

A G E N D A

JAMES CITY SERVICE AUTHORITY BOARD OF DIRECTORS

WORK SESSION

May 24, 2011

4:00 P.M.

- A. CALL TO ORDER**
- B. ROLL CALL**
- C. BOARD DISCUSSION**
 - 1. James City Service Authority Consent Order
- D. BREAK**

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M E M O R A N D U M

DATE: May 24, 2011
TO: The Board of Directors
FROM: Larry M. Foster, Manager of James City Service Authority
SUBJECT: James City Service Authority DEQ Consent Order Briefing

The Department of Environmental Quality (DEQ) Order by Consent was signed September 2007, which sets forth a host of activities to be accomplished under a fairly aggressive schedule. Because of interdependencies of other regional sewer utilities and Hampton Roads Sanitation District (HRSD) a tremendous amount of effort has been invested to coordinate and insure consistency in responses to the State Order by Consent. Following is a brief overview of the required reports and activities set forth in the Order with prescribed deadlines annotated:

- Flow Monitoring Plan – to provide DEQ with details regarding James City Service Authority’s (JCSA’s) proposed flow and rainfall monitoring program. This report explains the means methods, locations, and timeline for collecting flow and rainfall data within JCSA’s sanitary sewer system. **Due and Completed 12/2007**
- Flow and Rainfall Monitoring – to refine areas of excessive extraneous water flow into the sewer system. JCSA established flow monitoring at 72 pump stations and installed 11 rain gauges throughout the sewer system. Data was collected between March-October 2008, to support subsequent activities and reporting. **Due and Completed 11/2008**
- Sanitary Sewer Evaluation Survey (SSES) Plan – to identify and prioritize portions of the sewer system to be evaluated. This report identifies sewer basins requiring further evaluation due to excessive wet weather flow and/or a history of unresolved Sanitary Sewer Overflows (SSO’s). **Due and Completed 12/2008**
- Management, Operation, and Maintenance (MOM) Program – to provide a comprehensive guide to the operation of a sewer system. The MOM is intended to follow an EPA published guidance document that details everything the regulators want to see in the MOM. Some of the topics include:
 - Organization
 - Legal Authority
 - Goals, Operation, and Maintenance of all aspects of the collection and conveyance system
 - Design and performance standards
 - Emergency Overflow Response Plan
 - Capacity Assurance
 - Fats, Oils and Grease (FOG) control
 - Private property Inflow and Infiltration (I/I) abatement
 - Safety and Training; and
 - Ongoing Assessment.**Due and Completed 12/2008**
- Flow Evaluation Report (FER) – This report details the results of the flow and rainfall monitoring including decomposition of over nine months of flow and rainfall data. At least two storms with a minimum of one-inch accumulation and one storm that had to be at least a one-year storm event (about

three inches of rain) were analyzed for every flow monitoring site. Modeling had to be used to simulate observed flows within specified tolerances so peak hour flow projections for 2-, 5-, and 10-year storms could be made.

This was a very involved, complex, and time-consuming effort that JCSA staff completed in-house (the only locality to not delegate this effort to a consulting engineer). DEQ regarded JCSA's FER as one of the top three in the region in terms of quality and completeness. **Due and Completed 5/2009**

- Regional Hydraulic Model – to simulate flows and their impacts of infrastructure capacity at defined rainfall events. HRSD is responsible for developing a Regional Hydraulic Model which includes Interceptor force mains, pump stations, and appurtenances from the Treatment Plants up to and including the locality pump stations directly connected to the Interceptors. Localities were responsible for providing substantial data for their (locality's) pump stations and force mains. JCSA has 22 such Terminal Pump Stations. **Due and Completed 6/2009 & 3/2010**
- Annual Reports – DEQ wants to know about the progress of activities on an annual basis. The report summarizes the work undertaken and the status of all required activities for the previous fiscal year. In addition, the report must discuss repairs made to address the most urgent deficiencies discovered, system performance, (i.e., accounting for SSO's), planned activities for the coming year, and summary system benefits (i.e., major projects). **Due every year 10/2008 through 10/2013 – Completed Reports for 2008, 2009, and 2010.**
- Locality Model
 - For Unresolved Sewer System Overflows (SSO) Locations – to help define/predict impacts on sewer infrastructure at certain rainfall events. Localities were initially required to model portions of their sanitary sewer system upstream from terminal pump stations that experienced known or suspected unresolved capacity related overflows. For JCSA this included four pump station basins. The JCSA used the same modeling software that HRSD is using to develop the Regional model which HRSD purchased and provided to the localities free of charge. The modeling will include pertinent components of the gravity collection system and associated pump stations and force mains. **Due and Completed 11/2009**
 - For Capacity Assurance – This will be an all-inclusive model of JCSA's collection and conveyance system to evaluate existing and future development conditions for base flow and 2-, 5-, and 10-year predicted peak hour flow recurrences. The purpose of this modeling will be to analyze system capacities under the stated conditions and plan future improvements or upgrades to the system. **Ongoing - Due 12/2011**

JCSA personnel are developing its hydraulic model in-house while most of the other localities are delegating this effort to consulting engineering firms.

