

CITY OF KRUM Sanitary Sewer Corrective Action Plan

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1.0 Background

1.1 Sanitary Sewer Overflow Initiative Agreement

The Texas Commission on Environmental Quality (TCEQ) developed its Sanitary Sewer Overflow Initiative (SSOI) as a voluntary program to work with municipalities to reduce and prevent the release of sanitary sewer overflows (SSOs) into the environment. By jointly developing a plan to take appropriate corrective measures, the state and local government can reduce the frequency of these events, thereby helping to protect the health and safety of the local population and the environment.

Furthermore, participation in the SSOI program by the municipality avoids formal enforcement for future violations, as long as the SSOs do not result in a documented impact to human health and safety or the environment (e.g., as indicated by fish kills) and are addressed by the SSO Plan.

The City of Krum entered into the voluntary program of the Texas Commission on Environmental Quality (TCEQ), known as the Sanitary Sewer Overflow Initiative (SSOI), by letter of agreement confirming Krum's participation, dated July 8, 2008. The voluntary agreement between Krum and TCEQ is intended to address alleged violations identified in the TCEQ Investigation Report No. 639944, dated March 25, 2008.

This Corrective Action Plan (CAP) builds on the City of Krum's previous measures to correct collection system problems, provide for system integrity, and prevent overflows. Measures undertaken to date include contracting for jet-vac and emergency pumping, assessing critical line deficiencies, rehabilitation of the High Ridge Lift Station, and initiating East Side sewer line improvements.

The City also had a survey performed to determine eligibility for an ORCA CDBG sewer grant, for which they intend to submit a grant application. The target sewer rehabilitation projects include the 400 blocks of First Street, Second Street and Lake Street, and the 500 block of W. Lloyd Street and Lake Street.

Future corrective measures set forth in this CAP include a comprehensive evaluation of causes of overflows, prioritization of problem areas, field review, a capital program of repair and replacement, a Sanitary Sewer Overflow Response Plan, and enhanced operations and maintenance practices. TCEQ anticipates a 10-year period for completion of the actions committed to in the CAP.

The TCEQ letter accepting Krum's initial draft CAP requested the following items, which are provided in this document:

- Description of corrective measures, with milestones and timelines
- Provisions for the improvement of an enhanced Operation and Maintenance Program
- Description of the sources of funding, and
- Provisions for evaluating the effectiveness of the improvements.

The Krum CAP further provides the necessary flexibility to address sanitary sewer overflows as studies and assessments are developed, as well as flexibility to explore various means of achieving SSOI program goals within the 10-year period.

1.2 City of Krum Sanitary Sewer System

The City of Krum's sanitary sewer system is managed by the Sewer Division of the Department of Public Works, which is responsible for the collection of all wastewater from the City. This service includes the operation, maintenance and repair of all sewer lines, manholes, and lift stations connected to the wastewater collection system.

The City of Krum maintains its own wastewater treatment plant, TPDES Permit #WQ0010729-01. About half of the City's wastewater flow (generally on the west side of the City) is transferred to the Krum Wastewater Treatment Plant, via three lift station located in the southern area of the City. The other, eastern half of the City is served by the City of Denton and transferred via the Saddleback Lift Station.

The City of Krum has approximately 31 miles of wastewater lines (165,091 linear feet) throughout the city (see Figure 1).

1.3 Description of Causes of Krum Sanitary Sewer Overflows

The City of Krum utilizes TCEQ form #00501 to report and record its sanitary sewer overflows. A review of records for the years 2006-2008 indicates approximately half were reported as caused by stoppages and blockages within the system, and half were overflows at lift stations due to equipment failure. One event at a lift station was reported as due to excessive infiltration during a wet weather event.

1.4 Description of Interim Measures to Mitigate Effects of Krum Sanitary Sewer Overflows

The City of Krum has implemented practices to mitigate the effects of any sanitary sewer overflows so as to avoid and minimize any potential impacts to human health and the environment. These practices are being documented in the Standard Operating Procedures manual being developed by staff.

The mitigation steps taken by field crew in case of a spill include containment by sandbag, raking and disposal of solids, application of dry chlorine disinfectant (or non-pathogenic enzyme digesters if in a residential yard). If there is a discharge to a ditch, the ditch is barred so the flow cannot reach area streams. A pump truck contractor is on call if the spill is significant.

Figure 1 – City of Krum’s Sanitary Sewer Map



2.0 Summary of Previous and Ongoing Corrective Measures

The City of Krum has undertaken a focused program to date to address sanitary sewer system integrity and reduce overflows, as well as to meet the expected demands of growth in the City. These measures are listed below.

