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WATER QUALITY ASSESMENT PLAN FOR SANITARY SEWER OVERFLOWS FROM MANHOLE 1750 NEAR GULPHA CREEK IN HOT SPRINGS, AR

August 16, 2021

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1.0 INTRODUCTION

This Water Quality Assessment Plan (WQAP) serves as additional documentation for the procedures that FTN Associates, Ltd. (FTN) will follow to assist the City of Hot Springs Utilities Department (City of Hot Springs) with assessing potential health concerns when sanitary sewer overflows (SSO) occur at Manhole 1750 near Gulpha Creek in Hot Springs, Arkansas. The primary documentation for the overall activities that will occur in response to a SSO at Manhole 1750 is a Standard Operating Procedure (SOP) that the City of Hot Springs is submitting to the Arkansas Department of Energy and Environment Division of Environmental Quality (DEQ) on August 16, 2021. A copy of the SOP is included as Attachment 1 to this WQAP.

The SOP includes background information regarding Manhole 1750, including its location just west of Gulpha Creek and south of Malvern Avenue (see map that is labeled as Exhibit B in the SOP). Exhibit B in the SOP also shows the sampling locations where water quality data will be collected. Water quality sampling is the activity for which FTN will provide assistance.

2.0 SAMPLING AND ANALYSIS PROCEDURES

2.1 Sampling Locations and Parameters

The section of the SOP labeled "SAMPLING AND TESTING" notes that water quality sampling will occur at the three sampling locations shown on Exhibit B upon validation that a spill is entering Gulpha Creek. Site 2 is the upstream site in Gulpha Creek, Site 3 is the downstream site in Gulpha Creek, and Site 1 represents water from the SSO before it reaches Gulpha Creek.

Although the SOP discusses sampling only for fecal coliforms and *E. coli*, the samples at Site 1, Site 2, and Site 3 will be analyzed for the parameters in Table 2.1. As each sample is collected, turbidity (in NTU), temperature, pH, conductivity, and dissolved oxygen (DO) will be measured *in situ*. The laboratory will provide the *E. coli* results to the City of Hot Springs within three calendar days of when the samples were collected; results for other parameters will be provided to the City of Hot Springs within 14 calendar days of when the lab receives the samples. The City of Hot Springs will submit each set of results to DEQ upon receipt from the laboratory.

Table 2.1. Water chemistry parameters to be measured by the laboratory.

Parameter*	Sample container	Preservation	Maximum holding time	Analytical method
Sulfate	Plastic	4°C	28 days	EPA 300.0
Chloride	Plastic	4°C	28 days	EPA 300.0
TDS	Plastic	4°C	7 days	SM 2540 C-1997
TSS	Plastic	4°C, HNO_3	6 months	SM 2540 D-1997
Total Alkalinity	Plastic	4°C	14 days	SM 2320 B-2011
CBOD 5 day	Plastic	4°C	48 hours	SM 5210 B-2001
NH4 as N	Plastic	4°C, H_2SO_4	28 days	SM 4500-NH3H-1997
NO2 + NO3 as N	Plastic	4°C, H_2SO_4	28 days	SM 4500-NO3 F-2000
TKN as N	Plastic	4°C, H_2SO_4	28 days	SM 4500-P, G-1999
Ortho-phosphorus as P	Plastic	4°C	48 hours	SM 4500-P, G-1999
Total phosphorus as P	Glass	4°C, H_2SO_4	28 days	SM 4500-9
Chlorophyll *a*	Dark Plastic	4°C	24 hours unfiltered	EPA 445.0
E. coli	Dark Plastic	4°C	6 hours	EPA 1603

* TDS = total dissolved solids, TSS = total suspended solids, CBOD = carbonaceous biochemical oxygen demand, NH4 = ammonium, NO2 = nitrite, NO3 = nitrate, TKN = total Kjeldahl nitrogen

2.2 Re-sampling for *E. coli*

Re-sampling for *E. coli* will be conducted in accordance with the SOP (Attachment 1).

2.3 Sampling Methods

Personnel responding to any SSO must wear appropriate personal protective equipment (PPE) to prevent contact with raw sewage. PPE may include: rubber gloves, rubber boots, impermeable coveralls and protective headwear with splash shield.

