

## **Section 5 - Operations and Maintenance Program**

### **A. Introduction**

The intent of this section of the SSMP is to describe the current operation of the City's wastewater collection system. There are five areas of the City's Operations and Maintenance (O&M) program that are required to be described. These are:

1. Collection System Map
2. Preventive Operation and Maintenance Program
3. Rehabilitation and Replacement Plan
4. Training
5. Contingency Equipment and Replacement Inventories

These requirements are reviewed individually below.

### **B. Collection System Map**

#### **1. Regulatory Requirement**

Each Wastewater Collection System agency shall maintain up-to-date maps of its Wastewater Collection System facilities, showing all gravity line segments and manholes, pumping facilities, pressure pipes and valves, and applicable stormwater pumping facilities.

#### **2. City of Ceres Map**

The City has an up-to-date map of the Wastewater Collection System. A copy is included in pocket holder. The map is updated electronically whenever a new subdivision is added. These updates occur in less than a month from the time that the subdivision utilities have been completed and accepted by the City.

The Engineering Department is contacted by field personal and told of any discrepancies found in the field for map corrections. Memoranda or email is used to follow up on these locations.

### **C. Preventive Operation and Maintenance Program**

#### **1. Regulatory Requirement**

Describe routine preventive operation and maintenance activities by staff and contractors, including a system for scheduling regular maintenance and cleaning of the Sanitary Sewer System with more frequent cleaning and maintenance targeted at known problem areas. The Preventive Maintenance (PM) program should have a system to document scheduled and conducted activities, such as works orders.

## **2. City of Ceres Preventive Operation and Maintenance Program**

The City of Ceres owns and operates a 133 mile long wastewater collection system with 14 pumping stations. The area north of Hatch Road and east of Stonum Road is served by the City of Modesto. Some of this area is located within the City of Modesto, some is located in City of Ceres, and some is located in unincorporated areas of Stanislaus County. While the wastewater from some of the area north of the City is conveyed to and treated by the City of Modesto, Ceres maintains all of the sewers south of the Tuolumne River except the trunk sewers greater than 18 inches in diameter. The trunk sewers which convey wastewater to the City of Modesto, some of which are relatively deep, are maintained by the City of Modesto.

As covered under the Organization section, there are two Senior Wastewater System Operators, and six Wastewater System Operators I/II assigned to the Wastewater System Department for operating and maintaining the Wastewater Treatment Plant and the Collection System. These personnel work under the direction of the Wastewater System Supervisor. All of the Wastewater Department staff are trained to perform all of the work needed to operate the Treatment Plant and maintain the Collection System. The Wastewater System Supervisor and all of the Operators have Class B licenses which are required to drive the Vacuum/Flushing truck. While there is cross-training and cross-functional work assignments, one of the workers is considered the lead electrical operator and one is the lead laboratory analysis person. For the normal sewer cleaning operations, a two person crew is assigned unless the pipelines to be cleaned are located in heavy traffic zones, in which case a three person crew is used.

The City owns and maintains trucks and other equipment used for a variety of City functions. Included in the vehicles and equipment are pickup trucks assigned to the Wastewater System Department for maintenance of the treatment plant, lift stations, and the sewer pipeline. Also included in the equipment and trucks assigned to the Wastewater System Department is a flusher truck, a combination flushing/vacuum truck, an easement machine used for cleaning pipelines located in easements where grass or landscaping needs to be protected, a closed-circuit television inspection truck, three standby generators, and two portable generators, and one 6 inch portable pump. The Wastewater System Department also has access to a variety of construction equipment such as backhoes, dump trucks concrete saws, etc, when pipe must be excavated and replaced. An equipment list is included under a separate tab at the end of this section.

Equipment numbers are assigned as follow:

<u>First Two Numbers</u>	<u>Assigned Department</u>
20	Fleet Maintenance
25	Wastewater
30	Streets
35	Water
40	Parks

The City has initiated a root control program and has included this activity as part of its routine Preventive Maintenance program.

The age of the system is as follows:

<b>Const Yr</b>	<b>Age</b>	<b>Length (mi)</b>	<b>%</b>	<b>Cum %</b>
1920-29	> 80 yr	6.02	5.6%	5.6%
1930-39	> 70 yr		0.0%	5.6%
1940-49	> 60 yr	3.26	3.0%	8.6%
1950-59	> 50 yr	4.6	4.3%	12.9%
1960-69	> 40 yr	9.3	8.6%	21.5%
1970-79	> 30 yr	30.23	28.0%	49.5%
1980-89	> 20 yr	30.14	27.9%	77.4%
1990-99	> 10 yr	15.39	14.3%	91.6%
2000-09	< 10 yr	9.04	8.4%	100.0%
<b>Totals</b>		<b>107.98</b>	<b>100.0%</b>	

This table shows that while the majority of the system is relatively young, about 13% of the system is older than 50 years old and just over 6% is over 80 years old. The size distribution of the wastewater collection system is shown below.

