SANITARY SEWER
INSPECTION AND MAINTENANCE
PROGRAM

FEBRUARY, 2010
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1.0 INTRODUCTION

Sanitary sewer collection systems have a finite capacity to carry wastewater based on the size of the system components. The size of the components is based upon an analysis of the contributory flows into the system, plus a factor for growth. The analysis considers residential, commercial and industrial sources of flow plus a designed leakage rate for the system components. With time, the design basis for the system may change resulting in flows in excess of the designed flow. These factors can lead to sanitary sewer overflows (SSOs) of the sewer collection system as the increased flows exceed the ability of the collection system or lift stations to convey the wastewater to the wastewater treatment facility. SSOs are overflows, spills, diversions, or release of wastewater from a sewer collection system including those that discharge to waters of the state or to public or private property. A SSO can be caused by poor operation and maintenance of the sewer collection system, pipe or equipment failures, increased growth in the community, undersized pumps, aging infrastructure, and most common; excessive inflow and infiltration (I&I). I&I can also route additional water to the wastewater treatment facility, resulting in hydraulic overloading, which could result in a bypass. Operation and maintenance costs will also increase due to more frequent wear and tear on equipment and additional electrical cost as a result of I&I.

SSOs and bypasses, regardless of the cause, can release untreated sewage to surface waters, at times leading to substantial negative impacts by adding excessive nutrients, sediment, pathogens, metals, and organic enrichment to the receiving stream. These impairments can result in the beneficial loss use of a particular stream, even causing acute impact, such as a fish kill.
2.0 GOALS

The City of Cameron has developed this Sanitary Sewer Inspection and Maintenance Program (SSIMP) to put into place the ideas, concepts and procedures to be used to prevent SSOs and bypasses at the treatment facility to the extent possible and practicable. The City has utilized the United States Environmental Protection Agency’s (EPA) “Guide for Evaluating CMOM Programs at Sanitary Sewer Collection Systems (Document No. EPA 305-B-05-02) as a basis for developing this document. This document can be found at www.epa.gov/npdes/pubs/cmom guide for collection systems. pdf.

Note: The SSIMP is a working document and may need to be modified throughout the calendar year. At a minimum, the City will conduct an annual review and modify schedules and procedures in the SSIMP to accomplish the goals of the plan.

The goals of the plan are to:

- Prevent overflows from the sanitary sewer and bypasses to the extent possible and practicable.
- Manage the assets of the City of Cameron, inclusive of personnel and equipment to affect a regular maintenance program and to be able to respond to emergency overflows and bypasses of the system.
- Through the use of analytical and engineering methods, develop a system to assess and prioritize maintenance, rehabilitation and replacement activities for the portions of the collection system under operational control of the City.
- Decrease budget costs in the long term by reducing the number of equipment failures, repairs and replacement of infrastructure, and general unscheduled and/or emergency activities associated with the wastewater collection and treatment system.
- Through effective management, develop and enforce appropriate ordinances that will help to better manage the performance of the collection system.
- Through an effective Capital Improvement Program, establish specific budgeting goals in order to ensure the City is prepared financially to address all of the needs and requirements of the SSIMP.
3.0 COLLECTIO SYSTEM MANAGEMENT

Management of the Cameron wastewater system will be a proactive endeavor so that we are able to meet the goals of this plan as well as to provide our customers with fiscally, technically and environmentally sound operations of the system. An overview of our system along with our management approach is contained in the following sections.

3.1 Organization and System Parameters

3.11 System Profile

The Cameron sanitary sewer system consists of gravity and forced main components serving the city. The system is not interconnected with other sanitary collection systems. Maps of the system are maintained by the utility at 205 N. Main St., Cameron, Missouri.

Note: See also Appendix 9.1 for a copy of the City’s map(s).

The system profile is as follows:

**City of Cameron System Profile**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Population Served</td>
<td>9,788</td>
</tr>
<tr>
<td>Size of Service Area (acres)</td>
<td>7,040</td>
</tr>
<tr>
<td>Total Customers</td>
<td>3,000 connections</td>
</tr>
<tr>
<td>Treatment Plant Name(s) and Description of Treatment Process</td>
<td>Cameron Wastewater Plant Oxidation Ditch Treatment</td>
</tr>
<tr>
<td>Plant Design Capacity</td>
<td>Outfall #1 is 1.6 MGD Design</td>
</tr>
<tr>
<td>Average Daily Wastewater Flow @ the treatment plant</td>
<td>1.2 MGD</td>
</tr>
<tr>
<td>Average Daily Peak Wastewater Flow @ the treatment plant</td>
<td>8.6 MGD</td>
</tr>
<tr>
<td>Miles of Gravity Sewers</td>
<td>46</td>
</tr>
<tr>
<td>Miles of Force Mains</td>
<td></td>
</tr>
<tr>
<td>Type of Pipe eg; PVC, vitrified clay, cast iron, etc.</td>
<td>85% Clay pipe and 15% PVC</td>
</tr>
<tr>
<td>Age of System (collection system &amp; treatment plant)</td>
<td>75% of the system is &gt;50 years old. Plant was constructed in the mid-80’s</td>
</tr>
<tr>
<td>Number of Pump Stations</td>
<td>14</td>
</tr>
<tr>
<td>Number of Pump Station w/Backup Power</td>
<td>1</td>
</tr>
<tr>
<td>Number of Employees</td>
<td>4 for Water Distribution System &amp; Sewer Collection System Maintenance.</td>
</tr>
<tr>
<td>Number of Manholes</td>
<td>796</td>
</tr>
</tbody>
</table>
3.12 Critical Components

In this section, critical components of the sanitary system will be identified and described. This information will be used later under Section 4.0 Collection System Inspection and Maintenance Program and Section 5.0 I&I Assessment and Reduction Program. The components of the collection system will be described that are critical in terms of conditions, such as, lines with frequent backups, lines buried underneath flowing streams, lines that are in isolated areas in which overflow detection would be unlikely, facilities without backup power, parts of the system where root intrusion is reoccurring, old components, non-redundant components, and components/facilities known by the system to be critical (example; lift stations, manhole, etc.).

In addition, we will calculate the average dry weather flows versus wet weather flows for the most recent 12 month period. The total number of SSOs that have occurred in that same time period will also be documented. A facility is considered to have significant sources of I&I when wet weather flows are equal to or greater than 2.5 times the dry weather flows. Four or more SSOs/100 miles of sewer pipe also indicate problems associated with the collection system.

Note: Evaluation of whether or not a sanitary sewer collection system is experiencing wet weather flows that are greater than or equal to 2.5 times normal dry weather flow will be determined using the following method. The monthly average dry weather flow rate will be compared to the maximum day effluent flow, if the maximum day can be assumed to be a wet weather event.

\[
\frac{\sum \text{Daily Dry Weather Flow (one month)}}{\# \text{ of Days}} = \text{Average Dry Weather Flow (GPD)}
\]

\[
\frac{\text{Maximum Day Flow (GPD)}}{\text{Average Dry Weather Flow (GPD)}} = \text{Wet Weather Flow Factor}
\]

\[
\text{IF}, \quad \text{Wet Weather Flow Factor} \geq 2.5,
\]

\[
\text{THEN}, \quad \text{The system is considered to have significant sources of I&I.}
\]

This calculation will be considered for all wet weather months. If the Wet Weather Flow Factor is usually greater than 2.5 for the maximum day effluent flow for any given month, then I&I is a significant problem and the sources of I&I will be located. See Section 5.0, I&I Assessment and Reduction Program. By using this method, our system can take an average of the Wet Weather Flow Factors for 12 months, and get an average Wet Weather Flow Factor for any given year. This is a good method to use when evaluating several years of flow data to determine historical trends in the collection system.
3.12 Critical Components

A description of the system critical components are listed below

- Lift Station #1- Any SSOs that occur in the basin served by this station will flow into reservoir #2, which is one of the water supply reservoirs for the city.
- Gravity line flowing from Missouri Correctional Center lagoons (MH B0108 to MH B0107) is somewhat vulnerable at a ditch crossing. High flows in the ditch can impact the line. The City has taken measures to strengthen this line, but it still needs to be checked on occasion to make sure the culvert and line are stable.
- The City has some older 6” gravity mains that were constructed with limited slope. At some point, the lines will need to be addressed with larger lines of sufficient slope. Currently the City crew jet-cleans the lines and treats certain areas with bio-blocks for grease control.
- Lift Station #2- Some MH SSOs have occurred on the line feeding this station. The City’s consultant has developed a plan where Lift Stations #1 and #2 can be pumped directly to the treatment plant. This would free up some of the gravity sewer to handle excess flows.
- Telemetry/SCADA System- The SCADA system has experienced many signal losses during storm events. In most cases, this has not resulted in any SSOs, but the reliability of the SCADA system is questionable during storms. The City and Alliance Water Resources are researching other technology for a more reliable SCADA system.
- 10” gravity main running from Walnut/Evergreen to line near the animal shelter. This line may be undersized, and serves five lift stations (including schools).
A description of the City of Cameron organizational structure, including the positions responsible for implementing the elements of this plan and lines of authority are listed in the following paragraphs.