Water samples in Gulpha Creek will be collected in an area of flow near mid-channel, if the stream is flowing, rather than in an eddy or stagnant pool near the edge of the channel. Field Sampling personnel may walk into the stream as long as the samples are collected upstream of any disturbance created by the sampler walking on the stream bottom. If excessive flow precludes sampling near mid-channel due to safety concerns, samples maybe collected by an extendable sampling dipper as close to mid-channel as feasible.

Water samples will be collected at all locations using the direct grab method. Water grab samples will be collected from mid-depth of the water column using the actual sample container as the collection device, where practical. The container cap will be removed, the container will be slowly submerged, opening first, into the water and inverted so the opening is upright, allowing the water to run slowly into the container until filled. The filled container will be quickly returned to the surface and capped. Skimming the surface of the water or suspending bottom sediments during collection will be avoided. In cases where preservative has been added to the sampling containers, a bulk water sample will be collected in a transfer sampling container (to be provided by the laboratory) as described above and then transferred into the pre-preserved sampling bottles so as not to allow flow-back for preserved samples. Once capped, the sample container will be inverted several times to ensure sufficient mixing of sample and preservatives. Water samples will be placed on ice upon collection and delivered to the laboratory. If the laboratory is not open when sample collection is completed (e.g., after business hours), the samples will be kept on ice and analyzed by the laboratory even if actual holding times exceed the allowable holding times in Table 2.1. Any analyses conducted outside of the allowable holding times will be noted by the laboratory in its report of the results.

In situ parameters will be measured following the collection of water chemistry samples. The sampler will collect *in situ* measurements in the same approximate location as the water chemistry samples using a properly calibrated multi-parameter water quality sonde.

Water samples will be collected in Gulpha Creek beginning downstream and working upstream.

3.0 REFERENCES

DEQ. 2020. *Assessment Methodology for the Preparation of the 2020 Integrated Water Quality Monitoring and Assessment Report.* Arkansas Department of Energy and Environment Division of Environmental Quality, Office of Water Quality. Accessed online at www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2020/2020 AM Final.pdf

APCEC. 2020. *Regulation No. 2, Regulation Establishing Water Quality Standards for Surface Waters of the State of Arkansas.* Arkansas Pollution Control and Ecology Commission. Effective date February 13, 2020. Accessed online at https://www.adeq.state.ar.us/regs/files/reg02_final_200124.pdf

ATTACHMENT 1

City of Hot Springs Standard Operating Procedure (SOP)

STANDARD OPERATING PROCEDURE			
SOP Title:	**Manhole 1750 Sanitary Sewer Overflow**		
SOP CODE:	6459.662.61-2021.07	CATEGORY:	SSO RESPONSE

OBJECTIVE	To provide clear and complete instructions for responding to sanitary sewer overflows at Manhole 1750 in particular.
BACKGROUND	Manhole 1750 has a history of overflows during periods of wet weather due to the hydraulic design combined with unidentified I&I in the Gulpha Sewer Basin. Any SSO during dry weather would likely be due to a blockage or equipment failure at the Gulpha Lift Station.
SAFETY PROCEDURES	Personnel responding to any SSO must wear appropriate personal protective equipment (PPE) to prevent contact with raw sewage. PPE may include: rubber gloves, rubber boots, impermeable coveralls and protective headwear with splash shield.
POTENTIAL HAZARDS	Manhole 1750 is located (117 Catherine Heights Rd.) near Gulpha Creek, which flows into Spencer Bay and on to Lake Catherine. SSO contamination impacts the water quality of an area used for recreational activities.
RESPONSE	Upon notification from remote sensing equipment, notification by the remote float auto-dialer, SCADA, other staff, or public notification, personnel responding to an SSO may encounter an emergency situation that requires immediate action. The first responders to the site during normal business hours will be Wastewater Collection crews. After hours, On-Call personnel will respond and call for back up personnel as needed. Responding personnel will: 1. Determine whether the spill has reached Gulpha Creek 2. Notify testing laboratory to acquire testing samples should the spill reach Gulpha Creek* 3. Post ADH signs at locations shown in Exhibit A for Sample Site 1, should the spill reach Gulpha Creek 4. Provide a CodeRED in accordance with Public Notification requirement in this SOP for effected area as outlined in the notification boundary shown in Exhibit A. 5. Determine the cause of the problem (blockage, equipment failure at Gulpha Lift Station, wet weather I&I) 6. Determine what additional resources may be needed (equipment and materials). 7. Document any necessary information needed for reporting requirements. 8. Take photos of the impacted area. 9. Estimate the release volume based on size of the sewer, weather conditions and the extent of the release. 10. Report spill in accordance with Office of Water Quality, DEQ reporting requirements. *Should testing agency not be available for immediate sampling, City of Hot Springs laboratory personnel will acquire a sample and hold in accordance with testing protocol and provide a chain of custody to the testing laboratory for further handling.
CONTAINMENT	Containment of an overflow is the responder's first priority. The methods used will vary on a case by case basis. The Manager, Crew Leader and maintenance responders will: 1. Identify and obtain the necessary equipment and materials needed to contain the overflow. 2. Take immediate steps to contain the overflow (block path toward receiving water, recover with vacuum truck). 3. Determine whether additional containment measures are needed.