Completed Activities

- ▶ Developed an Operations and Maintenance Standard Operating Procedures Manual
- ▶ On-call agreement with contractor for emergency mobile pumping units
- ▶ Jetting and cleaning of 20-block problem area
- ▶ Assessed critical system deficiencies (See Figure 2)
- ▶ Phase I Northwest Side Improvements – rehabilitation of downtown lines
- ▶ Phase 2 Southwest Side Improvements - rehabilitation of lines
- ▶ Assessment of need and design drawings for removal of Brooks and County Barn Lift Stations (note: alternative solutions pending easement issues)
- ▶ 385' E. McCart line replacement

Ongoing Activities

- ▶ Lift station daily inspection and monthly washing
- ▶ Grease trap inspection program
- ▶ Monitor and respond to overflows so as to locate problem areas and decrease response times
- ▶ Root control program (cutting, particularly in manholes)
- ▶ Routine review of missing residential end-caps, with education via doorknob notices requesting the resident call public works

3.0 Future Corrective Measures

The City has planned for additional corrective measures to further reduce SSO events. These measures can be grouped generally under:

- Assessment and evaluation
- Capital improvements and rehabilitation
- Operations and maintenance (O&M) including the sewer overflow response program (SORP), and
- Monitoring of program effectiveness.

The corrective measures are described below and set forth in a tabular form, with associated milestone dates and costs, in Table 1.

3.1 Assessment and Evaluation Measures

The City of Krum is planning to undertake a Wastewater Master Plan to evaluate existing and future system capacity and rehabilitation needs. The Wastewater Master Plan (WWMP) can be conducted in two phases:

1. To evaluate the causes of existing Sanitary Sewer Overflows, and provide the basis for a Capital Improvements Plan for system renewal and rehabilitation.
2. If indicated, to evaluate the effects of growth on the system, so that proper pipe sizing can be planned in advance of rehabilitation expenditures.

System evaluation under the Corrective Action Plan will assess the potential impact of growth on the system, to determine the extent of need for a growth-based Wastewater Master Plan.

A key component of the WWMP will be an SSO Characterization Analysis. A preliminary review of the City's SSO reports has determined the primary cause of SSOs in recent years is blockage, with a very minor extent (<3%) due to wet weather.

The results of this SSO Characterization Analysis indicates that flow monitoring and an Infiltration and Inflow study are not needed for the rehabilitation program. (Later studies may indicate the need for flow monitoring data, if the system is modeled for the growth-based WWMP.)

Under the SSOI CAP, prioritization of line segments for further CCTV inspection will be established, based on areas with the poorest system performance. More detailed field inspection will further refine rehabilitation/replacement needs.

Based on the preliminary analysis of system deficiencies identified in the Master Plan, the City will be divided into four (4) study areas of approximately equivalent capital investment needs. This proportioning of study areas will allow the assessment, planning, and investment programs to be suitably phased within the City's budgeting process. It is anticipated that one

study area per two years will be undertaken for the years 2009 – 2018, with capital improvement activities taking place in the alternate years.

Staff assessment to date has identified three additional phases subsequent to the two phases identified under “Completed Activities”. Phases 3, 4, and 5 will be discussed in section 3.2, Capital Improvements.

The City is working to build a GIS map and database which will facilitate this asset assessment activity. As field data is collected and recorded, the GIS system can continue to be updated, providing a tool for further more proactive system management.

The City of Krum intends to continue updating its Sanitary Sewer Master Plan every five years.

3.2 Capital Improvements

The Master Plan for wastewater will include a Capital Improvements Program (CIP) in five-year increments for the years 2010-2014, and 2015-2019 (including the end of the SSOI agreement period).

As the field studies described previously are completed, the specific rehabilitation projects identified will be incorporated into the phased improvements recommended by the Master Plan, through updates to the Capital Improvements Program (CIP). This planning process will also be designed to allow lines targeted for rehabilitation, but requiring upsizing for future growth, to be replaced with properly sized pipe through careful consideration of repair-or-replace decisions.