- SSES Field Activities – Extensive field investigations are required to access the condition of the wastewater collection and conveyance system within identified SSES basins.

The activities include:

- Manhole Checks – A fairly detailed inspection of every manhole within the SSES basins (over 6,500 manholes) is required. JCSA is performing this effort using in-house staff. All manholes are graded "A-F" with "A" being the best and "F" the worst. Data is collected in an Access database with field

laptops and downloaded into JCSA's Geographic Information System (GIS) mapping. Photos are taken in the field and are then linked to the respective manholes in GIS. Manholes graded "D" or "F" are scheduled for prompt repair and addressed through manhole rehabilitation contracts that are ongoing. To date 70 manholes have been or are under contract to be rehabilitated. **Ongoing - Due 11/2011**

- **Smoke Testing** – Smoke testing was required in all SSES basins (about 200 miles of sewer mains). This involved isolating a portion of the sanitary sewer system and forcing non-toxic smoke into it through one of the manholes. The purpose was to identify defects and possible sources of storm water Inflow and Infiltration (I/I-extraneous water). The defects were documented and photographed in the field and JCSA incorporated the data into its GIS mapping. Severe defects that are discovered are repaired by JCSA's Operations personnel and/or by local contractors under "find and fix" contracts. **Completed 4/2010**
- **Night Flow Isolation Monitoring** – This is performed to quantify infiltration in selected portions of the sewer collection system, primarily in areas where ground water levels are above the pipe. Sections of the main are isolated by plugging incoming pipes (up to about 3,500 ft.) and a weir is placed at the downstream end of the test section. Flow measurements are recorded for every 10 to 20 minutes. The test is performed between the hours of midnight and 5 a.m. when wastewater flows are minimal, therefore measured flows are considered to be primarily the result of groundwater infiltration. **Completed major interceptors in the LS 1-2 and 1-5 basins 6/2010 - Effort is Ongoing – Due 11/2011**
- **Isolated Flow Monitoring** – JCSA purchased five open channel flow meters to perform monitoring in areas of interest upstream from the pump stations in order to isolate portions of the collection system and identify areas where I/I is excessive. **Ongoing - Due 11/2011**
- **Closed Circuit Television (CCTV) Inspections** – CCTV cameras are deployed in sewer pipes to inspect and record the condition. Operators identify defects and code them based on a National Pipeline Assessment program. Structural defects (i.e., fractures, cracks, and holes) are rated 1-5 with five being the most severe. Maintenance related defects (i.e., grease and roots) rated 1-5; again five is the worst case. It is anticipated that JCSA's subcontractors will cctv approximately 25-30 percent of the piping in the SSES basins or 300,000–400,000 linear feet (LF). This effort is underway and findings are being incorporated the in Hansen (maintenance management system). Severe defects that are discovered are repaired by JCSA's Operations personnel and/or by local contractors under "find and fix" contracts. To date approximately 230,000 feet of sewer line has been cctv-ed. **Ongoing - Due 11/2011**
- **Condition Assessment Report and Rehabilitation Plan** – The Condition Assessment Report details all of the SSES activity findings for each sewer basin. The Rehabilitation Plan defines the specific measures that will be taken to repair and rehabilitate the Sanitary Sewer System in order to reduce I/I and wet weather SSO's. The plan must detail the projected costs associated with the proposed rehabilitation, the schedule for completion of these activities, and the estimated post rehabilitation reduction of I/I. **Due 11/2012**
- **Regional Wet Weather Management Plan** – The Regional Wet Weather Management Plan will define improvements necessary in HRSD's and the locality's sanitary sewer systems to address capacity deficiencies for a specific Level of Service (LOS). The LOS is defined as the peak sewer flow recurrence that the Regional Sanitary Sewer System can convey without resulting in a capacity-related overflow. This "peak flow recurrence" is associated with a specific rainfall recurrence such as a 2-, 5-, or 10-year storm

event, and will be negotiated between HRSD, the Localities, DEQ, and EPA. Peak flows associated with a 10-year rainfall recurrence are greater than peak flows resulting from a two-year event. Capacity enhancement costs associated with accommodating a greater peak flow are consequently greater than those associated with a lesser flow. Regulators tend to seek the higher (10-year peak flow recurrence) LOS so HRSD and the localities will attempt to prepare cost evaluations to justify a lower LOS if possible. **Due 11/2013**

- Rehabilitation and Capacity Enhancement Implementation – Upon approval of the Rehabilitation and Regional Wet Weather Management Plans, HRSD and the localities will implement projects as defined and scheduled in the plans. It is anticipated that implementation will be programmed over a 10- to 20-year time span. The time schedule will be negotiated with DEQ and EPA. Historically EPA has limited the implementation period to 10 to 15 years in other jurisdictions. **Due 2023-2033**
- Post Rehabilitation Monitoring – Localities will be required to perform post rehabilitation flow and rainfall monitoring to show that agreed upon reductions of I/I have been achieved. JCSA has continued to maintain flow and rainfall monitoring since March 2008. **Due 2014-2034**

