction twice to provide a more compact design. At each direction change, a baffle would be installed to maintain plug flow. The existing magnetic meter would be relocated to the piping downstream of the chlorine contact chambers.

Irrigation

No changes would be made to the existing land application site, or to operation of the irrigation system. However, the two 40 hp vertical turbine irrigation pumps at the existing chlorine contact chamber would be replaced to ensure reliable operation into the future.

A process schematic for the recommended alternative is presented in Figure 17.

8.1.4. Rehabilitation/Replacement Costs and Annual Budget

Section 5.1.2 and 9.2 summarize the recommended collection system replacement / rehabilitation budget of $77,000/year.

8.2. Financing Strategy

Section 8 summarizes available funding resources. Upon completion of this facilities planning study, the City should request a "one-stop" meeting with IFA. This meeting will bring together a number of funding sources, and this group will suggest which funding package will be best for the City. The City has a jump start in this process having already submitted an application for the DEQ-SRF for the Main Lift Station and force main project. The City was ranked 9th among the applicants. The DEQ has indicated that there should be enough funds for this project to be funded. The next step would be to attend a "one-stop" meeting and decided whether the City should continue to step through the DEQ-SRF process or begin working with another agency.

8.3. Implementation Schedule

The Main Lift Station and force main project should be completed as soon as possible. Efforts for the treatment plant improvement financing package should begin immediately as well. Due to the size of the treatment plant improvements, more than one source of funding may be preferred. Refer to Table 9-2 in Section 9 for the 6-year CIP, which forecasts anticipated annual expenses to complete Priority 1 improvements.

- 2013
  - Replace irrigation pumps
  - Adopt Facilities Plan
  - Secure financing for Main lift station and force main
- 2014
  - Revise annual O&M and replacement budgets
  - Secure financing for treatment plant upgrades
  - Preliminary engineering and design for Main lift station project (Jan-June)
  - Begin construction of Main lift station and force main (June-Dec)
  - Preliminary engineering for treatment plant upgrades
  - Pilot study of filters
- 2015
  - Design for treatment plant upgrades
  - Complete construction of Main lift station and force main
- 2016
  - Begin construction treatment plant upgrades
- 2017
  - Complete construction of treatment plant upgrades
- 2018
  - Complete half of biosolids removal
- 2019
  - Complete all of biosolids removal