Staff assessment to date identifies three additional phases subsequent to the two phases identified under “Completed Activities”. Phases 3, 4, and 5 are presented below:

- ▶ Phase 3: Line A (Lake Street) and Line B (Alley West of 156 at 2nd Street) - ORCA grant application
- ▶ Phase 4: E. 6th St. Rehabilitation between East Lloyd and No. Sharon (three blocks) – 6” clay line replaced by 8” PVC
- ▶ Phase 5: High Ridge Lift Station Rehabilitation
 - replacement of clay pipe with PVC
 - rail system
 - pump upsizing
 - backup generator
 - provide accessibility and compatibility for future SCADA capabilities
 - control panel
 - removal of Brook and County Barn Lift Stations (alternative solutions pending easement issues; potential for retention of lift stations)

Further repair and replacement of collection system facilities are anticipated to be phased until the ten year milestone of the SSOI agreement, 2018.

3.3 Operations and Maintenance

The City has developed provisions for its Corrective Action Plan that address the operations and maintenance aspects of their sanitary sewer system management program. Specifically, the City plans to:

- Develop and implement a Sanitary Sewer Overflow Response Plan (SORP), to include steps from the initial notification, reporting to the State (TCEQ Form 00501), and corrective action to prevent recurring SSOs. Reflect these revisions in Chapter Three, Wastewater, of the City of Krum *Standard Operating Procedures* manual.
- Revise the Work Order forms to include cause codes (e.g., grease, roots, debris, structural failure, vandalism, contractor error, heavy rains). Train staff in consistent documentation of stoppage causes.
- Develop a GIS Operations/Work Order map and an asset database of the system.
- Develop and implement a sewer collection system Operations and Maintenance (O&M) program, to include annual manhole inspections and regular line cleaning. Many resources are available to municipalities to develop an O&M program appropriate to their community's size, density, and proximity to critical customers and sensitive water bodies. City staff will work to develop short, medium, and long-term O&M practices.
- Review and update the current commercial grease trap ordinance (§11.201 and §11.203). Introduce a "Cease the Grease" education program for all residential and commercial customers (the North Central Texas Council of Governments provides resources for this program). The ordinances can be strengthened through more consistent inspection, and tracking of blockages from grease resulting in dry weather SSOs. The public education program can take the form of utility bill inserts, public service announcements, links on the home page of the city's website, and outreach to businesses.

3.4 Monitoring of Program Effectiveness

A primary measure of sewer system management, repair and replacement program effectiveness will be tracking and evaluation of trends in SSOs, by cause and volume. Krum has undertaken systematic recording and reporting of SSOs since 2005. As capital improvements are made, tracking of system performance in terms of SSOs before and after construction will support assessment of the effectiveness of these investments in achieving program goals.

A typical tool for monitoring sewer system improvement effectiveness is to conduct flow monitoring following each phase of construction. Given existing data, it is not believed that a significant proportion of Krum's system performance is the result of wet weather capacity constraints. Accordingly, flow monitoring to track program effectiveness is not anticipated at this time.

Table 1. Krum SSO Initiative Corrective Action Plan	Date	Est. Cost¹
ASSESSMENT AND EVALUATION		
1. 2009 Rehab-only Sanitary Sewer Master Plan and Capital Improvements Plan	Feb. 2010	\$45,000
2. Conduct a system performance evaluation from SSO records and crew system knowledge. Develop a priority ranking of collection system “problem areas” needing further inspection.	May 2009	\$2,000
3. Initiate, update and maintain of geographical information system (GIS) for the collection system as new information becomes available.	Ongoing	~\$2,500/yr
4. Conduct field studies to inspect identified problem areas of collection system to determine specific rehabilitation/replacement needs and prepare bid documents.	Ongoing	Internal
5. Update the Sanitary Sewer Master Plan every 5 years (if indicated).	Ongoing	\$20,000
CAPITAL IMPROVEMENTS		
6. Phase 3: Line A (Lake Street) and Line B (Alley West of 156 at 2nd Street) - ORCA grant application	2011	\$349,000

¹ Estimated consulting engineer cost

Table 1. Krum SSO Initiative Corrective Action Plan (cont.)	Date	Est. Cost
CAPITAL IMPROVEMENTS		
7. Phase 4: E. 6th St. Rehabilitation between East Lloyd and No. Sharon (three blocks) – 6” clay line replaced by 8” PVC	2012	~\$12/lf
8. Phase 5: High Ridge Lift Station Rehabilitation <ul style="list-style-type: none"> • replacement of clay pipe with PVC • rail system • pump upsizing • backup generator • provide accessibility and compatibility for future SCADA capabilities • control panel • removal of Brook and County Barn Lift Stations (alternative solutions pending easement issues; potential for retention of lift stations) 	2013	\$TBD
9. Incorporate rehabilitation/replacement needs into CIP.	1 every 2 yrs until Oct 2018	
a. Study Area 1:	Jul 2012	\$TBD
b. Study Area 2	Jul 2014	\$TBD
c. Study Area 3	Jul 2016	\$TBD
d. Study Area 4	Jul 2018	\$TBD