Emergency operations are initiated by the Director of Utilities or appropriate division supervisor as needs and availability dictate.

Wastewater treatment plant and lift stations are maintained by the wastewater division. At times, the City provides equipment and assistance to Alliance Water Resources, the contract operator of the plant and lift stations.

The collection system is maintained by the City’s supervisor over the water distribution/collection division.

Asset management is carried out by all divisions pertaining to their area of responsibility, along with the director of utilities.

Response to environmental emergencies would be carried out by the director of the department and the appropriate division supervisor.

Equipment maintenance decisions are mainly made at the supervisory level of the division involved, with general approval and direction of the director.

Safety training is performed City-wide, as well as within each division on a regular basis.
3.2 Training

Each certified employee is required to obtain professional/trades development training each year upon approval by an immediate supervisor. Training may be in the form of formal off-site or on-site training, on-the-job training, college/vocational course work or other appropriate venue. The training will be directly relevant to the employee’s duties as described in his/her job description. If an employee is required to obtain continuing education units (CEUs) for his/her operator certification, the employee is required to determine if the certificate granting agency/board will provide CEUs before the employee begins the course.

Required Training

The City provides courses in lock out/tag out and confined space entry as part of its Risk Management Program. The Utilities Director or his/her designee will approve the course prior to attendance.

Other potential course topical areas include:
- Routine line maintenance including rodding, cabling, chemical and jet cleaning
- Traffic control
- Environmental/safety regulations
- Pump stations operation and maintenance
- Laboratory procedures, equipment calibration, sample collection and handling
- Electrical and instrumentation
- Sewer overflow response and reporting
- Collection system evaluation including smoke testing and closed circuit TV
- Pipe repair
- Collection system rehabilitation including pipe bursting, cured in place, slip lining, and trenching/shoring
- Wastewater System Operations and Maintenance
3.3 Legal Authority

A summarized description of the City of Cameron’s ordinance(s), service agreements, etc., providing legal authority to control the elements of a system maintenance program are outlined below. The elements addressed include the following: 1) I&I; 2) Sewer design, installation, testing and inspection standards; 3) Utility access to all system locations; 4) Pretreatment program, if necessary; and 5) Sewer and grease ordinance, to include grease traps, 6) Private service laterals and illegal storm water connections.

Note: See Appendix 9.2 for a copy of the City’s Utility Ordinance(s).
The sanitary system is a foundational component of the City’s infrastructure; providing a necessary service to the citizens. As such, it is important that the City have a well-planned, systematic, and comprehensive Collection System Inspection and Maintenance Program (Program). Such a Program will help ensure that service and reliability are maximized at minimal costs and help assure the sustainability of the collection system. An effective Program will increase maintenance activities. Thus, corrective maintenance and emergency maintenance in response to imminent or occurring sanitary sewer overflows are reduced, saving the City time and money.

4.1 Inspection Component

The Program has a schedule that ensures the entire collection system is inspected every ten years or less. Inspection of the collection system may include smoke testing, dyed water injection, and TV inspections of the sewer lines, as well as inspections of manholes and lift stations.

4.11 Sewer Line and Manhole Inspection Schedule

The City has been divided into 23 sub-basins (watersheds), as seen in Table 4.1 and Appendix 9.1 Collection System Map, through which inspection activities for the sewer lines and manholes will continuously rotate. Additionally, each manhole has been given a unique, permanent number. Findings of the inspection activities within a sub-basin will provide the basis for a majority of the scheduled maintenance within that sub-basin the following year.

<table>
<thead>
<tr>
<th>Program Year</th>
<th>Sub-basin/Watershed</th>
<th>Miles/Feet of Gravity Sewer Line</th>
<th>Pipe Material</th>
<th>Manholes</th>
<th>Total Number of Manholes</th>
<th>First Rotation Calendar Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>F-0001 (68%)</td>
<td>25,000</td>
<td>VCP</td>
<td>84</td>
<td>800</td>
<td>2011</td>
</tr>
<tr>
<td>2</td>
<td>F-0001 (32%)</td>
<td>25,000</td>
<td>VCP</td>
<td>80</td>
<td>800</td>
<td>2012</td>
</tr>
<tr>
<td></td>
<td>E-001/1001 (31%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>E-0001/1001 (54%)</td>
<td>25,000</td>
<td>VCP/PVC</td>
<td>80</td>
<td>800</td>
<td>2013</td>
</tr>
<tr>
<td></td>
<td>D-0001/1001 (31%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>D-0001/1001 (69%)</td>
<td>25,000</td>
<td>VCP/PVC</td>
<td>80</td>
<td>800</td>
<td>2014</td>
</tr>
<tr>
<td>5</td>
<td>D-2001/3001 (86%)</td>
<td>25,000</td>
<td>VCP/PVC</td>
<td>80</td>
<td>800</td>
<td>2015</td>
</tr>
<tr>
<td>6</td>
<td>F-1001/2001 (100%)</td>
<td>25,000</td>
<td>VCP/PVC</td>
<td>80</td>
<td>800</td>
<td>2016</td>
</tr>
<tr>
<td></td>
<td>C-001/1001/2001/3001 (40%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>C-001/1001/2001/3001 (60%)</td>
<td></td>
<td>VCP/PVC</td>
<td>80</td>
<td>800</td>
<td>2017</td>
</tr>
<tr>
<td></td>
<td>A-001/1001/2001/3001 (44%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>A-001/1001/2001/3001 (69%)</td>
<td></td>
<td>VCP/PVC</td>
<td>80</td>
<td>800</td>
<td>2018</td>
</tr>
<tr>
<td></td>
<td>B-001/1001/2001/3001 (44%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>B-0001/1001/2001 (56%)</td>
<td>25,000</td>
<td>VCP/PVC</td>
<td>80</td>
<td>800</td>
<td>2019</td>
</tr>
<tr>
<td></td>
<td>G-0001/2001/3001</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>VCP/PVC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---------</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Misc. (100%)</td>
<td>25,000</td>
<td>80</td>
<td>800</td>
<td>2020</td>
<td></td>
</tr>
</tbody>
</table>

*Table 4.1 Sewer Line and Manhole Inspection Schedule*

A. Each manhole within the sub-basin for the given Program Year will be inspected during dry weather and wet weather, and the Manhole Inspection Worksheet and Comments form will be filled out (Appendices 9.3 and 9.4).

B. Smoke testing and/or dyed water injection will be conducted, if warranted, throughout the sanitary system.

C. Based on the findings, areas of sewer lines will be scheduled for further TV inspections or repairs/rehabilitation. Locations where there is direct stormwater connection to the sewer collection system will be addressed through the City’s ordinance enforcement procedures.
4.12 **Lift Station Inspection Schedule**

Each lift station in the City’s sewer collection system will be inspected at least three times per week for its general condition. Each lift station will be drained and thoroughly inspected according to Table 4.2. The Lift Station Inspection Worksheet (Appendix 9.5) will be completed during normal regularly scheduled inspections.