Fats, Oils and Grease (FOG)

EPA's Guide for Evaluating, Management, Operation, and Maintenance (MOM) Programs for Sanitary Sewer Collection Systems states that "...the grease control section of the document should contain the requirement to install grease traps at appropriate facilities (e.g., restaurants). Additionally, these facilities should be required to properly maintain the grease traps and pump them out on a regular basis. The document should also address periodic inspections of grease traps by collection system personnel and the ability to enforce (i.e., levy fines on persistent offenders)."

Part of any valid MOM program for a sanitary sewer system includes efforts for eliminating pollutant discharges that cause interference in the function of both the gravity and force main systems, including interference caused by the discharge of Fats, Oils, and Grease (FOG) from Food Service Establishments (FSE's) and residences. EPA estimates that "grease from restaurants, homes, and industrial sources are the most common cause (47 percent) of reported blockages." Regional research indicates that the largest contributors to FOG entering the system are FSE's.

A regional program has been developed to include a model FOG Ordinance, Grease Control Device (GCD) design guidelines, enforcement response program, and education and training. Several localities have enacted the ordinance and are working with FSE's in their jurisdictions to register their GCD's, obtain required training, and establish inspection and record keeping practices.

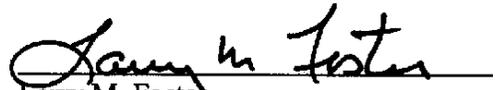
Private Property I/I Abatement

Section 4.7, titled Private Sources of I/I, included in the Regional Technical Standards which are part of the DEQ State Order By Consent states that:

"Private property I/I sources may include roof drains, area and foundation drains, defective laterals, and private sewers. HRSD and the Localities shall develop and implement a Private Property I/I Abatement Program. The Private Property I/I Abatement will require, to the extent allowed by law, the correction of identified private system deficiencies."

The Capacity Team (a committee of locality and HRSD engineers and consultants) has been working with HRSD to implement a Program that would be consistent across the region. This Regional Program will make

provisions for HRSD to address private property I/I abatement within individual jurisdictions. Assuming this program reaches consensus among all parties HRSD and the localities will agree upon specific areas where I/I abatement on the private side would be most beneficial. Then HRSD will perform or cause to be performed work on the private sewer laterals from the building to the right-of-way. HRSD would be responsible for funding these projects.