Table 1. Krum SSO Initiative Corrective Action Plan (cont.)	Date	Est. Cost
10. Repair/replace collection system facilities utilizing findings of field studies.	Ongoing until 2018	Est. \$12 per linear foot rehabilitation costs ²
11. Develop and implement a Sanitary Sewer Overflow Response Plan (ORP), to include steps from the initial notification to corrective action to prevent recurring SSOs.	Jul 2009	\$5,000
OPERATIONS AND MAINTENANCE		
12. Develop and implement a sewer collection system Operations and Maintenance (O&M) program, to include annual manhole inspections and regular line cleaning.	Oct. 2009	\$2,000
13. Review and update the current commercial grease trap ordinance and introduce an education program for all residential and commercial customers.	July 2010	Internal
14. Continue sewer monitoring to locate problem areas and to decrease response times when problems are observed.	Ongoing	Internal
PROGRAM MONITORING		
15. Track records of SSO events and locations to evaluate program effectiveness.	Ongoing	Internal
16. Evaluate the utility of and Inflow and Infiltration evaluation and flow monitoring	July 2011	Internal

² Rule of thumb: ½ of a system inspected will indicate the need for rehabilitation, so 147,000lf/2=73,500 lf * \$15-20/lf=\$1,470,000

4.0 Proposed Timeline

		Table 2. KRUM SSOI CAP TIMELINE																		
		2009		2010				2011				2012				2013				OUTYEARS
Year		3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	--
Quarter																				
ASSESSMENT AND EVALUATION																				
1. 2009 Rehab-only Sanitary Sewer Master Plan and Capital Improvements Plan																				
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3. Initiate, update and maintain of geographical information system (GIS) for the collection system as new information becomes available.																				
4. Conduct field studies to inspect identified problem areas of collection system to determine specific rehabilitation/replacement needs and prepare bid documents.																				
5. Update the Sanitary Sewer Master Plan every 5 years.																				
CAPITAL IMPROVEMENTS																				
6. Phase 3: Line A (Lake Street) and Line B (Alley West of 156 at 2nd Street) - ORCA grant application																				
7. Phase 4: E. 6th St. Rehabilitation between East Lloyd and No. Sharon (three blocks) – 6” clay line replaced by 8” PVC																				
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9. Incorporate rehabilitation/replacement needs into CIP.																				
e. Study Area 1																				
f. Study Area 2																				
g. Study Area 3																				
h. Study Area 4																				

Table 2. KRUM SSOI CAP TIMELINE (cont.)																			
Year	2009		2010		2011		2012		2013		OUTYEARS								
Quarter	3	4	1	2	3	4	1	2	3	4	1	2	3	4	--				
OPERATIONS AND MAINTENANCE																			
10. Develop and implement a Sanitary Sewer Overflow Response Plan (ORP), to include steps from the initial notification to corrective action to prevent recurring SSOs.																			
11. Develop and implement a sewer collection system Operations and Maintenance (O&M) program, to include annual manhole inspections and regular line cleaning.																			
12. Review and update the current commercial grease trap ordinance and introduce an education program for all residential and commercial customers.																			
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PROGRAM MONITORING																			
14. Track records of SSO events and locations to evaluate program effectiveness.																			
15. Evaluate the utility of and Inflow and Infiltration evaluation and flow monitoring																			

5.0 Funding Sources

To restore its water and sanitary sewer system infrastructure and address the needs of new growth, the City of Krum supports sanitary sewer capital improvements through the existing rate base. Operations and maintenance is also supported through water and sewer service rates.

Krum is applying for CDBG (Community Development Block Grant) funds from the State for wastewater service rehabilitation. For census tracts with household incomes that meet the CDBG funding criteria, this represents another source of potential funds.

The City has also directed staff to submit the necessary Information Forms for the Texas Water Development Board (TWDB) Intended Use Plans (IUPs) for the State Revolving Fund (SRF). This process will also provide access to the potential federal “economic stimulus” fund.

The system rehabilitation costs estimated in the SSOI CAP will be incorporated in any rate study conducted for the City. A rate study would determine the extent to which rates can be increased for City utility customers and still meet the affordability criteria.

It is important to note that the prioritization and phasing provisions of the SSOI CAP will ensure overall program goals can be achieved within a schedule acceptable to the ratepayers.