<table>
<thead>
<tr>
<th>Lift Station</th>
<th>Lift Station Type</th>
<th>Capacity</th>
<th>Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Station #1</td>
<td>Wetwell/Drywell</td>
<td>460 GPM</td>
<td>January</td>
</tr>
<tr>
<td>Station #2</td>
<td>Wetwell/Drywell</td>
<td>345 GPM</td>
<td>January</td>
</tr>
<tr>
<td>Station #3</td>
<td>Vacuum Prime</td>
<td>80 GPM</td>
<td>January</td>
</tr>
<tr>
<td>Station #4</td>
<td>Wetwell/Drywell</td>
<td>290 GPM</td>
<td>January</td>
</tr>
<tr>
<td>Station #5</td>
<td>Submersible</td>
<td>135 GPM</td>
<td>April</td>
</tr>
<tr>
<td>Station #6</td>
<td>Vacuum Prime</td>
<td>80 GPM</td>
<td>April</td>
</tr>
<tr>
<td>Station #7</td>
<td>Vacuum Prime</td>
<td>80 GPM</td>
<td>April</td>
</tr>
<tr>
<td>Station #8</td>
<td>Wetwell/Drywell</td>
<td>150 GPM</td>
<td>January</td>
</tr>
<tr>
<td>Station #9</td>
<td>Wetwell/Drywell</td>
<td>80 GPM</td>
<td>February</td>
</tr>
<tr>
<td>Station #10</td>
<td>Wetwell/Drywell</td>
<td>666 GPM</td>
<td>January</td>
</tr>
<tr>
<td>Station #11</td>
<td>Wetwell/Drywell</td>
<td>650 GPM</td>
<td>January</td>
</tr>
<tr>
<td>Station #12</td>
<td>Submersible</td>
<td>45 GPM</td>
<td>October</td>
</tr>
<tr>
<td>Station #13</td>
<td>Submersible</td>
<td>200 GPM</td>
<td>October</td>
</tr>
<tr>
<td>Station #14</td>
<td>Submersible</td>
<td>200 GPM</td>
<td>May</td>
</tr>
</tbody>
</table>

*Table 4.2 Lift Station Annual Inspection Schedule*

4.13 **Inspections in Response to Complaints**

In addition to the regularly scheduled inspections listed in Tables 4.1 and 4.2, time must be allowed for inspections of the collection system initiated by citizen complaints. Complaint inspections will follow any necessary maintenance or cleaning activity conducted in response to the complaint. Inspection worksheets will be completed as appropriate. Please refer to Section 4.3, Sewer Complaints, for further instructions on complaint response.

4.2 **Maintenance Component**

The Program classifies maintenance activities as: Preventative, Corrective, and Emergency. All repairs and maintenance work will be included in the Capital Improvements Plan (Section 8.0).

4.21 **Preventative Maintenance**

Preventative maintenance will be scheduled according to the equipment manufacturer and the needs of the City, based on how critical the equipment is to proper system functions.
<table>
<thead>
<tr>
<th>Lift Station #</th>
<th>Location</th>
<th>Manufacturer</th>
<th>Maintenance Tasks</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Northland Drive</td>
<td>Smith &amp; Loveless</td>
<td>Change seal filters, Volt/Amp Meg Hour readings</td>
<td>Weekly</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Monthly</td>
</tr>
<tr>
<td>3</td>
<td>Park Avenue</td>
<td>Smith &amp; Loveless</td>
<td>Hour Readings Volt/Amp Meg Vacuum Prime</td>
<td>3XWeek</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Monthly</td>
</tr>
<tr>
<td>4</td>
<td>Golf Course</td>
<td>Smith &amp; Loveless</td>
<td>Change seal filters, Volt/Amp Meg Hour readings</td>
<td>Weekly</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Monthly</td>
</tr>
<tr>
<td>5</td>
<td>Pence Rd.</td>
<td>Unknown</td>
<td>Volt/Amp Meg Hour readings</td>
<td>Monthly</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3XWeek</td>
</tr>
<tr>
<td>6</td>
<td>W. Fourth St.</td>
<td>Smith &amp; Loveless</td>
<td>Volt/Amp Meg Vacuum Prime Hour readings</td>
<td>Monthly</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Monthly</td>
</tr>
<tr>
<td>7</td>
<td>Little Brick St.</td>
<td>Smith &amp; Loveless</td>
<td>Volt/Amp Meg Vacuum Prime Hour readings</td>
<td>Monthly</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3XWeek</td>
</tr>
<tr>
<td>8</td>
<td>W. Grand Ave.</td>
<td>Smith &amp; Loveless</td>
<td>Change seal filters, Volt/Amp Meg Hour readings</td>
<td>Weekly</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Monthly</td>
</tr>
<tr>
<td>9</td>
<td>Old Hwy. 36</td>
<td>Smith &amp; Loveless</td>
<td>Change seal filters, Volt/Amp Meg Hour readings</td>
<td>Weekly</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Monthly</td>
</tr>
<tr>
<td>10</td>
<td>SE Oregon Rd.</td>
<td>Smith &amp; Loveless</td>
<td>Change seal filters, Volt/Amp Meg Hour readings</td>
<td>Weekly</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Monthly</td>
</tr>
<tr>
<td>11</td>
<td>Industrial Park</td>
<td>Smith &amp; Loveless</td>
<td>Change seal filters, Volt/Amp Meg Hour readings</td>
<td>Weekly</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Monthly</td>
</tr>
<tr>
<td>12</td>
<td>Wesleyan Terrace</td>
<td>ABS Submersible</td>
<td>Volt/Amp Meg Hour readings Remove Grease Change Oil</td>
<td>Monthly</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3XWeek</td>
</tr>
<tr>
<td>13</td>
<td>Logan Jones Lane</td>
<td>ABS Submersible</td>
<td>Volt/Amp Meg Hour readings Change Oil</td>
<td>Monthly</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3XWeek</td>
</tr>
<tr>
<td>14</td>
<td>W. Eighth St.</td>
<td>ABS Submersible</td>
<td>Volt/Amp Meg Hour readings Change Oil</td>
<td>Monthly</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3XWeek</td>
</tr>
</tbody>
</table>

*Table 4.3 Preventative Maintenance Schedule*
4.22 **Corrective Maintenance**

The majority of the maintenance activities (e.g., sewer jetting, root cutting, etc.) are scheduled according to the findings of the inspection activities within a Sub-basin/watershed. Scheduling of maintenance activities will be done through the City’s work order process. Corrective maintenance may be scheduled immediately after inspection activities reveal an imminent problem that must be corrected to avoid an emergency situation. The completed work will be reported on the Sewer Line Maintenance Repair Report (Appendix 9.6).

4.23 **Emergency Maintenance**

Emergency maintenance cannot be scheduled, but a procedure for responding to and remediating the emergency situation must be developed. The completed work will be reported on the Sewer Line Maintenance Repair Report (Appendix 9.6).

4.3 **Sewer Complaints**

Information received from a citizen reporting a sewer complaint must be recorded on the Sewer Complaint Report (Appendix 9.7). All information listed on the form will be collected by the City staff person taking the complaint.

Response to a sewer complaint may require that immediate corrective or emergency maintenance be conducted to correct the situation. If such maintenance is conducted, the Sewer Line Maintenance Repair Report (Appendix 9.6) will be completed.

The location of every complaint received by the City will be inspected after any necessary maintenance activities are completed to alleviate the complaint situation. Inspections will be conducted as appropriate for the location. In addition to the inspection worksheet(s), the Sewer Response Report (Appendix 9.8) will be completed.
5.0 I&I ASSESSMENT AND REDUCTION PROGRAM

Inflow and infiltration (I&I) are terms used to describe the ways that groundwater and stormwater enter the sanitary sewer system. Inflow is water that enters the sewer system through improper connections, such as downspouts, broken piping at creek crossings, and groundwater sump pumps. Infiltration is groundwater that enters the sewer system through breaks in the piping. All of this water is often called “clear water” to distinguish from sanitary sewage. Clear water belongs in storm sewers or on the surface of the ground and not in the sanitary sewers. When clear water gets into the sanitary sewers, it must be moved and treated like sanitary waste. Too much clear water often causes sewer backups and sanitary sewer overflows (SSOs) when it rains. Excessive I&I is one of the leading causes of SSOs and one of the most labor intensive and expensive problems to correct. Failing to correct or reduce I&I leads to basement backups, SSOs and bypasses at the treatment plant. Overflow occurrences put public health at risk and violate state and federal environmental regulations as well as increased costs at the wastewater treatment plant. Additionally, sewer backups into basements or households can result in litigation and potential liabilities for the City. By reducing I&I, the City can reduce operating costs and can increase the lifetime capacity of the lift stations and treatment plant as well as maintain compliance with state and federal water quality regulations.