Larry M. Foster

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Attachment

James City Service Authority

Board of Directors/Supervisors

Work Session

May 24, 2011

Update on Consent Order with
Department of Environmental Quality

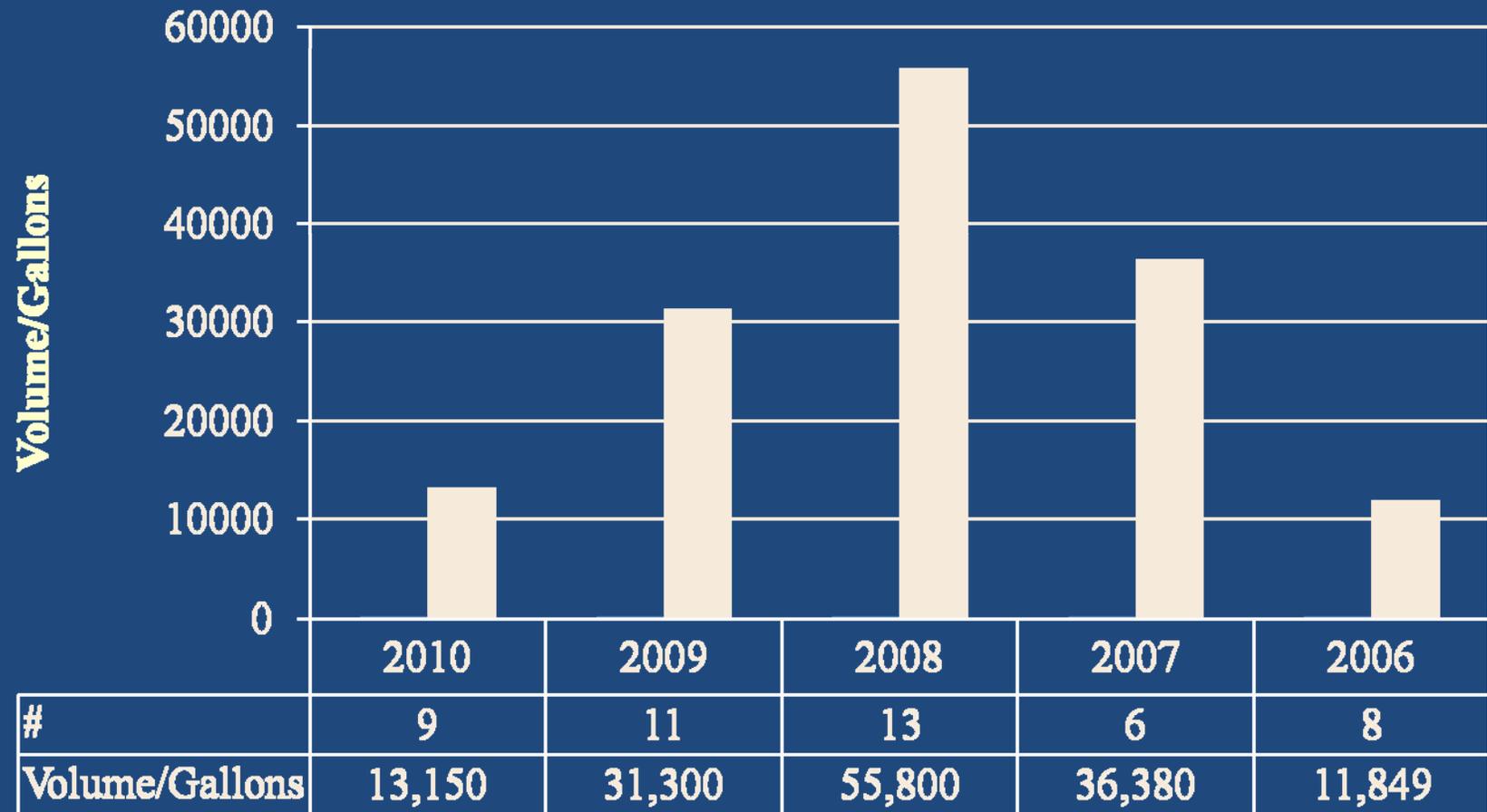
JCSA

- 400 Miles Sewer Lines
- 20,000 Customers
- 76 Sewer Pumping Stations
- 9,000 Manholes

Safe Drinking Water Act

- No Sewer Spills
- Impossible

Sewer Spills



Biggest Challenge

- Deteriorating Sewer Lines – 30-40 Years Old
- Infiltration/Inflow – Extraneous Water
 - JCSA Sewer Lines
 - Private Sewer Laterals
 - Roof Drains
- Fats, Oils, Grease (FOG) – Household/Restaurants
- Utility Contractors

Consent Order

- US EPA – Sept. 2005
 - DEQ – Consent Order Sept. 2007
 - All Hampton Roads Sewer Utilities
 - We have worked collectively to
 - Establish Regional Standards
 - Create Regional Sewer System Model

