CITY OF FORT LAUDERDALE

CITY OF FORT LAUDERDALE

WASTEWATER CONSENT ORDER PROGRAM

COLLECTION SYSTEM ASSET MANAGEMENT AND CAPACITY, MANAGEMENT, OPERATION, AND MAINTENANCE PROGRAM

OGC No. 16-1487
City Project No. 12367
Hazen Project No. 43194-011
June 25, 2020

FINAL

Hazen

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Executive Summary

Executive Summary

Background

The City of Fort Lauderdale (City) owns, maintains, and operates a wastewater collection and transmission system (Collection System) comprising:

- 482 miles of gravity sanitary sewer
- Over 10,000 manholes
- 177 raw wastewater pumping stations
- 111 miles of force main piping and associated valves

These assets are operated and maintained by the City Public Works Department's Utilities Division and have an estimated total replacement value of approximately $976 million. The Collection System transports wastewater from individual service connections to the George T. Lohmeyer Wastewater Treatment Plant for treatment and disposal.

On September 29, 2017, the City entered into Consent Order Number 16-1487 (Consent Order) with the Florida Department of Environmental Protection (FDEP). The Consent Order identifies specific corrective actions, with completion deadlines, to improve sanitary sewer service within the City.

Paragraphs 6(i), 6(k), and 6(l) of the Consent Order require the City to develop and implement an Asset Management, and Capacity, Management, Operation and Maintenance (AM and CMOM) Program for the Collection System and to provide schedules for the implementation of the AM and CMOM Program as well as schedules for completion of Phase II force main improvement projects, which are included in the March 23, 2020 *Force Main Condition Assessment Report*. On August 27, 2018, the City submitted an AM and CMOM Program Development Plan to FDEP for comment in accordance with Paragraph 6(i) of the Consent Order. No comments were received by the City from FDEP. This AM and CMOM Program document follows the AM and CMOM Program Development Plan.

The CMOM program framework was originally developed by Region IV of the United States Environmental Protection Agency (EPA) over 15 years ago as a way to help utilities reduce sanitary sewer overflows (SSOs) through the development and implementation of Operation and Maintenance programs to achieve level of service goals in a cost-effective manner. Asset Management, as defined by EPA, is maintaining a desired level of service at the lowest lifecycle cost focusing on timely and appropriate asset rehabilitation, repair, and replacement.

While AM and CMOM have similar goals and activities, the CMOM focuses primarily on activities that involve day-to-day operations and maintenance of the collection system to prevent sewer spills, whereas AM is more capital focused and addresses the overall risk of asset failure

and capital planning to manage the long-term life cycle of assets. **Figure ES-1** illustrates the relationship and interconnections between the two programs.

The Consent Order specifically requires that the City's AM-CMOM program reflect EPA guidance and best practices. The guidance documents cited in the CO include:

- EPA 305-B-05-002, *Guide for Evaluating Capacity, Management, Operation, and Maintenance (CMOM) Programs at Sanitary Sewer Collection Systems*
- EPA 816-F-08-014, *Asset Management: A Best Practices Guide*

AM and CMOM Program Report Structure

This document is structured to show alignment with the EPA guidance for AM and CMOM programs and is divided into Part A (CMOM Program), Part B (AM Program), and Part C (AM and CMOM Program and Phase II Force Main Schedules).