5.1 Mapping

The first step in the process of locating and repairing sources of I&I is to ensure an accurate map of the collection system is available. The map will be used to identify manholes, lift stations, and service main locations. The City’s map has GPS coordinates of the collection system manholes. Using an accurate map, the City will divide the collection system into designated areas that will be prioritized based on known problem areas with a schedule to inspect the lines in a designated area. Sewer lines that were installed within the last fifteen (15) years may be excluded from the plan unless there is a reason to believe they are a major source of I&I. The City has updated its collection system maps with GPS coordinates, as well as unique manhole identification numbers. Pipe segments are updated on the map as they are installed. See Appendix 9.12.

5.2 Capacity Determinations

The concept of capacity for a wastewater system has two basic elements; the capacity of the wastewater plant and the capacity of the collection system. Inflow/infiltration and growth can result in wastewater flows exceeding the design capacity of either the plant or collection system or both. Capacities within the collection system vary by the size of the piping making up the system. It is desirable to determine capacities within the collection system to gauge whether portions are subject to surcharging and overflows and to develop a baseline from which planning decisions regarding new connections may be made.
Even if the treatment plant flows are within the design capacity, portions of the collection system could be receiving flows in excess of their design capacities. There are a number of simple ways to determine if the collection system is receiving excess flows. Where this condition is suspected or verified, more specific evaluation methods are to be used to determine the exact flows. The City will make an initial assessment of collection system capacity via the following methodology. The City will monitor the lift station hour meter readings on a daily basis and calculate pumping rates (Pump Run Time multiplied by GPM Rating For Each Pump) to determine capacity issues and record the information on the Lift Station Worksheet (Appendix 9.5). Pumping rates will be monitored and compared during both dry and wet weather conditions. Daily rainfall will be recorded on the City’s monthly discharge monitoring reports. In portions of the collection system in which I&I or capacity issues are known or suspected, flow monitoring within the collection system at appropriate locations will be conducted in conjunction with corrective measures. The frequency and location of monitoring shall be determined by the City on a case-by-case basis but will be sufficient enough to be representative of seasonal average and peak flows and sufficient to indicate if corrective measures are effective. A comprehensive evaluation of the system’s capacity will be made and incorporated as part of the City’s Capital Improvement Projects. See Appendix 9.12.

5.3 Inspection of the Collection System

5.31 Visual

Using the map of the collection system, the City will conduct visual inspections of all manholes and lift station locations. See Appendix 9.12, Capital Improvement Projects. Each manhole and lift station will be identified and inspected to obtain general information concerning the condition of each structure. Information that will be included but not limited is the depth, construction material, depth of flow, surcharge conditions or noted high water marks, visible leakage, and need to repair. All findings will be documented accordingly utilizing the forms and worksheets found in Appendices 9.3- 9.6. The City will also track and investigate citizen’s complaints utilizing the Sewer Complaint and Response Report Worksheets (Appendices 9.7 and 9.8).

5.32 Smoke Testing

The City will conduct smoke testing on the collection system beginning with those sections suspect of inflow based on the flow studies performed in Section 5.2 and the visual inspections outlined in Section 5.31. Smoke testing will be conducted during dry conditions. Notification to property owners will be made prior to beginning the smoke testing since smoke can enter homes through illegal connections. Property owners will be encouraged to immediately correct illegal connections where possible, consistent with the City’s ordinance banning storm and ground water connections to the sanitary sewer.
In the event storm sewers are found to be connected into the sanitary sewer where a separate storm sewer exists, the City will make repairs to reconnect to the storm sewer system. All sources of inflow will be documented and keyed on the City’s collection system map. Smoke testing of the City’s collection system will be performed during Fiscal Year(s) 2011-2012. See Appendix 9.12, Capital Improvement Projects.

5.33 **Closed Circuit Television (CCTV)**

In the case of suspected excess infiltration, the City will conduct TV surveillance of the portions of the collection system believed to be impacted by groundwater infiltration. CCTV will be conducted during wet conditions. Sources of infiltration will be documented and keyed on the City’s collection system map. A schedule for performing CCTV has been noted in Appendix 9.12, Capital Improvement Projects.

5.4 **Repairs and Replacement**

Based upon findings from inspections of the collection system, repairs and replacements will be prioritized by severity and corrected in phases with Phase I being addressed first, Phase II second, and so forth. Emergencies that are contributing to significant SSOs will be corrected immediately. All repairs will be included in with the City’s Capital Improvements Program. See Appendix 9.12.

In the case of illegal service connections, such as, storm water guttering and sump pumps, the City will work with its customers through its sewer use ordinance to ensure these connections are properly disconnected in a timely manner.

5.5 **Progress and Reporting**

The City Utility Director will prepare evaluation reports to the City Manager and/or City Council documenting progress made towards reducing I&I. These reports will also serve as a basis for planning and budgeting future I&I projects that will be captured in the City’s ongoing Capital Improvement Program (See Appendices 9.11 and 9.12). **In addition, progress reports will be forwarded to the Department of Natural Resources according to the requirements outlined in the City’s NPDES Permit.**
6.0 SANITARY SEWER OVERFLOW (SSO)/ BYPASS TRACKING PROGRAM

The City’s tracking and management system will include all information necessary to establish a system that is effective and collects useful information for SSOs, bypasses, backup events, and responses to such events. The tracking and management system will also be designed and operated in a manner that allows the City to use the system for operation and maintenance activities, long term management of the wastewater treatment system and operations of the I&I Assessment and Reduction Program. The City’s tracking system will be managed in an electronic database and will include the following information (at a minimum):

- Date and time (best estimate) of the event
- Precipitation data (including intensity and duration)
- Source of the information (e.g. citizen complaint, observation)
- Location of the SSO, bypass or backup
- Duration of the discharge (estimate or monitored)
- Best estimate of the volume discharged, including flow metering data where applicable
- Sampling results from any sampling performed
- Identification of the water body to which the wastewater was released
- Cause of the discharge
- Measures taken to respond to the discharge
- Date and time of repairs
- Measures taken to prevent reoccurrence
- Date and time notification to DNR Regional Office

Note: See Appendix 9.9 for a copy of the City’s tracking form.
7.0  SSO/ BYPASS REPORTING PROGRAM

The City of Cameron Missouri State Operating Permit MO-0104299 Standard Conditions Part I Section B 2 and 5; and Missouri Department of Natural Resources Regulation 10 CSR 20-7.015 (9) (E) 2 require the City to report all SSOs and bypasses to the Missouri Department of Natural Resources within twenty-four (24) hours and follow up with a written report within five (5) days unless waived by the Department.

The City will contact the Department of Natural Resources, Northwest Regional office at Ph# 816-622-7000, within 24 hours of the permittee becoming aware of an SSO or bypass. If the SSO or bypass occurs after normal business hours or on the weekend, the City will contact the Department of Natural Resources Emergency Spill Line at 573-634-2436.

A written response will be submitted to the Northwest Regional Office within (5) business days or time agreed to by the Regional Office using the Department’s “Self-Reporting Form for Sanitary Sewer Overflows or Wastewater Treatment Facility Bypasses.” A record of each occurrence will also be entered into the City’s electronic tracking database.

Note: See Appendix 9.10 for a Copy of the Department of Natural Resources Self-Reporting Form for Sanitary Sewer Overflows or Wastewater Treatment Facility Bypasses.
8.0 CAPITAL IMPROVEMENTS PROGRAM
SHORT TERM/LONG TERM PROJECTS and BUDGET

8.1 Purpose

When setting short term and long term goals for sanitary sewer system repairs, maintenance and upgrade, it is crucial to have a capital improvements program (CIP) in place to make certain that the available and planned budget parallels those infrastructure goals. The purpose of the City of Cameron CIP is to set forth specific budgeting goals in order to ensure that the City is prepared financially to address all of the needs and requirements of the system. The City will make an annual review of their sewer rates and compare with their operations budget and adjust accordingly to support their SSIMP, along with other cost associated with operating and maintaining their sewer system.

8.2 Development

The CIP budget will be developed and reviewed on an annual basis as provided in the attached budget worksheet, see Appendix 9.11. This CIP budget is for sanitary sewer work only and will be maintained separate from other City funds. Although the CIP budget may include funds for emergency repairs, the primary goal of the CIP is to address longer term improvements, versus only immediate repairs. As part of the annual CIP budget review, funds will be set aside each year as savings for larger projects or longer term capital improvements. The CIP projects will be organized and prioritized as follows.

- Current Fiscal Year Planned Improvements
- Five-Year Projected Improvement Plan
- Long Term, 5 to 20-Year Projected Improvement Plan

Projects will be prioritized in this project timeline based upon need, state and federal requirements, and available finances. See Appendix 9.12 for a detailed list of the City’s proposed projects.

