

## **APPENDIX H**

### **WASTEWATER SYSTEM CAPITAL IMPROVEMENT PROGRAM**

## INTRODUCTION

This appendix summarizes proposed improvements to the City of Poulsbo's wastewater system that are necessary to resolve existing system deficiencies and accommodate the projected growth associated with the delivery of services. The wastewater system improvements were identified from an evaluation of the results of the wastewater system analyses. The wastewater system improvements are designed to meet both the existing and future demand conditions of the system.

A Capital Improvement Program number, herein referred to as a CIP number, has been assigned to each improvement as set forth in the Wastewater System Comprehensive Plan. The improvements are organized and presented in this appendix according to the following categories:

- Collection System Improvements
- Facility Improvements
- Miscellaneous Improvements
- Developer Funded Improvements

The remainder of this appendix presents a brief description of each group of improvements, the criteria for prioritizing, the basis for the cost estimates, and the implementation schedule.

## DESCRIPTION OF IMPROVEMENTS

This section provides a general description of each group of improvements and an overview of the deficiencies that they will resolve. Most of the improvements are necessary to resolve existing system deficiencies. Additionally, improvements have been identified in the undeveloped areas in the northwest section of the City's that will be necessary to properly serve that area. The locations of improvements in these areas and other undeveloped areas will most likely be altered to fit the layout of the future developments. The CIP numbers for these improvements have a "D" prefix (example: DI, DFI). The costs associated with these improvements shall be borne by the developers, rather than the existing water customers.

## COLLECTION SYSTEM IMPROVEMENTS

Most of the wastewater collection system improvements are required to resolve existing system deficiencies due to capacity concerns and age.

Existing, Flow and Capacity

Based on a computer analysis of the system it was determined that the majority of the sewer main within the system is adequately sized for existing flows from tributary areas.

The principle capacity problems identified by the analysis were the ability of the Central Interceptor, as well as the Marine Science and Lindvig Pump Stations, to accommodate the Peak Design Flow (PDF). The Central Interceptor is undersized and is currently unable to meet peak flows.

The estimated peak design flow rate currently of the Central Interceptor is approximately 3,100 gpm. The flow capacity of the interceptor is limited by several lengths of 18-inch main laid at minimum slope. During peak flow events the Central Interceptor surcharges and flows under pressure.

The second deficiency identified from the analysis was that the peak design flow rate of the Marine Science Center Pump Station during peak flow is approximately 1,850 gpm, which exceeds the 1,650 gpm maximum discharge pumping rate of the pump station. If the excessive flows continue for more than a short length of time then the wet well could surcharge.

#### Collection System Infiltration and Inflow (I&I)

Infiltration is defined as groundwater that enters sewer and building connections through defective joints and cracks in pipes, and manholes. Inflow is primarily described as stormwater which is discharged into the sewer system from foundation and roof drains.

A major component of the peak design flow into the collection system has been identified as the inflow of infiltration and inflow of storm and surface water. The inflow and infiltration into the collection system was evaluated based upon review of pump station flow log, the I/I study performed in 1992 and on a review of 1995 pump station run time. It is evident that significant infiltration and inflow occurs in the drainage basins tributary to the Marine Science Center, 6<sup>th</sup> Avenue and 9<sup>th</sup> Avenue Pump Stations. The run time on these pumps during wet weather is greater than 2 times an average daily flow.

### **FACILITY IMPROVEMENTS**

#### **CIP CS-1 Inflow & Infiltration Improvements – 6<sup>th</sup> Avenue, 9<sup>th</sup> Avenue and Central Poulsbo Drainage Basins**

**Deficiency:** The City of Poulsbo sewer system experiences a high volume of infiltration from groundwater and inflow from storm drainage into the sanitary sewer system. This is confirmed by the fact that the average dry weather flow is nearly half of the average wet weather flow.

It is estimated that the complete replacement of sanitary sewer main and side sewer could reduce inflow and infiltration into the system by as much as 0.5 mgd.