CORRECTION OF OVERFLOW	The time required to correct the cause of the overflow depends on the determined cause. In the case of Manhole 1750, the most frequent cause is wet weather initiated I&I and the current hydraulic limitations of the collection and pumping system. Responding crews must begin by investigating upstream manholes and the downstream lift station for evidence of blockage or equipment failure. When necessary, contractor services may be requested as an additional resource to abate the overflow.
SAMPLING AND TESTING	Upon response to the spill and validation that the spill is entering Gulpha Creek, the following sampling and testing will be initiated for Fecal Coliform Bacteria and *E. Coli*. 1. Sampling shall occur at the locations shown on Exhibit A. 2. First series of test shall be for Sample Site 1. 3. Results shall be made available to the City of Hot Springs within three (3) calendar days of the event from the testing laboratory. 4. Should the *E.Coli* test result exceed 126 cfu/100ml at Sample Site 1 as shown on Exhibit A, ADH signs will be posted for Sample Site 3, Sample Site 4, and Sample Site 5. 5. A second series of tests will be scheduled and conducted for Sample Site 2, Sample Site 3, Sample Site 4, and Sample Site 5 until two consecutive results for *E.Coli* are equal to or less than 126 cfu/100ml are achieved, at which time the testing will cease, concluding safe bacteriological standards recommended by EPA. 6. ADH Signs shall be removed upon demonstration of safe bacteriological testing. 7. City of Hot Springs shall email all test results to DEQ's Office of Water Quality, Enforcement Branch at water-enforcement-report@adeq.state.ar.us upon receipt from the testing laboratory. Testing shall be conducted at approved Department of Environmental Quality laboratory.
RECOVERY/CLEANUP	Cleanup will be completed for all SSOs following containment and correction of the overflow. The recovery efforts will be directed at returning the affected to a pre-release condition as quickly and efficiently as possible. Cleanup activities will vary depending on the situation. Actions selected will be performed thoroughly. The general process is as follows: 1. Response crew will use appropriate PPE during cleanup and recovery 2. Affected area will be cleaned as much as possible using rakes, shovels, hand picker tools and vacuum equipment. 3. Affected overflow area will be evaluated for appropriate disinfection. This may include applying lime to absorb liquid and raise the pH to reduce pathogens, applying a non-hazardous bio-enzymatic bacteria consuming product to reduce impact of pathogens on receiving waters. 4. Maintain, as far as possible, an appropriate buffer zone between limited areas and the waters of the state and the United States. 5. The immediate area around the overflow site will be inspected to ensure that no visual residue remains, including solids, papers, and rags, etc. 6. If flushing is warranted and ultimately performed, then all solids and debris must be collected and disposed of properly. 7. All wash-down water must be returned to the sewer system.
ADDITIONAL RESOURCES	If the maintenance crew is unable to contain and clean up the affected area with typical maintenance equipment, then the next step will be to bring in contractor or other construction support. The following steps will be taken by on-call management: 1. Assess and mark the boundaries of the suspected area for all utility service locations (marking materials such as white paint will be used to mark the boundaries, and "Locate" will be written to indicate the area). 2. Call (811) CALL BEFORE YOU DIG. 3. Determine the additional resources and type of construction crew required to perform the task(s).