As part of the annual review of the CIP, the City will also review sewer use rates and compare revenues to the expenditures required by the operations budget and CIP. As appropriate, the City will increase sewer use rates as needed to meet the requirements of the operations budget and CIP.

8.3 Projects

Projects addressed by the CIP belong to three categories: collection system inspection and maintenance, I&I assessment and reduction, and replacement or upgrade of sanitary sewer or wastewater treatment facility components. Often, these three categories may overlap; however, prioritization of budget for each of these categories will proceed as follows.

Collection system inspection and maintenance includes but is not limited to manhole inspections, pump station inspection and maintenance, inspections at SSO locations, and
removal of line blockages. This work is done on a pre-determined schedule, or as needed. The schedule requires regular inspection and maintenance on individual portions of the collection system on a rotating basis.

I&I Assessment and Reduction projects will proceed as described in the plan outlined in Section 5.0 of this SSIMP. The I&I Assessment and Reduction Program will prioritize projects based upon location, flow, number of SSO events, and economic factors. The projects addressed in this plan will be included on both the short term and the long term CIP project lists.

Replacement or upgrades of the collection system or wastewater treatment system components will be prioritized based upon immediate need, determinations made through the I&I Assessment Program, and the requirements of state and federal environmental regulations.
APPENDICES

Appendix 9.1: Collection System Map
Appendix 9.2: Ordinance

DIVISION 5. SEWER USE

Sec. 12-251. Definitions.
The following words, terms and phrases, when used in this division, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:


BOD, denoting biochemical oxygen demand, means the quantity of oxygen utilized in the biochemical oxidation of organic matter under standard laboratory procedures in five (5) days at twenty (20) degrees centigrade, expressed in milligrams per liter.

Building drain means that part of the lowest horizontal piping of a drainage system which receives the discharge from soil, waste and other drainage pipes inside the walls of the building and which conveys the discharge to the building sewer beginning five (5) feet (1.5 meters) outside the inner face of the building wall.

Building sewer means the extension from the building drain to the public sewer or other place of disposal.

Combined sewer means a sewer receiving both surface runoff and sewage.

Garbage means solid wastes from the domestic and commercial preparation, cooking and dispensing of food and from handling, storage and sale of produce.

Industrial wastes means the liquid wastes from industrial manufacturing processes, trades or businesses as distinct from sanitary sewage.

Natural outlet means any outlet into a watercourse, pond, ditch, lake or other body for surface or ground water.

pH means the logarithm of the reciprocal of the weight of hydrogen ions in grams per liter of solution.

Properly shredded garbage means the wastes from the preparation, cooking and dispensing of food that have been shredded to such a degree that all particles will be carried freely under the flow conditions normally prevailing in public sewers, with no particle greater than one-half inch (1.27 centimeters) in any dimension.

Public sewer means a sewer in which all owners of abutting properties have equal rights and which is controlled by public authority.

Sanitary sewer means a sewer which carries sewage and to which storm, surface and ground waters are not intentionally admitted.

Sewage means a combination of the water-carried wastes from residences, business buildings, institutions and industrial establishments, together with such ground, surface and storm waters as may be present.

Sewage treatment plant means any arrangement of devices and structures used for treating sewage.

Sewer means a pipe or conduit for carrying sewage.

Sewerage works means all facilities for collecting, pumping, treating and disposing of sewage.

Slug means any discharge of water, sewage or industrial wastes which, in concentration of any given constituent or in quantity of flow, exceeds, for any period of duration longer than fifteen (15) minutes, more than five (5) times the average twenty-four-hour concentration or flow during normal operation.
**Storm drain** or **storm sewer** means a sewer which carries storm and surface waters and drainage but excludes sewage and industrial wastes other than unpolluted cooling water.

**Superintendent** means the superintendent of sewage works and of waterworks of the city or his authorized deputy, agent or representative.

**Suspended solids** means solids that either float on the surface of or are in suspension in water, sewage or other liquids and which are removable by laboratory filtering.

**Watercourse** means a channel in which a flow of water occurs, either continuously or intermittently.

**W.P.C.F.** means the Water Pollution Control Federation.

(Ord. No. 3404, Art. I, 5-15-84)

Sec. 12-252. Right of entry of city employees; liability of city upon entry.

(a) The superintendent and other duly authorized employees of the city bearing proper credentials and identification shall be permitted to enter all properties for the purposes of inspection, observation, measurement, sampling and testing in accordance with the provisions of this division. The superintendent or his representatives shall have no authority to inquire into any processes including metallurgical, chemical, oil, refining, ceramic, paper or other industries beyond that point having a direct bearing on the kind and source of discharge to the sewers or waterways or facilities for waste treatment.

(b) While performing the necessary work on private properties referred to in subsection (a) of this section, the superintendent or duly authorized employees of the city shall observe all safety rules applicable to the premises established by the company, and the company shall be held harmless for injury or death to city employees. The city shall indemnify the company against loss or damage to its property by city employees and against liability claims and demands for personal injury or property damage asserted against the company and growing out of the gauging and sampling operation, except as such may be caused by negligence or failure of the company to maintain safe conditions as required in section 12-264.

(c) The superintendent and other duly authorized employees of the city bearing proper credentials and identification shall be permitted to enter all private properties through which the city holds a duly negotiated easement for the purposes of, but not limited to, inspection, observation, measurement, sampling, repair and maintenance of any portion of the sewerage works lying within such easement. All entry and subsequent work, if any, on such easement shall be done in full accordance with the terms of the duly negotiated easement pertaining to the private property involved.

(Ord. No. 3404, Art. VII, 5-15-84)

Sec. 12-253. Damaging, destroying or tampering with system.

No unauthorized person shall maliciously, willfully or negligently break, damage, destroy, uncover, deface or tamper with any structure, appurtenance or equipment which is part of the sewerage works. Any person violating this section shall be subject to immediate arrest under charge of disorderly conduct.

(Ord. No. 3404, Art. VI, 5-15-84)

Sec. 12-254. Installation of toilet facilities and connection to public sewer.

The owner of all houses, buildings or properties used for human employment, recreation or other purposes situated within the city and abutting on any street, alley or right-of-way in which there
is now located or may in the future be located a public sanitary or combined sewer of the city is hereby required at his expense to install suitable toilet facilities therein and to connect such facilities directly with the proper public sewer in accordance with the provisions of this division within ninety (90) days after the date of official notice to do so, provided that the public sewer is within one hundred (100) feet (30.5 meters) of the property line.

(Ord. No. 3404, Art. II, § 4, 5-15-84)

Sec. 12-255. Depositing waste on property.
It shall be unlawful for any person to place, deposit or permit to be deposited in any unsanitary manner on public or private property within the city or in any area under the jurisdiction of the city any human or animal excrement, garbage or other objectionable waste.

(Ord. No. 3404, Art. II, § 1, 5-15-84)

Sec. 12-256. Discharging sewage or polluted waters to natural outlets.
It shall be unlawful to discharge to any natural outlet within the city or in any area under the jurisdiction of the city any sewage or other polluted waters except where suitable treatment has been provided in accordance with this division.

(Ord. No. 3404, Art. II, § 2, 5-15-84)

Sec. 12-257. Discharge of storm water and unpolluted water.
Storm water and all other unpolluted drainage shall be discharged to such sewers as are specifically designated as combined sewers or storm sewers or to a natural outlet approved by the superintendent. Industrial cooling water or unpolluted process waters may be discharged, on approval of the superintendent, to a storm sewer, combined sewer or natural outlet.

(Ord. No. 3404, Art. V, § 2, 5-15-84)

Sec. 12-258. Construction of privies, cesspools or septic tanks restricted.
Except as provided in this division, it shall be unlawful to construct or maintain any privy, privy vault, septic tank, cesspool or other facility intended or used for the disposal of sewage.


Sec. 12-259. Private sewage disposal system.
(a) Where a public sanitary or combined sewer is not available under the provisions of section 12-254, the building sewer shall be connected to a private sewage disposal system complying with the provisions of this section.

(b) Before commencement of construction of a private sewage disposal system, the owner shall first obtain a written permit signed by the superintendent. The application for such permit shall be made on a form furnished by the city which the applicant shall supplement by any plans, specifications and other information as are deemed necessary by the superintendent. A permit and inspection fee of ten dollars ($10.00) shall be paid to the city at the time the application is filed.