Activities and Schedules

Flow Monitoring Plan

December
2007

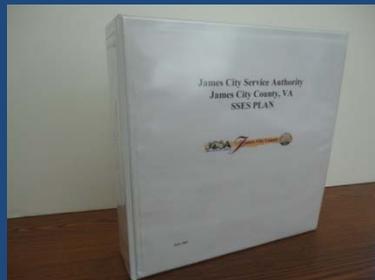


Flow & Rainfall Monitoring

March 2008 – October
2008

Sanitary Sewer Evaluation Survey Plan

December
2008



Management, Operation & Maintenance Program

December
2008



Activities and Schedules

Flow Evaluation Report

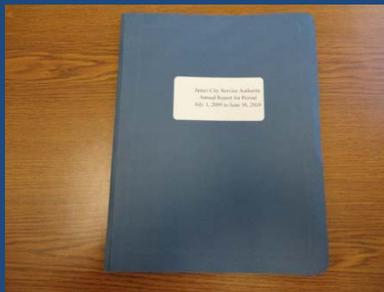


May 2009

Regional Hydraulic Modeling

June 2009, March 2010
and May 2011

Annual Reports



Each
October
since 2008

JCSA's Locality Hydraulic Modeling

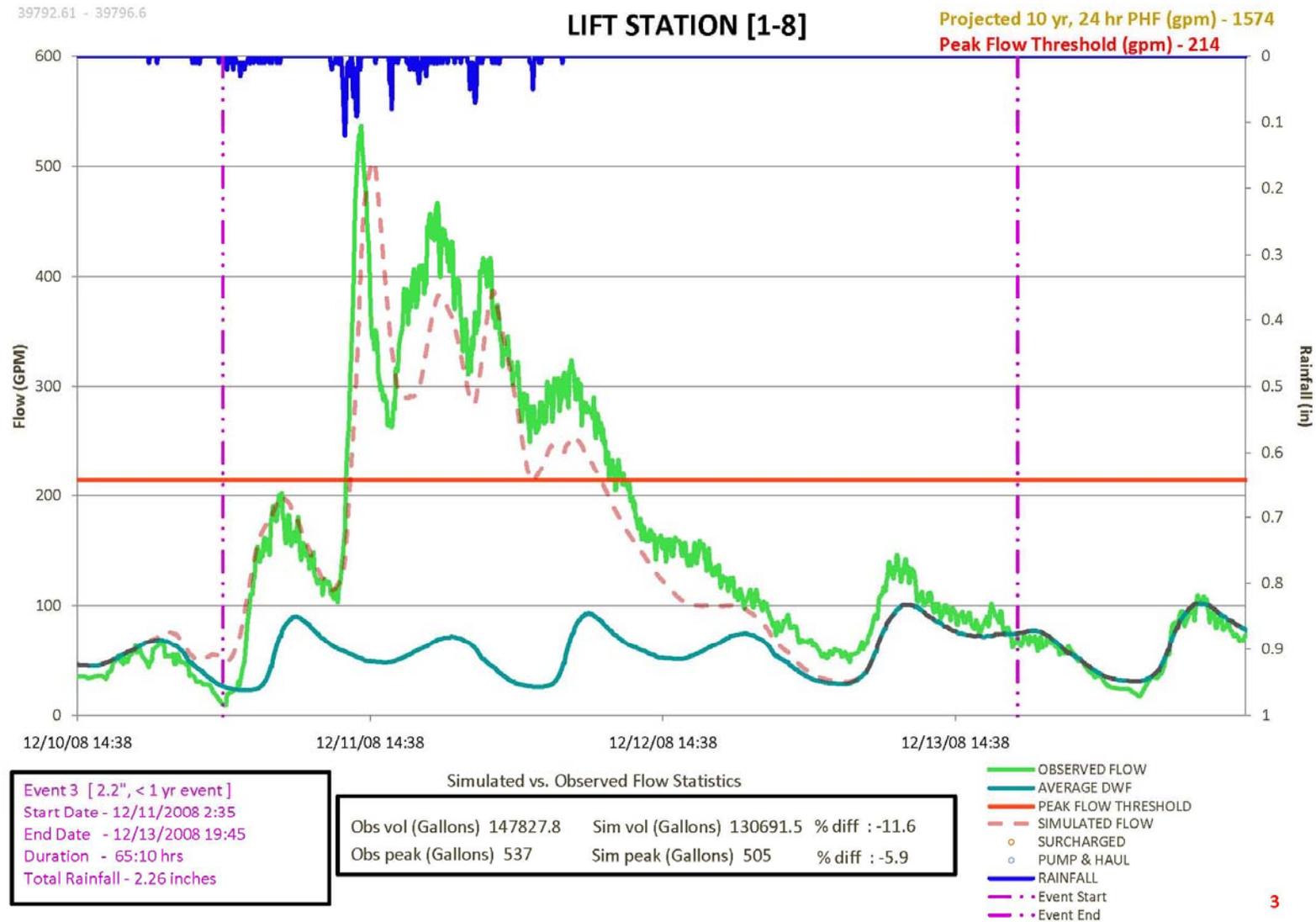
November 2009 and
December 2011

Sanitary Sewer Evaluation Survey Tasks

- Manhole Inspections – 6,500 manholes
- Smoke Testing – 200 miles of sewer mains
- Night Flow Isolation Flow Monitoring
- Isolated Flow Monitoring
- Closed Circuit Television Pipeline
Inspection – 55 to 75 miles of sewer mains