<b>Size</b>	<b>Gravity Sewer (miles)</b>	<b>%</b>	<b>Cum</b>
< 4 inch			
4 inch	0.82	0.6%	0.6%
6 inch	39.6	30.1%	30.7%
8 inch	62	47.0%	77.7%
10 – 18 inch	24.5	18.6%	96.3%
18 – 36 inch	3.9	3.0%	99.3%
> 36 inch	0.96	0.7%	100.0%
<b>Totals</b>	<b>131.78</b>	<b>100.0%</b>	

This table shows that like most other sewer agencies, about 80% of the sewer system is small diameter pipe which is 8-inches in diameter or less. The vast majority of the system (96.3%) of the system is small or moderate sized (18-inch or smaller). Only a small percentage is large diameter sewer.

The City uses a Preventive Maintenance (PM) approach to operating and maintaining the wastewater collection system. The PM program consists of:

- Inspecting and maintaining the pumping stations once per week
- Cleaning 48 pipelines segments where grease related stoppages have occurred one or more times on a cycle of approximately every 30 to 45 days but no longer than once every 60 days (A copy of the list is attached at the end of this section.)
- Cleaning the entire pipeline system on a cycle of about 2 ½ years

The City maintains the sewer pipelines and the pumping stations. The City does NOT own or maintain the service lateral piping which conveys the wastewater from the house or structure to the connection to the sewer main. The property owner is responsible for any problems in the service lateral.

Summary information on the pump stations is shown below.

<b>Pump Station <u>Name</u></b>	<b>Capacity <u>(gpm)</u></b>	<b>Inspection <u>Frequency</u></b>	<b>SCADA</b>	<b>Backup Power</b>	<b>Flow Meter</b>
Pine St	600 x 2	Weekly	YES	YES	NO
Paramount	300 x 2	Weekly	YES	YES	NO
Barbours	900 x 2	Weekly	YES	YES	NO
Walgreens	405 x 2	Weekly	YES	YES	NO
Moffet Rd	555 x 2	Weekly	YES	YES	NO
River Ranch	325 x 2	Weekly	YES	YES	NO
Hatch & Mitchell	190 x 2	Weekly	YES	YES	NO
Central Evans	400 x 2	Weekly	YES	YES	NO
Service Rd	600 x 2	Weekly	YES	YES	NO
Morgan Rd	500 x 2	Weekly	YES	YES	NO
Westpointe	750 x 2	Weekly	YES	YES	NO
Industrial	300 x 2	Weekly	YES	YES	NO
Kmart	300 x 2	Weekly	YES	YES	NO
Costa Fields	150 x 2	Weekly	YES	YES	NO

All of the pump stations use submersible pumps mounted on rails. Thirteen of the pump stations are installed with constant speed pumps. One of the pump stations has a variable speed pump.

The City responds to all customer complaints or requests for information. During the past three years the City responded to 77 to 93 customer complaints or requests for information. Of these, 12 to 14 annually were or requests for information, 39 to 50 annually were determined to be property owner problems that were not associated with the City's sewer pipelines. Between 17 and 31 annually of the customer call in reports were found to be stoppages in the City's sewer system. A copy of the City's Customer Service Request is attached in a tab at the end of the section.

Work is scheduled daily based on current needs. The City uses a work week of 10 hours per day Monday through Thursday. Unless there are emergencies, the lift stations are maintained on Mondays and the treatment plant head works maintenance needs are performed on Mondays and Thursdays.

Pipeline cleaning is performed using a highlighted map of the sewer system showing which lines were cleaned during the currently calendar year. This work is performed as time allows where the grease hot spot list work is scheduled first based on when the list was last completed.

Work is tracked through time sheets. Lift station data is summarized on spreadsheets. Budget data is kept on a spreadsheet. Daily hours for each pump station are taken from SCADA and manually entered into a spreadsheet showing the total hours pumped by each pump.