(c) A permit for a private sewage disposal system shall not become effective until the installation is completed to the satisfaction of the superintendent. The superintendent shall be allowed to inspect the work at any stage of the construction and, in any event, the applicant for the permit shall notify the superintendent when the work is ready for final inspection and before
any underground portions are covered. The inspection shall be made within forty-eight (48) hours of the receipt of notice by the superintendent.

(d) The type, capacities, location and layout of a private sewage disposal system shall comply with the requirements of this division. In no event shall a private disposal sewage system be permitted to discharge to any natural outlet.

(e) At such time as a public sewer becomes available to a property served by a private sewage disposal system as provided in section 12-254, a direct connection shall be made to the public sewer in compliance with this division, and any septic tanks, cesspools and similar private sewage disposal facilities shall be abandoned and filled with suitable material.

(f) The owner shall operate and maintain the private disposal facilities in a sanitary manner at all times, at no expense to the city.

(g) No statement contained in this section shall be construed to interfere with any additional requirements that may be imposed by the utilities superintendent.

(h) When a public sewer becomes available, the building sewer shall be connected to the public sewer within ninety (90) days and the private sewage disposal system shall be cleaned of sludge and filled with clean bank-run gravel or dirt.

(Code 1970, § 18-10; Ord. No. 3404, Art. III, 5-15-84; Ord. No. 4379, § 1, 2-6-96)

Sec. 12-259.1. Lot dimensions and building setbacks for private sewage systems. When permitted by the other provisions of this division, lots on which private sewage systems are to be located and the buildings on such lots must meet the following minimum dimensions and setbacks:

1. Total lot area, twenty (20) acres.
2. Lot width, five hundred (500) feet.
3. Front yard setback, thirty (30) feet.
4. Rear yard setback, seventy-five (75) feet.
5. Side yard setback, fifty (50) feet.

(Ord. No. 4379, § 2, 2-6-96; Ord. No. 4803, § 1, 10-17-00)

Sec. 12-259.2. Specifications for sewage lagoons (waste stabilization ponds). When permitted by the other provisions of this division, sewage lagoons (waste stabilization ponds) must, at a minimum:

1. Be designed and operated in accordance with the most recent state department of health standards, presently 19 CSR 20-3.060;
2. Have received design approval by the state department of health prior to application for a building permit;
3. Have four hundred forty (440) square feet of surface area per bedroom at a three-foot operating level, but in no event shall the surface area be less than nine hundred (900) square feet;
4. Be enclosed by a four-foot woven or chain link fence located outside of the berm;
5. Retain all effluent on the property from which it originates; and
6. Observe the following setbacks:
   a. Adjacent property lines, seventy-five (75) feet.
   b. Adjoining residence (not served by system), two hundred (200) feet.
   c. Residence served by system, one hundred (100) feet.
   d. Drinking water supply well, one hundred (100) feet.
   e. Stream, watercourse, lake or impoundment, fifty (50) feet.
Sec. 12-259.3. Specifications for septic tanks and soil absorption systems.
When permitted by the other provisions of this division, septic tanks and soil absorption systems must, at a minimum;:
(1) Be designed and operated in accordance with the most recent state department of health standards, presently 19 CSR 20-3.060;
(2) Retain all effluent on the property from which it originates;
(3) Have a minimum tank size of one thousand (1,000) gallons with an additional two hundred-fifty-gallon capacity for each additional bedroom over three (3);
(4) Have percolation rates determined in accordance with the most recent state department of health standards;
(5) Have absorption fields constructed as follows:
   a. Minimum system size, four hundred (400) square feet.
   b. Minimum number of trenches, two (2).
   c. Maximum trench length, one hundred (100) feet.
   d. Minimum spacing between trenches, ten (10) feet.
   e. Trench width, no less than eighteen (18) inches and no more than three (3) feet.
   f. Trench depth, no less than eighteen (18) inches and no more than thirty (30) inches (measured from top of pipe).
   g. Rock size, no less than one and one-half (1 1/2) inches and no greater than three (3) inches.
   h. Minimum rock depth, one (1) foot with no less than six (6) inches below the pipe and no less than two (2) inches above the pipe.
(6) Observe the following setbacks:

<table>
<thead>
<tr>
<th></th>
<th>Septic Tank (feet)</th>
<th>Disposal Area (feet)</th>
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</thead>
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<td>100</td>
</tr>
<tr>
<td>Lake or impoundment</td>
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<td>Stream or ditch</td>
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<td>25</td>
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<td>Adjacent property lines</td>
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<td>15</td>
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<td>Basement</td>
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<td>25</td>
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<tr>
<td>Water line</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

(Ord. No. 4379, § 2, 2-6-96)
Sec. 12-259.4. Specifications for alternative private sewage systems. When permitted by the other provisions of this division, alternative private sewage systems must be designed by an engineer and approved by the most recent state department of health standards, currently 19 CSR 20-3.060.

(Ord. No. 4379, § 2, 2-6-96)

Sec. 12-260. Prohibited discharges.
(a) No person shall discharge or cause to be discharged any stormwater, surface water, groundwater, roof runoff, subsurface drainage including interior and exterior foundation drains, uncontaminated cooling water or unpolluted industrial process water to any sanitary sewer.
(b) No person shall discharge or cause to be discharged any of the following described waters or wastes to any public sewers:

1. Any gasoline, benzene, naphtha, fuel oil or other flammable or explosive liquid, solid or gas.
2. Any waters or wastes containing toxic or poisonous solids, liquids or gases in sufficient quantity to, either singly or by interaction with other wastes, injure or interfere with any sewage treatment process, constitute a hazard to humans or animals, create a public nuisance or create any hazard in the receiving waters of the sewage treatment plant including but not limited to cyanides in excess of two (2) mg/l as CN in the wastes as discharged to the public sewer.
3. Any waters or wastes having a pH lower than 5.5 or having any other corrosive property capable of causing damage or hazard to structures, equipment and personnel of the sewerage works.
4. Solid or viscous substances in such quantities or of such size capable of causing obstruction to the flow in sewers or causing other interference with the proper operation of the sewerage works such as, but not limited to, ashes, cinders, sand, mud, straw, shavings, metal, glass, rags, feathers, tar, plastics, wood, unground garbage, paunch manure, hair and fleshings, entrails and paper dishes, cups, milk containers, etc., either whole or ground by garbage grinders.
5. Any waters or wastes, subject to the review of the superintendent:

a. Having a five-day BOD greater than three hundred (300) parts per million by weight;
b. Containing more than three hundred fifty (350) parts per million by weight of suspended solids; or
c. Having an average daily flow greater than two (2) percent of the average sewage flow of the city.

Where necessary in the opinion of the superintendent, the owner shall provide, at his expense, such preliminary treatment as may be necessary to:

a. Reduce the biochemical oxygen demand to two hundred forty (240) parts per million by weight;
b. Reduce the suspended solids to two hundred forty (240) parts per million by weight; or
c. Control the quantities and rates of discharge of such waters or wastes.

Plans, specifications and any other pertinent information relating to proposed preliminary treatment facilities shall be submitted for the approval of the superintendent, and no construction of such facilities shall be commenced until the approvals are obtained in writing.
(c) No person shall discharge or cause to be discharged the following described substances, materials, waters or wastes if it appears likely, in the opinion of the superintendent, that such wastes can harm either the sewers, sewage treatment process or equipment, can have an adverse effect on the receiving stream or can otherwise endanger life, limb, public property or constitute
a nuisance. In forming his opinion as to the acceptability of these wastes, the superintendent will give consideration to such factors as the quantities of subject wastes in relation to flows and velocities in the sewers, materials of construction of the sewers, nature of the sewage treatment process, capacity of the sewage treatment plant, degree of treatability of wastes in the sewage treatment plant and other pertinent factors. The substances prohibited are:

1. Any liquid or vapor having a temperature higher than one hundred fifty (150) degrees Fahrenheit (65 degrees centigrade).
2. Any water or waste containing fats, wax, grease or oils, whether emulsified or not, in excess of one hundred (100) mg/l or containing substances which may solidify or become viscous at temperatures between thirty-two (32) degrees and one hundred fifty (150) degrees Fahrenheit (0 and 65 degrees centigrade).
3. Any garbage that has not been properly shredded. The installation and operation of any garbage grinder equipped with a motor of three-fourths horsepower (0.76 hp metric) or greater shall be subject to the review and approval of the superintendent.
4. Any waters or wastes containing strong acid iron pickling wastes or concentrated plating solutions, whether neutralized or not.
5. Any waters or wastes containing iron, chromium, copper, zinc and similar objectionable or toxic substances or wastes exerting an excessive chlorine requirement to such degree that any such material received in the composite sewage at the sewage treatment works exceeds the limits established by the superintendent for such materials.
6. Any waters or wastes containing phenols or other taste-producing or odor-producing substances in such concentrations that exceed limits which may be established by the superintendent as necessary, after treatment of the composite sewage, to meet the requirements of state, federal or other public agencies of jurisdiction for such discharge to the receiving waters.
7. Any radioactive wastes or isotopes of such half-life or concentration as may exceed limits established by the superintendent in compliance with applicable state or federal regulations.
8. Any waters or wastes having a pH in excess of 9.5.
9. Materials which exert or cause:
   a. Unusual concentrations of inert suspended solids such as, but not limited to, fuller's earth, lime slurries and lime residues or of dissolved solids such as, but not limited to, sodium chloride or sodium sulfate;
   b. Excessive discoloration such as, but not limited to, dye wastes and vegetable tanning solutions;
   c. Unusual BOD, chemical oxygen demand or chlorine requirements in such quantities as to constitute a significant load on the sewage treatment works;
   d. Unusual volume of flow or concentration of wastes constituting slugs.
10. Waters or wastes containing substances which are not amenable to treatment or reduction by the sewage treatment processes employed or are amenable to treatment only to such degree that the sewage treatment plant effluent cannot meet the requirements of other agencies having jurisdiction over discharge to the receiving waters.

(Ord. No. 3404, Art. V, §§ 1, 3, 4, 5-15-84)

Sec. 12-261. Authority of superintendent for prohibited discharges.
(a) If any waters or wastes are discharged or are proposed to be discharged to the public sewers, which waters contain the substances or possess the characteristics enumerated in section 12-
260(c) and which, in the judgment of the superintendent, may have a deleterious effect upon the sewerage works, processes, equipment or receiving waters or which otherwise create a hazard to life or constitute a public nuisance, the superintendent may:

1. Reject the wastes;
2. Require pretreatment to an acceptable condition for discharge to the public sewers;
3. Require control over the quantities and rates of discharge; and/or
4. Require payment to cover the added cost of handling and treating the wastes not covered by existing taxes or sewer charges under the provisions of section 12-266.

(b) If the superintendent permits the pretreatment or equalization of waste flows, the design and installation of the plants and equipment shall be subject to the review and approval of the superintendent and subject to the requirements of all applicable codes, ordinances and laws.

(Ord. No. 3404, Art. V, § 5, 5-15-84)

Sec. 12-262. Grease, oil and sand interceptors.
Grease, oil and sand interceptors shall be provided when, in the opinion of the superintendent, they are necessary for the proper handling of liquid wastes containing grease in excessive amounts or any flammable wastes, sand or other harmful ingredients, except that such interceptors shall not be required for private living quarters or dwelling units. All interceptors shall be of a type and capacity approved by the superintendent and shall be located as to be readily and easily accessible for cleaning and inspection.

(Ord. No. 3404, Art. V, § 6, 5-15-84)

Sec. 12-263. Maintenance of preliminary treatment or flow-equalizing facilities.
Where preliminary treatment or flow-equalizing facilities are provided for any waters or wastes, they shall be maintained continuously in satisfactory and effective operation by the owner at his expense.

(Ord. No. 3404, Art. V, § 7, 5-15-84)

Sec. 12-264. Control manhole.
When required by the superintendent, the owner of any property serviced by a building sewer carrying industrial wastes shall install a suitable control manhole together with such necessary meters and other appurtenances in the building sewer to facilitate observation, sampling and measurement of the wastes. Such manhole, when required, shall be accessibly and safely located and shall be constructed in accordance with plans approved by the superintendent. The manhole shall be installed by the owner at his expense and shall be maintained by him so as to be safe and accessible at all times.

(Ord. No. 3404, Art. V, § 8, 5-15-84)

Sec. 12-265. Measurements, tests and analyses.
All measurements, tests and analyses of the characteristics of waters and wastes to which reference is made in this division shall be determined in accordance with the latest edition of "Standard Methods for the Examination of Water and Wastewater," published by the American Public Health Association, and shall be determined at the control manhole provided, or upon suitable samples taken at the control manhole. If no special manhole has been required, the control manhole shall be considered to be the nearest downstream manhole in the public sewer to the point at which the building sewer is connected. Sampling shall be carried out by customarily
accepted methods to reflect the effect of constituents upon the sewerage works and to determine the existence of hazards to life, limb and property. The particular analyses involved will determine whether a twenty-four-hour composite of all outfalls of a premises is appropriate or whether grab sample or samples should be taken. Normally, but not always, BOD and suspended solids analyses are obtained from twenty-four-hour composites of all outfalls whereas pH's are determined from periodic grab samples.

(Ord. No. 3404, Art. V, § 9, 5-15-84)

Sec. 12-266. Special agreements.
No statement contained in this division shall be construed as preventing any special agreement or arrangement between the city and any industrial concern whereby an industrial waste of unusual strength or character may be accepted by the city for treatment, subject to payment therefor by the industrial concern.

(Ord. No. 3404, Art. V, § 10, 5-15-84)

Sec. 12-267. Violation; penalty.
(a) Any person found to be violating any provision of this division, except section 12-253, shall be served by the city with written notice stating the nature of the violation and providing a reasonable time limit for the satisfactory correction of the violation. The offender shall, within the period of time stated in such notice, permanently cease all violations.
(b) Any person who shall continue any violation beyond the time limit provided for in subsection (a) of this section shall be guilty of an offense and, upon conviction thereof, shall be punished as provided in section 1-9.
(c) Any person violating any of the provisions of this division shall become liable to the city for any expense, loss or damage occasioned the city by reason of such violation.

(Ord. No. 3404, Art. VIII, 5-15-84)
Appendix 9.3: Manhole Inspection Worksheet

**Manhole Number:**
- Inspection Date:
- Inspection By:
- Rivet Elevation:
- Downstream Manhole:
- Distance:

**Construction Material**
- Brick = B
- Precast = P
- Cast-In-Place Concrete = CIPC
- Block Masonry = BM
- Other = O

**Pipe Data**

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Material</th>
<th>Depth from Rim</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outlet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>inlet 1</td>
<td></td>
<td></td>
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<tr>
<td>inlet 2</td>
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<tr>
<td>inlet 3</td>
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<tr>
<td>inlet 4</td>
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</tr>
</tbody>
</table>

**Location**
- Field
- Lawn
- Wooded
- Gravel
- Pavement
- Other

**Subject to stream flooding?**
- Unlikely
- Frequent
- Occasionally

**Subject to ponding?**
- Unlikely
- Frequent
- Occasionally
- Depth (inches)
- Area (ft²)

**Estimated inflow & infiltration**
- Flow, gpm
- Visual estimate, measured

**Rehab Required: (Rate by number)**

**Base & Pipe Connections**
- Cut protruding pipes
- Grout pipe connections
- Seal wall-base joint
- Pour new bench
- Replane smooth bench
- Walls
- Repair cracks/holes
- Seal interior walls
- Install new shoes
- Replace joint gaskets
- Flame & Cover (F&C)
- Replace manhole F&C
- Replace waterproof F&C
- Seal frame to riser
- Raise F&C, add risers
- Seal pitchholes
- Other
- Reconstruct Manhole

**Rehabilitation Rating Key**

1. No work required.
2. No visible I & L, but future work required.
3. Visible or potential I & L, but not severe, future work required.
4. Visible or potential I & L significant, schedule for repairs.
5. Visible or potential I & L severe, immediate repair required.
Appendix 9.4: Manhole Inspection Comments

<table>
<thead>
<tr>
<th>Date</th>
<th>Additional Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>
## Lift Station Inspection Worksheet

<table>
<thead>
<tr>
<th>Pump</th>
<th>Pump</th>
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<tbody>
<tr>
<td>LS1</td>
<td></td>
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<td>LS5</td>
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<td>LS7</td>
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<td>LS10</td>
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<td>LS12</td>
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<td>LS14</td>
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</tbody>
</table>