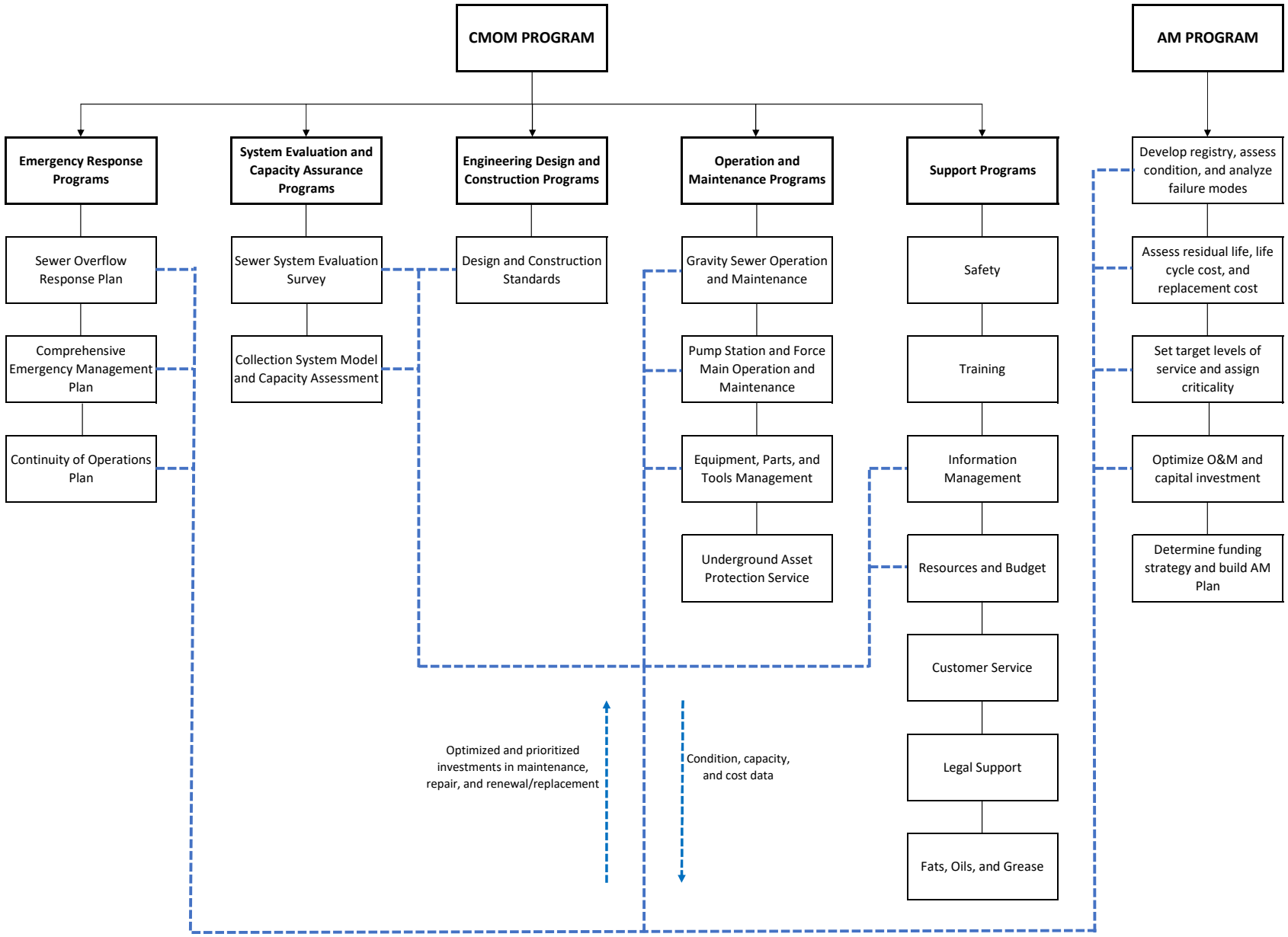
Part A - Capacity, Management, Operation and Maintenance Program

Part A is organized into discrete sub-programs for clarity and to facilitate development of various programmatic elements in alignment with EPA CMOM guidance documents:

- Section A.2 – Emergency Response Programs (*Sewer Overflow Response Plan* ♦ *Comprehensive Emergency Management Plan*).
- Section A.3 – System Evaluation and Capacity Assurance Programs (*Sewer System Evaluation Survey* ♦ *Collection System Model and Capacity Assessment*).
- Section A.4 – Engineering Design and Construction Programs (*Design and Construction Standards*).
- Section A.5 – Operation and Maintenance Programs (*Gravity Sewer Operation and Maintenance* ♦ *Pump Station and Force Main Operation and Maintenance* ♦ *Equipment, Parts, and Tools Management* ♦ *Underground Asset Protection Service*).
- Section A.6 – Support Programs (*Safety* ♦ *Training* ♦ *Information Management* ♦ *Budgeting* ♦ *Customer Service* ♦ *Legal Support* ♦ *Fats, Oils, and Grease*).