## **D. Rehabilitation and Replacement Plan**

### **1. Regulatory Requirement**

Develop a rehabilitation and replacement plan to identify and prioritize system deficiencies and implement short-term and long-term rehabilitation actions to address each deficiency. The program should include regular visual and TV inspections of manholes and sewer pipes, and system for ranking the conditions of sewer pipes and scheduling rehabilitation. Rehabilitation and replacement should focus on sewer pipes that are at risk of collapse or prone to more frequent blockages due to pipe defects. Finally, the rehabilitation and replacement plan should include a capital improvement plan that addresses proper management and protection of the infrastructure assets. The plan shall include a time schedule for implement the short- and long-term plans plus a schedule for developing the funds needed for the capital improvement plan.

### **2. City of Ceres Rehabilitation and Replacement Plan**

The City hasn't experienced many structural problems with the pipeline system. When a problem is discovered, an assessment is performed of the suspect area. For example, the City recently completed an assessment of all of the sewers in the Morrow Village area.

When closed circuit television inspection is used, the attributes and defects are recorded on a 1-10 rating system used to determine the severity of the defects found during the inspection process. A copy of the rating system is attached to the end of this section.

Funds are budgeted in the City's 5-year Capital Improvement Program (CIP) for the City's rehabilitation and replacement (R&R) plan based on specific project needs. General rehabilitation and replacement funds are also budgeted to provide for unknown upcoming needs. The City also budgets for unknown needs in the annual operating budget by budgeting for sewer pipe materials and other general supplies used during the course of a year by the City's crews. Current project needs that have been included in the City's 5-year Capital Improvement Program (CIP) are as follow:

- Sewer Condition Assessment – A project to inspect and assess the condition of the sewers in the oldest part of the community
- Sewer Maintenance Management System – A project to purchase and install a new computerized maintenance management system
- Sewer Management Plan – This document

- Sewer rehabilitation and replacement – General funds budgeted for unknown specific needs (\$250,000 budgeted for fiscal years 2007-2008 through 2015-2016).

## **E. Training**

### **1. Regulatory Requirement**

Provide training on a regular basis for staff in sanitary sewer system operations and maintenance, and require contractors to be appropriately trained.

### **2. City of Ceres Training Program**

The City provides the following training for the wastewater department staff:

- Safety – On the job training (OJT) and weekly safety meetings
- Routine line maintenance – OJT
- Confined space entry – Yearly formal confined space entry / rescue training program.
- Traffic control – formal training and OJT
- Record keeping – OJT
- Electrical and instrumentation – offsite specialty training
- Pipe repair – OJT
- Public relations - OJT for initial contract. Turned over to HR for more extensive PR work
- SSO/emergency response – OJT
- Pump station operations and maintenance – OJT & formal training for mechanical equipment & electrical systems
- CCTV and trench/shoring – OJT & formal

As can be observed, on-the-job training (OJT) represents a significant portion of the City's training program. Staff is sent to training programs with formal curriculums for the following: confined space safety, lockout/tag out, and trench/shoring training. These elements require testing and certification of successful completion. Training records are kept by the City's Human Resources Department.

## **F. Contingency Equipment and Replacement Inventories**

### **1. Regulatory Requirement**

Provide equipment and replacement part inventories, including identification of critical replacement parts.

### **2. City of Ceres Contingency Equipment and Replacement Inventory Program**

The City maintains a good supply of contingency equipment and replacement parts for the wastewater system. The equipment and spare parts are stored at the City's Wastewater Treatment Plant. This inventory includes:

- Four (4) spare submersible pumps. One of these pumps can be used in four different pump stations, providing a backup pump for 7 of the 14 pump stations.
- Two (2) spare motor starters, three (3) breakers, and (2) processors for the electrical systems for the pumping stations. The City has standardized the use of these components so that all of the pump stations can be quickly fixed for electrical system failures while maintaining a reasonable supply of spare parts.
- One (1) portable 6-inch diameter pumps
- Two (2) portable emergency generator
- An assortment of various sized vitrified clay pipe ranging in size from 4-inches to 12-inches in diameter
- Spare manhole frames and covers

Through the use of spare parts, backup pumps and electrical generators, the City can readily deal with equipment failures at any of the pumping stations and could handle a relatively long term power outage that may impact the entire community. The City can also readily repair any pipeline collapse that may occur for any pipe size up to 12-inches in diameter which covers 95% of the sewer system. In addition to spare parts on hand, there are three shops in Modesto (Center State Pipe & Supply Co, Groeniger & Co. and Howk Systems) where replacement piping and equipment can be obtained 24 hours per day 7 days per week.

Parts are replaced as they are used and the spare parts inventory is reviewed weekly by the Sanitary Services Supervisor.