**Date**

**Time**

**Time**

**Time**
Appendix 9.6: Sewer Line Maintenance Repair Report

Sewer Maintenance Log

<table>
<thead>
<tr>
<th>Date</th>
<th>Maintenance Performed</th>
<th>Initials</th>
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<tbody>
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</table>
Appendix 9.7: Sewer Complaint Report

Sewer Complaint Report

Complaint #

Date of Report: _____________________________

Received by: _______________________________

Issuer of the Complaint: ______________________

Contact Number:

(home) __________________________ (cell) __________________________

Physical Location: ________________________________

Complaint:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Signature


Appendix 9.8: Sewer Response Report

Sewer Response Report

Complaint #

Date of Responses: ____________________________

Respondent/Investigator: ____________________________

Physical Location: ____________________________

Problem Description: ____________________________

________________________________________________

________________________________________________

________________________________________________

Did any sewage spill onto the ground? ____ yes ____ no

Is a SSO report required? ____ yes ____ no

If so, estimate how many gallons spilled out. __________________

Action Taken: ____________________________

________________________________________________

________________________________________________

________________________________________________

________________________________________________

________________________________________________

Was the problem resolved? ____ yes ____ no
### Appendix 9.9: Tracking Form for SSO/ Bypasses

<table>
<thead>
<tr>
<th>Date Begin</th>
<th>Date End</th>
<th>Time Begin</th>
<th>Time End</th>
<th>Location Manhole Segment ID</th>
<th>Event</th>
<th>Remitt Amount</th>
<th>Approve Change</th>
<th>Reporting Party</th>
<th>Sample Taken Y/N</th>
<th>Personnel, Actual Time, &amp; Remedy</th>
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<tbody>
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</table>
# Appendix 9.10: Self-Reporting Form for Wastewater SSOs/Bypasses

## REPORT OF SANITARY SEWER OVERFLOW (SSO) OR WASTEWATER TREATMENT PLANT BYPASS

### FACILITY INFORMATION

<table>
<thead>
<tr>
<th>PERMITTEE (MUNICIPALITY/DISTRICT &amp; PLANT):</th>
<th>PERMIT NUMBER:</th>
</tr>
</thead>
<tbody>
<tr>
<td>COUNTY:</td>
<td>PHONE NUMBER:</td>
</tr>
</tbody>
</table>

### SSO OR BYPASS DETAILS

- **a. Street Address/Landmark/Cross Street:**
- **b. Complaint Name/Telephone #:**
- **c. Start Date & Time**
- **d. End Date & Time**
- **d. Total Time**
- **e. Volume (Gallons):**
- **f. Contact Date & Time**
- **f. Weather Conditions/Precipitation Data**
- **g. Categories of SSO**
  - [ ] Vandalism
  - [ ] Power Outage
  - [ ] Broken Sewer
  - [ ] Inflow & Infiltration
  - [ ] Plugged Sewer
  - [ ] Equipment Failure
  - [ ] Rain Inches____
  - [ ] Manhole location #_______
  - [ ] Widespread Flooding
  - [ ] Other
- **h. Categories of STP Bypass**
  - [ ] Head Works
  - [ ] Aeration/Biological Treatment
  - [ ] Digester
  - [ ] Primary Basins
  - [ ] Clarifiers
  - [ ] Solids Handling/Drying Beds
  - [ ] Other
- **i. Strength of SSO/Bypass:**
  - [ ] Raw (Dry weather SSO or Influent)
  - [ ] Partially Treated Bypass or Wet weather SSO
  - [ ] Was sampling performed? [ ] yes [ ] no
  - **Type of Samples Taken:**
    - [ ] BOD
    - [ ] TSS
    - [ ] Fecal
    - [ ] Ammonia
    - [ ] DO
    - [ ] Other

### WATERCOURSE INFORMATION

- **a. Name of Receiving Stream:**
- **b. Length Affected:**
- **b. Discharge Course**
  - [ ] Runs on ground and absorbs into the soil.
  - [ ] Ditch. Name of surface water it drains to:
  - [ ] Storm sewer. Name of surface water it drains to:
  - [ ] Surface water direct discharge:
  - [ ] Other, describe:

### CORRECTIVE ACTIONS/CLEAN UP

- **a.**
  - [ ] Flushing
  - [ ] Removing
  - [ ] Chemical Application
  - [ ] Other:
b. Describe detailed actions taken to correct & clean up the SSO/Bypass and any follow up actions:

CLEAN UP PREFORMED BY: ________________________________

REPORT PREPARED/SUBMITTED BY

<table>
<thead>
<tr>
<th>NAME (PRINTED):</th>
<th>TITLE:</th>
</tr>
</thead>
</table>

| SIGNATURE: | DATE: | TIME: |

NOTE: Any SSO, bypass or shutdown of a wastewater treatment facility and/or tributary sewer system, is prohibited unless necessary to prevent loss of life, personal injury or property damages. The Continuing Authority is required to notify the Department of Natural Resources by TELEPHONE or FAX by the next business day of any SSO or bypass, and to follow with a written report within 5 business days.
Appendix 9.11: Capital Improvement Budget and Projects

FUND: WASTEWATER
DEPARTMENT: TREATMENT/COLLECTION

<table>
<thead>
<tr>
<th></th>
<th>2009-2010</th>
<th>2010-2011</th>
<th>2011-2012</th>
<th>2012-2013</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EQUIPMENT</strong></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Diffused Air/Blowers for Oxidation</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Ditches</td>
<td>550,000</td>
<td>-</td>
<td>-</td>
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<tr>
<td>(approx. $94,000 elec. cost recovery/yr.)</td>
<td></td>
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<tr>
<td>Truck w/lift for L.S. Maint. 09-19-273</td>
<td>38,000</td>
<td>-</td>
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<tr>
<td>Generator for Lift Stations</td>
<td>60,000</td>
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<td>-</td>
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<tr>
<td>Land Purchase at Plant</td>
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<tr>
<td>SCADA System</td>
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<td>Terragator Injector Truck/Solids Handling</td>
<td>154,000</td>
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<tr>
<td>*Mower for plant and L.S.(09-10) $5,000</td>
<td>5,000</td>
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<td>-</td>
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<tr>
<td>Plant Generator Transfer Switch</td>
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<td>-</td>
<td>-</td>
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<tr>
<td><strong>SUBTOTAL</strong></td>
<td>89,000</td>
<td>219,000</td>
<td>575,000</td>
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**MAINTENANCE**

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<tr>
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<th>2010-2011</th>
<th>2011-2012</th>
<th>2012-2013</th>
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<tr>
<td>Manhole Rehab/Replacement</td>
<td>15,000</td>
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<tr>
<td>CIPP($36/ft.Avg.)/Lines</td>
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<tr>
<td>CCTV (line televising)</td>
<td>10,000</td>
<td>10,000</td>
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<tr>
<td>Roof Repairs-Parts Building</td>
<td>10,511</td>
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<tr>
<td>Roof Repairs-Office/Control Building</td>
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<td>15,000</td>
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</tr>
<tr>
<td><strong>SUBTOTAL</strong></td>
<td>15,000</td>
<td>170,511</td>
<td>160,000</td>
<td>15,000</td>
</tr>
</tbody>
</table>

**PROJECTS**

I/I Field Study Sub-basin 1
I/I Field Study Sub-basin 2
I/I Field Study Remaining Sub-basins
<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lift Stations #4 and #10 Rehab.</td>
<td>240,000</td>
<td>-</td>
</tr>
<tr>
<td>New Sewer Extensions/Replacements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lift Stations 1 &amp; Route Force Mains</td>
<td>2,290,000</td>
<td></td>
</tr>
<tr>
<td>Lift Stations 2 Replacement</td>
<td>1,205,200</td>
<td></td>
</tr>
<tr>
<td>Plant Excess Flow Holding Basin</td>
<td>1,504,800</td>
<td></td>
</tr>
<tr>
<td>Asphalt Road</td>
<td>-</td>
<td>122,000</td>
</tr>
<tr>
<td>Plant Improvements-Regulatory</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Fencing L.S. #13 and 14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lift Station #4 Re-routing</td>
<td>276,000</td>
<td></td>
</tr>
</tbody>
</table>

**Permit Renewal Requirements Likely:**

**Permit Expires November 20, 2012**

- Nitrogen/Phosphorus Limits
- Effluent Disinfection

**SUBTOTAL**

| 2,290,000 | 1,902,800 | 1,445,200 | - |

**TOTAL EXPENSES**

| 2,394,000 | 2,292,311 | 2,180,200 | 15,000 |