CMOM Program development was based on an assessment of the City's current CMOM-related activities and practices relative to the criteria listed in the EPA guidance documents, which include specific self-evaluation checklist questions. Checklist responses were reviewed and program gaps identified and prioritized. This evaluation process also included input from two parallel City initiatives of particular relevance to the City's CMOM Program. First, the City's efforts under the ISO 9001 Quality Management System provide numerous useful inputs such as strategic management and control documents, procedures for monitoring of key actions and schedules related to professional licenses for personnel and calibration of equipment, and an extensive list of Standard Operating Procedures that address activities ranging from processing of complaints to field personnel safety and procedures for routine maintenance and emergency

Figure ES-1. City of Fort Lauderdale AM-CMOM Program Structure



Figures ES-1 and A1-1, Structure E1-1, 6/23/2020

response. Second, the City's adoption in 2017 of Effective Utility Management principles in daily operation and management establishes a framework to help identify and address priorities through an incremental, continual improvement management approach that is closely in alignment with CMOM Program objectives.

For those programs and practices requiring further development, a prioritized implementation plan with specific activities is presented within each section. Certain areas, such as *Safety,* were seen to reflect a high maturity of implementation and no specific plans were defined to modify existing practices and procedures. For other areas such as *Gravity Sewer Operation and Maintenance,* possible improvements were noted including development of a Continuous Sewer Assessment Program (CSAP) to replace the current ten-year inspection cycle, with some sewers inspected more or less frequently based on need and condition. The CSAP recommendation, as with many others, reflects the overarching goal of building on the initial risk analysis towards a data-driven, condition-based program of continuous assessment and rehabilitation that addresses Consent Order compliance imperatives along with AM principles. Overall, the CSAP will serve both CMOM and AM objectives.

Part B - Asset Management Program

Part B reflects the EPA's asset management framework and documents the following process for the City's gravity collection, pump station, and force main systems:

- Section B.2 – Asset inventory and condition assessment (*Use of the City's GIS database, and available condition assessment data for both structural- and capacity-related criteria, to inventory all assets and identify those needing maintenance/repair to preempt failure*).
- Section B.3 – Asset valuation (*Estimation of replacement cost for assets in the City's GIS database*).
- Section B.4 – Risk assessment (*Development of prioritized asset-specific risk scores based on estimations of* ***Consequence of Failure*** *and* ***Likelihood of Failure*** *for individual assets*).
- Section B.5 – Capital Improvement Program development and prioritization (*Description as to how repairs, upgrades, and replacement of assets will be determined, prioritized, authorized, and funded*).

The primary long-term goal of the AM Program is to optimize decisions concerning investments in maintenance, repair, and renewal to provide the lowest life cycle costs while delivering an appropriate level of service to residents. Process modifications will be designed to result in a more proactive, less reactive mode of operations. Central to this transition will be a focus on risk-based prioritization of investments and an emphasis on information regarding asset condition to guide the timing of projects. As program implementation advances and better information is gathered concerning asset condition, initial assumptions concerning probability of failure will be refined with condition-based assessments.

Part C – AM and CMOM Program Schedules

Part C includes the implementation schedules as required by Paragraph 6(l) of the Consent Order. These include:

- AM and CMOM Implementation – This schedule has a primary focus on activities listed in Part A – CMOM, however in implementing the Part A action items the City is also advancing the AM Program, particularly as it relates to the CSAP and Cityworks initiatives.
- Schedule for completion of construction of each Phase II Improvement Project identified in Exhibit C of the Consent Order.
- A schedule for any other projects that need to be added to Phase II, as identified by the Force Main Condition Assessment Report submitted to FDEP on March 23, 2020.

Conclusions

While the AM and CMOM Programs described herein meet the requirements as presented in the CO, the City of Fort Lauderdale understands AM and CMOM are perpetual programs and is committed to a strategy of continuous improvement.