	4. Call for the additional resources using existing approved contact lists as deemed necessary. 5. Enlist appropriate contract services. 6. Manage actions taken by the additional construction crew to clean up the affected area. 7. Ensure actions are documented following the SSO reporting procedures.
FIELD REPORTING	Responding personnel will collect accurate and complete field data required to be submitted to DEQ. The following information will be documented: 1. Date and time of notification (SCADA, Public Notification, Staff Report) 2. Date and time of dispatch 3. Date and time of arrival 4. Date and time of departure 5. Date and time of release ended (estimated as close as possible) 6. Location 7. Downstream Gulpha Pump Station status 8. Probable Cause 9. Estimated release 10. Visual impact observed 11. Actions to repair/mitigate
REGULATORY REPORTING	Shawn Davis, Wastewater Collection Manager or his designate will report the SSO to the Arkansas Energy and Environment Department, Office of Water Quality within 24 hours. The Online Sanitary Sewer Overflow (SSO) Reporting Form can be found at https://www.adeq.state.ar.us/water/enforcement/sso/submit.aspx This initial 24-hour report should include the following information: 1. Permit Number 2. Location of overflow (manhole number or street address) 3. The receiving water (if applicable) 4. Cause of overflow (if known) 5. Estimated volume of overflow 6. Total duration of the overflow If the "total duration of the overflow" is not known when the 24-hour SSO online report is submitted, then a follow-up report (5-day report) giving a detailed account of the overflow and the steps taken to resolve it must be submitted within 5 days of the overflow's discovery. This report can be submitted by email at ssoadeq@adeq.state.ar.us or by mail (include Attn: Water Quality Enforcement). A sample of the spill shall be taken prior to confluence of the receiving stream for Fecal Coliform Bacteria and *E.coli*. Results of the testing shall be reported to the DEQ's Office of Water Quality, Enforcement Branch within three calendar days of the event sampled. Test results will be emailed to water-enforcement-report@adeq.state.ar.us Sample locations are shown in Exhibit A.
PUBLIC NOTIFICATION	When SSO spill reaches Gulpha Creek, City of Hot Springs Utilities will take measures inform those affected by the possible impact on water quality. The methods of public notification include: 1. Signs will be posted at locations as shown in Exhibit A upon first response to the spill advising against human contact with the affected water in accordance with this SOP. Signs will be removed when testing concludes bacteriological standards are achieved in accordance the sampling and testing section in this SOP.

	Sign content shall be as follows: **<u>HEALTH ADVISORY</u>** WATER QUALITY IN THIS AREA MAY BE UNSAFE **SWIM AT YOUR OWN RISK** **Arkansas Department of Health** 4815 West Markham Street • Little Rock Arkansas 72205-3867 Environmental Health (501)661-2171 Epidemiology (501)661-2893 2. A **CodeRED** alert will be sent to the population living in close proximity to the water bodies in accordance with boundary shown on Exhibit A. *<u>ADVISORY</u>* *As of [date and time] a **NO SWIMMING** Advisory has been issued for the Gulpha Creek/Spencer Bay area due to a wastewater overflow. Hot Springs Utilities will monitor the water quality in the area until it is safe for human contact**. If you have any questions, you may contact Hot Springs Utilities at (501) 321-6200*** 3. Upon satisfaction of *E.Coli* testing as outlined in Sampling and Testing section of the SOP the Recission of Advisory shall be provided. *<u>RECISSION OF ADVISORY</u>* *The NO SWIMMING Advisory issued on [date and time] for the Gulpha Creek/Spencer Bay area has been canceled. The Bacteriological survey indicates that the water is safe for recreational activities**. If you have any questions you may contact Hot Springs Utilities at (501) 321-6200***
ASSOCIATED EQUIPMENT	The following equipment may be deployed for responding to any SSO: 1. Flusher/Vac Truck 2. Backhoe 3. Dump Truck 4. Crew Trucks 5. Confined Space Entry Equipment 6. Shovels 7. Rakes 8. Trash Pickers/Grabbers 9. Trash Bags
PPE	The following personal protective equipment may be required when responding to any SSO: 1. Hard Hats 2. Safety Glasses/Goggles 3. Face Shield 4. Ear/Noise Protection 5. Rubber gloves 6. Rubber Boots 7. Protective Body Suit 8. Respirators

Exhibit B

Legend

- Identified Residences
- Area for Code Red Alerts

N

0 375 750 1,500 2,250 3,000 Feet

Sample Site 2
-92.986343, 34.47537

Sample Site 1
-92.986489, 34.47090

Manhole 1750

Signs

Gulpha
Pump Station

Sample Site 3 and Sign
-92.985549, 34.468338

0 50 100 200 300 400 Feet

Figure A

See Figure A

Sample Site 4 & Sign
-92.976742, 34.457851

Sample Site 5 & Sign
-92.968230, 34.455490

Residential Areas Around Gulpha Creek and Spencer Bay