**Improvements:** The proposed improvements consist of sewer main rehabilitation and side sewer replacement in the 6<sup>th</sup> Avenue, 9<sup>th</sup> Avenue and Marine Science Center drainage basins (**Figure 2-5**). The oldest developed areas of town are located in these basins and are identified as having the highest occurrence of infiltration and inflow in the City.

Activities would include the rehabilitation, and/or removal and replacement of the 8-inch sewer collection mains together with the side sewers to the property. Side sewer replacement on private property would require the voluntary participation of private property owners.

Improvements would involve replacement of approximately 30,400 linear feet of pipe in the 6<sup>th</sup> Avenue, 9<sup>th</sup> Avenue and Marine Science Center Basins. The estimate consists of 10,000 linear feet in the 6<sup>th</sup> Avenue Basin, 7,400 linear feet in the 9<sup>th</sup> Avenue Basin and 13,000 linear feet in the Marine Science Center Basin. Pump station maintenance upgrades to the 6<sup>th</sup> Avenue and 9<sup>th</sup> Avenue Pump Stations would also occur as part of this work.

### **CIP CS-2 Marine Science Center Pump Station**

**Deficiency:** The Marine Science Center Pump Station is located in downtown Poulsbo near Hostmark & Front Streets. The pump station consists of an existing 420-square-foot concrete and masonry building housing a diesel engine generator, electrical service panel and storage space. Below the building is a steel dry well housing three constant-speed pumps and electrical controls. The pump station receives all of the flows for the service area near the downtown together with flows from the Lindvig Pump Station. The Marine Science Center Pump Station discharges flows via a 12-inch ductile iron force main that connects with the central interceptor located on SR-305.

The Marine Science Center Pump Station has a pump capacity of approximately 1.8 mgd. This is undersized to meet the current flow conditions. The pump station is designed to operate two pumps with a third pump as backup. Peak flows to the pump station have exceeded the design discharge rate, and all three pumps have been required to operate on occasion to meet existing flow requirements. The pump station is undersized and the electrical controls require upgrade.

**Improvements:** The proposed Marine Science Pump Station upgrade would increase the flow capacity from approximately 1.8 mgd to approximately 2.2 mgd, based on operating two pumps with a third pump on standby. The existing pumps would be replaced with new 50-horsepower pumps.

The electrical panels and associated emergency generator would be upgraded to facilitate the higher horsepower pumping equipment. No major building modifications are anticipated.

### **CIP CS-3 Central Interceptor**

**Deficiency:** The Central Interceptor consists of approximately 7,200 linear feet of 18-inch gravity sewer located in the vicinity of State Route (SR) 305 between Hostmark Street to the Kitsap County metering manhole at SR 305 and Johnson Road. During peak flow events, the gravity main flows full and surcharges in manholes.

**Improvements:** The improvements consist of the construction of a 23-inch-diameter main along the east side of the City of Poulsbo and Washington State Department of Transportation right-of-way parallel to the existing 18-inch main located on the west side of SR 305. The gravity main would terminate at the proposed Kitsap County Pump Station No. 70.

The dual gravity main will allow the City to eliminate overflows and balance flows through both of the gravity mains. These improvements would increase system capacity to approximately 6.0.

### **DEVELOPER FUNDED IMPROVEMENTS**

The following water system facility improvements have been identified for the mostly undeveloped areas in the northwest section of the city's existing and future service areas to illustrate the major facilities that will be required to properly serve that area. The costs associated with these improvements should be borne by the developers rather than the existing wastewater customers, unless over-sizing of the improvements provides benefit to the existing customers.

### **CIP DF-2 Bond Road Pump Station**

**Deficiency:** The Bond road Pump Station in conjunction with the Bond Road Force Main and the SR 305 Force Main would allow for the redirecting of existing and future wastewater flows from the Lindvig Pump Station currently being discharged to the Marine Science Pump Station to the proposed Bond Road Pump Station. The reallocation of flows would allow the Marine Science Pump Station capacity to be used to meet service requirements of the Central Poulsbo Area. Additionally the pump station would allow for the collection of wastewater flows from the northwest portion of the city to include those areas west of Viking Avenue and north of Finn Hill Road and along SR 305 west of Bond Road.