To be completed by November 2011

Flow Monitoring Results



Manhole Inspection Results



Smoke Testing Results



Smoke Testing Results



4-2-029a

Smoke Testing Results



4-2-029b

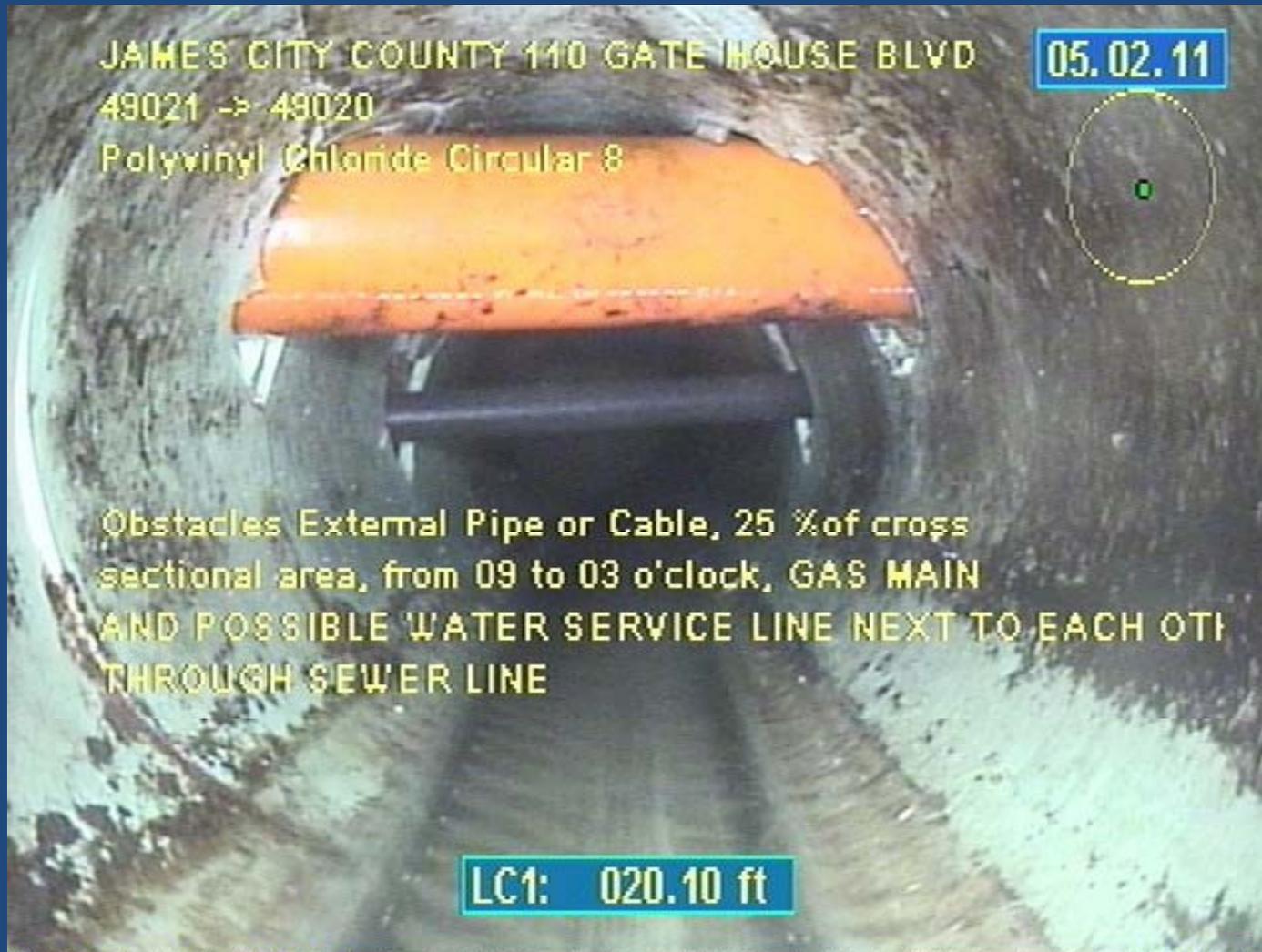
CCTV Inspection Results



CCTV Inspection Results



CCTV Inspection Results



CCTV Inspection Results

JAMES CITY COUNTY IRONBOUND RD

36019 ~ 36020

Concrete Pipe (non-reinforced) Circular 8

11.22.10

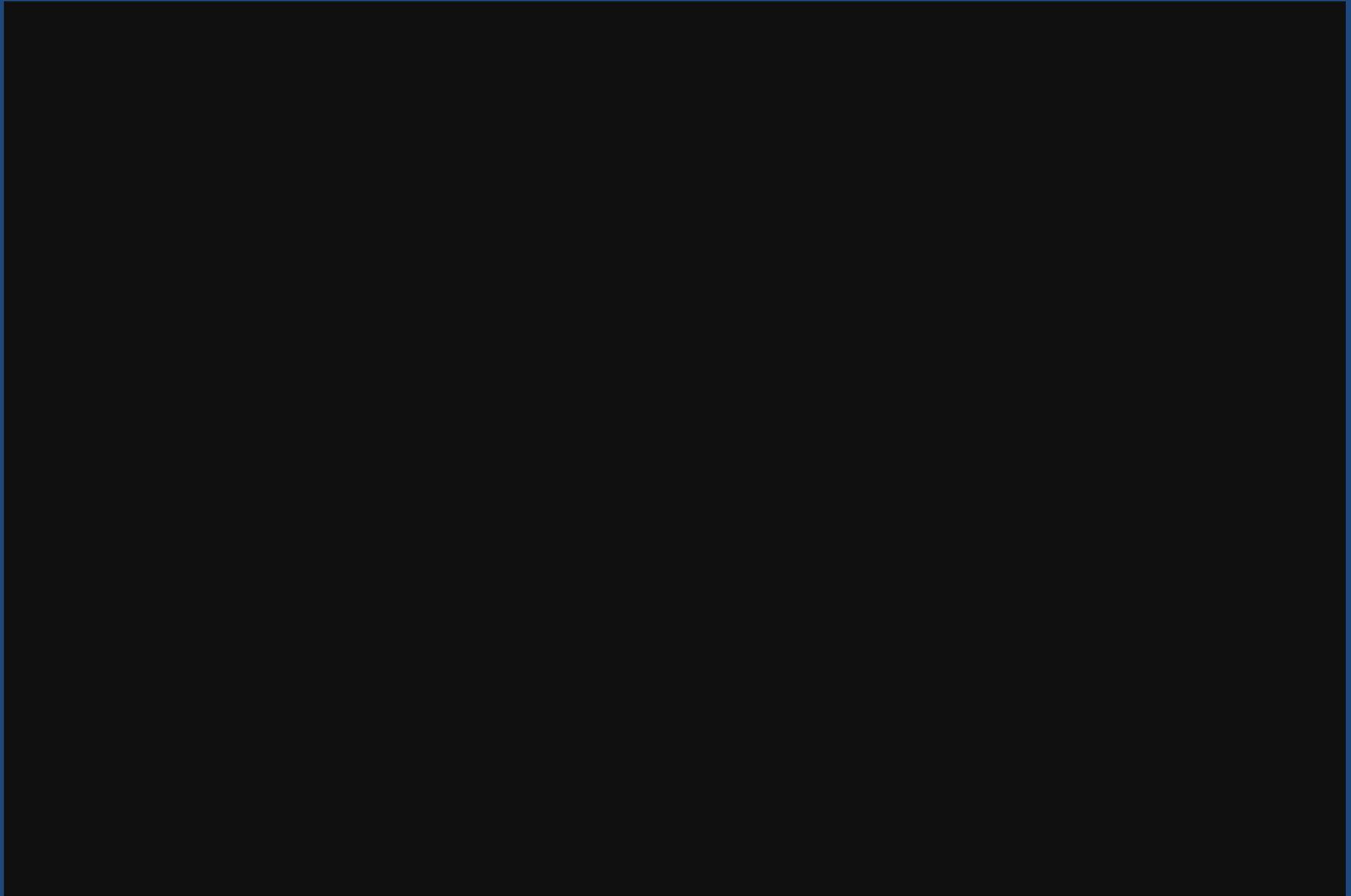


LC1: 018.40 ft

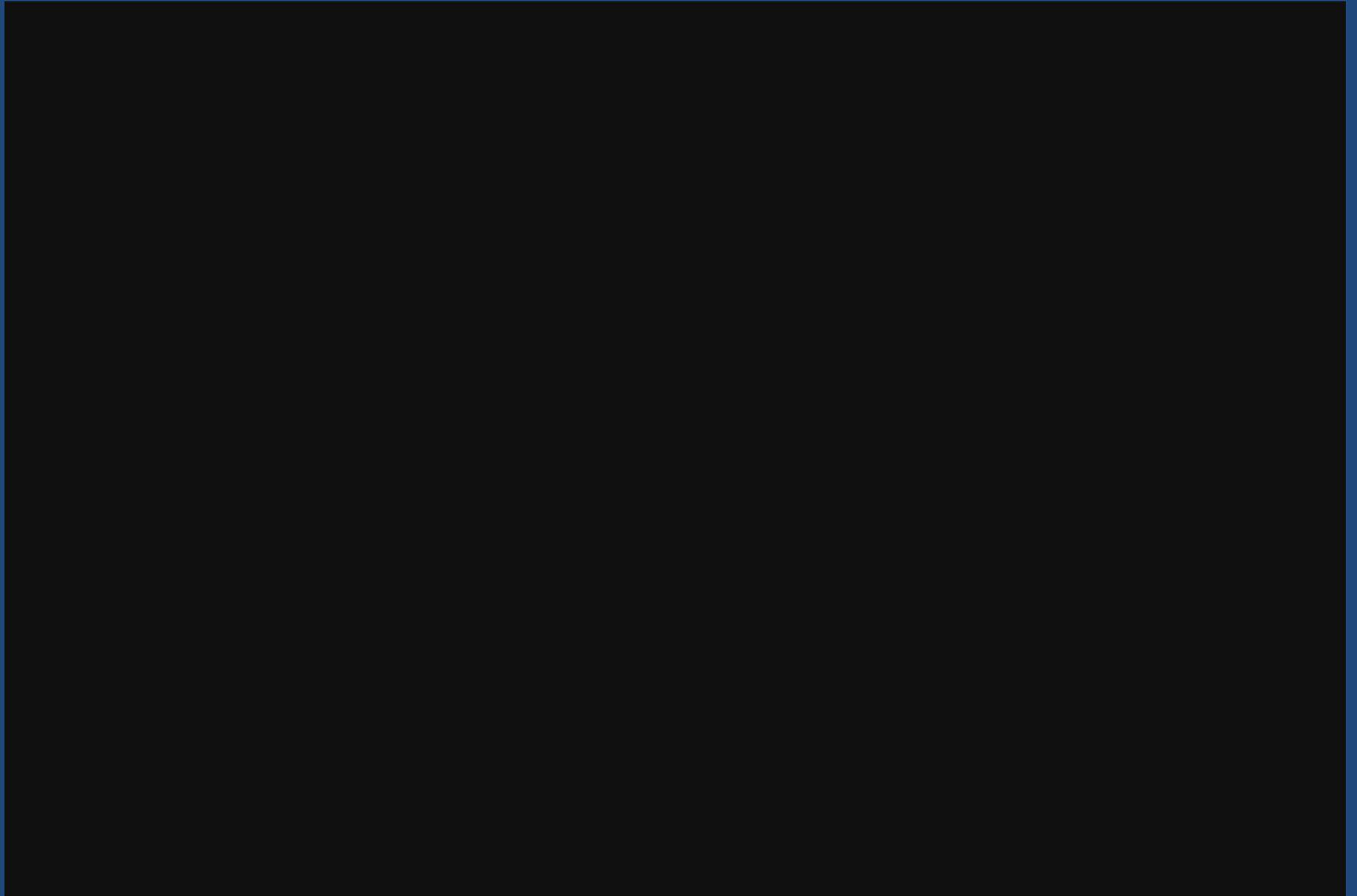
Rehabilitated Manhole



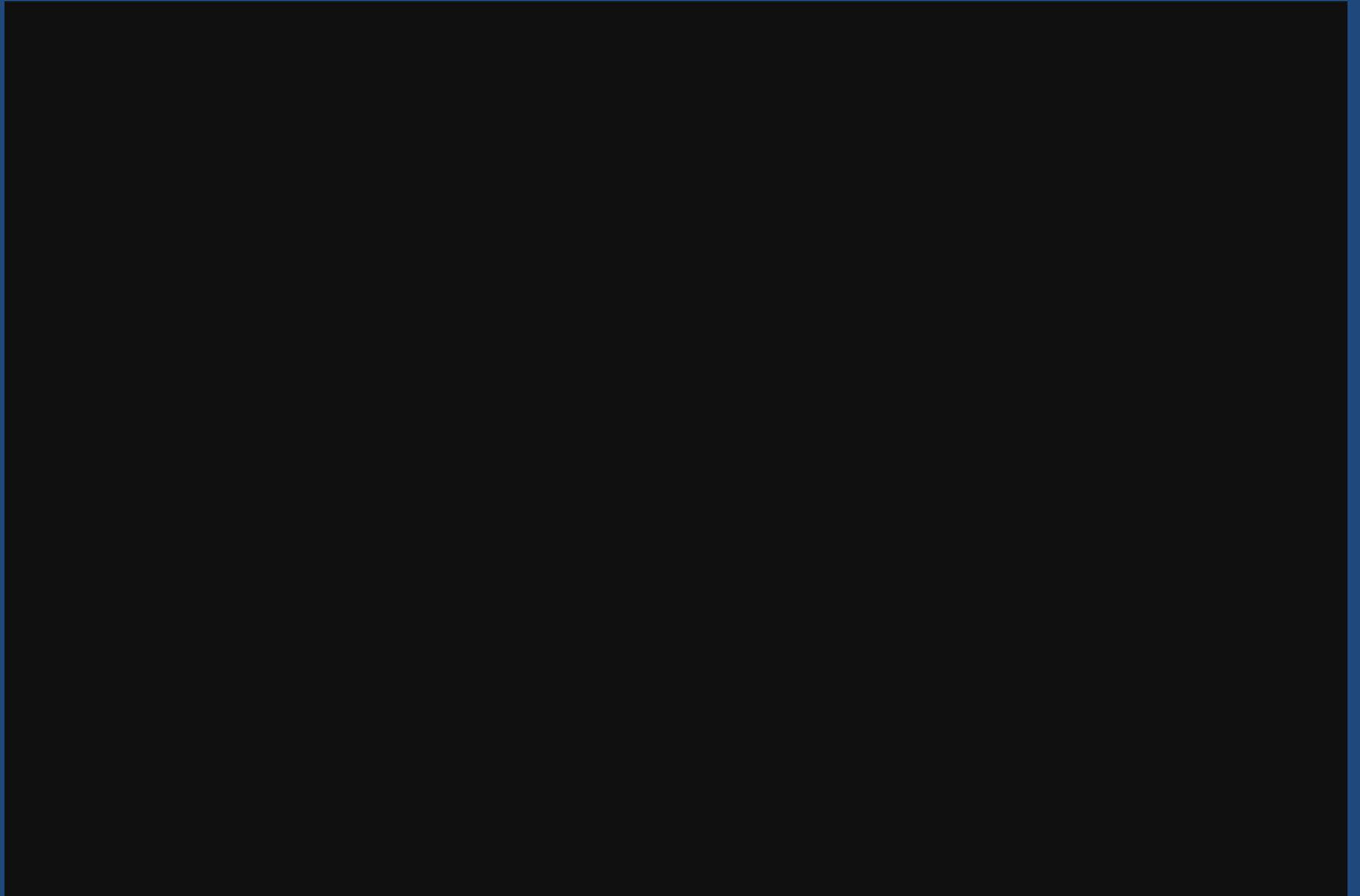
Cured-In-Place Pipelining



Cured-In-Place Pipelining



Cured-In-Place Pipelining



What's Next:

- Regional Leader
 - Complete Sewer System Evaluation
 - Prioritize and Implement System Repairs
 - 10-20 Year Cycle
- FOG Ordinance
 - Requesting Maintenance of Grease Traps in Restaurants
- Agreement with HRSD for Private Sewer Lateral Repairs