**Improvement:** The proposed bond Road Pump Station would be located near the intersection of SR 305 and Bond Road. The station would consist of a small above grade electrical building next to a circular wet well with submersible pumps. The Pump Station would be constructed in two phases. Phase I would consist of the construction of a wet/dry well facility, building and allied appurtenances. The pump station would be sized to ultimately accommodate three pumps and associated equipment for a total capacity of 2.6 mgd. Phase I equipment would be based on delivering a firm

capacity of only 1.0 mgd, and would consist of two 1.0 mgd submersible pumps sized to approximately 20 horsepower. A 50-kilowatt, standby generator would be provided in the electrical building, along with the electrical and control panels. Space would be provided outdoors for future addition of carbon canisters for odor control, if required.

### **CIP DF-2 Bond Road Force Main**

**Deficiency:** The Bond Road Force Main in conjunction with the Bond Road Pump Station and the SR 305 Force Main would allow for the redirecting of existing and future wastewater flows from the Lindvig Pump Station currently being discharged to the Marine Science Pump Station to the proposed Bond Road Pump Station. The reallocation of flows would allow the Marine Science Pump Station capacity to be used to meet service requirements for the Central Poulsbo Area. Additionally, the pump station would allow for the collection of wastewater flows from the northwest portion of the city to include those areas west of Viking Avenue and north of Finn Hill Road and along SR 305 west of Bond Road

**Improvement:** This improvement would consist of the construction of approximately 2,500 feet of 8-inch force main located along Bond Road between the Lindvig Pump Station and the Bond Road Pump Station. The flows from the Bond Road Pump Station would pump through the SR 305 force main and would discharge into the proposed Central Interceptor gravity.

### **CIP DF-3 SR 305 Force Main**

**Deficiency:** The SR 305 Force Main, in conjunction with the Bond Road Pump Station and the Bond Road Force Main, would allow for the redirecting of existing and future wastewater flows from the Lindvig Pump Station currently being discharged to the Marine Science Pump Station to the proposed Bond Road Pump Station. The reallocation of flows would allow the Marine Science Pump Station capacity to be used to meet service requirements for the Central Poulsbo Area. Additionally, the pump station would allow for the collection of wastewater flows from the northwest portion of the city to include those areas west of Viking Avenue and north of Finn Hill Road and along SR 305 west of Bond Road.

**Improvements:** The improvements would consist of the construction of approximately 7,200 feet of 12-inch force main located along the City of Poulsbo and Washington State Department of Transportation right-of-way between the Bond Road Pump Station and Harrison Street. The flows from the force main would be discharged into the proposed Central Interceptor.

## MISCELLANEOUS IMPROVEMENTS

The following miscellaneous improvements are planning efforts and program elements that are required to comply with various State water regulations and for management and control of the system.

### **CIP M-1 Telemetry and Supervisory Control Improvements**

**Deficiency:** Some of the City's telemetry and supervisory control equipment is getting old and in need of improvements. The master telemetry unit at the Public Works facility is at capacity and its capabilities are limited. Some, but not all, of the facilities are equipped with a remote telemetry unit to enable monitoring and control of the facilities. The existing remote telemetry units are linked to the master telemetry unit with leased telephone lines, which are less reliable than a radio-based telemetry system.

**Improvement:** Install radio equipment at all controlled facilities to convert the communication link from telephone lines to radio. Install a new master telemetry unit with expanded capacity and capabilities, and a computer-based data logger and user-friendly access screen.

### **Comprehensive Wastewater System Plan Update**

**Deficiency:** WAC 173-240 requires that the City's Comprehensive Wastewater System Plan be updated every six years and submitted to the Department of Ecology for review and approval. Water Quality regulations are continuously changing and must be addressed in the City's Comprehensive Wastewater System Plan.

**Improvement:** Update the Comprehensive Wastewater System Plan every six years to meet the requirements that are in effect at the time of the update.

**INSERT WASTEWATER C.I.P TABLE**