As part of the continuous improvement process, the City will revisit these improvement areas to assess progress, adjust actions, identify new areas of improvement, move areas completed off the implementation list, and make other adjustments as necessary to reflect circumstances at the time of the evaluation. The City's CMOM and AM Programs are designed to work together to assure reliable, cost-effective performance of the wastewater collection/transmission system over time.

Part A

Collection System Capacity, Management, Operation and Maintenance Program

CITY OF FORT LAUDERDALE

City of Fort Lauderdale
Wastewater Consent Order Program
Part A: Collection System Capacity, Management, Operation and Maintenance Program

June 25, 2020

Prepared by Hazen

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Appendix AB: Standard Details

Appendix AC: Standard Operating Procedures

Appendix AD: Fats, Oils, and Grease Technical Memorandum

List of Acronyms

Acronym	Definition
AM	Asset Management
AM-CMOM	Asset Management & Capacity, Management, Operation and Maintenance
AMS	Asset Management System
BMP	Best Management Practice
BSF	Base Sanitary Flow
CCTV	Closed-Circuit Television
CEMP	Comprehensive Emergency Management Plan
CER	Capacity Evaluation Report
CHWS	Competent Hot Work Supervisor
CIPP	Cured-in-Place Pipe
CIS	Customer Information System
City	City of Fort Lauderdale
CM	Corrective or Unplanned Maintenance
CMOM	Capacity, Management, Operation and Maintenance
CO	Consent Order
COOP	Continuity of Operations Plan
COWTM	Consent Order Wastewater Transmission Model
CRM	Customer Relationship Management
CSAP	Continuous Sewer Assessment Program
CUSMP	Comprehensive Utility Strategic Master Plan
D&C	Distributions and Collections
DHS	Department of Homeland Security
DPEMB	Domestic Preparedness and Emergency Management Bureau
DRC	Development Review Committee
DSD	Department of Sustainable Development
EPA	Environmental Protection Agency

Acronym	Definition
ERA	Environmental and Regulatory Affairs
ERP	Enterprise Resource Planning
EUM	Effective Utility Management
FCD	Federal Continuity Directive
FDEP	Florida Department of Environmental Protection
FEMA	Federal Emergency Management Agency
FMCA	Force Main Condition Assessment
FOG	Fats, Oils, and Grease
fps	feet per second
GIS	Geographical Information Systems
gpcd	gallons per capita day
GPR	Ground Penetrating Radar
GTL WWTP	George T. Lohmeyer Wastewater Treatment Plant
GTL	George T. Lohmeyer
GTO	Grease Trap Ordinance
GWI	Groundwater Infiltration
HWO	Hot Work Operator
I/I	Infiltration and Inflow
IT	Information Technology
KPI	Key Performance Indicator
LEL	Lower Explosive Limit
MCC	Motor Control Center
MIS	Management Information System
MOT	Maintenance of Traffic
MSDS	Material Safety Data Sheet
NAPOT	Nominal Average Pump Operating Time
NASSCO	National Association of Sewer Service Companies

Acronym	Definition
NSF	National Sanitation Foundation
O&M	Operations & Maintenance
PACP	Pipeline Assessment Certification Program
PDP	Personnel Development Plan
PIO	Public Information Officer
PM	Planned or Preventative Maintenance
PPE	Personal Protective Equipment
PWD	Public Works Department
RA	Requisition Authorization
RDII	Rain-Derived Inflow and Infiltration
RFQ	Request for Qualifications
RRR	Repair/Rehabilitation/Replacement
SCADA	Supervisory Control & Data Acquisition
SMP	Standard Maintenance Procedures
SOP	Standard Operating Procedure
SSES	Sanitary Sewer Evaluation Survey
SSO	Sanitary Sewer Overflow
SSORP	Sanitary Sewer Overflow Response Plan
SUE	Subsurface Utility Exploration
SUO	Sewer Use Ordinance
TAM	Transportation and Mobility
TWA	Time Weighted Average
WCTS	Wastewater Collection and Transmission System
WWTP	Wastewater Treatment Plant

Section A1
Introduction

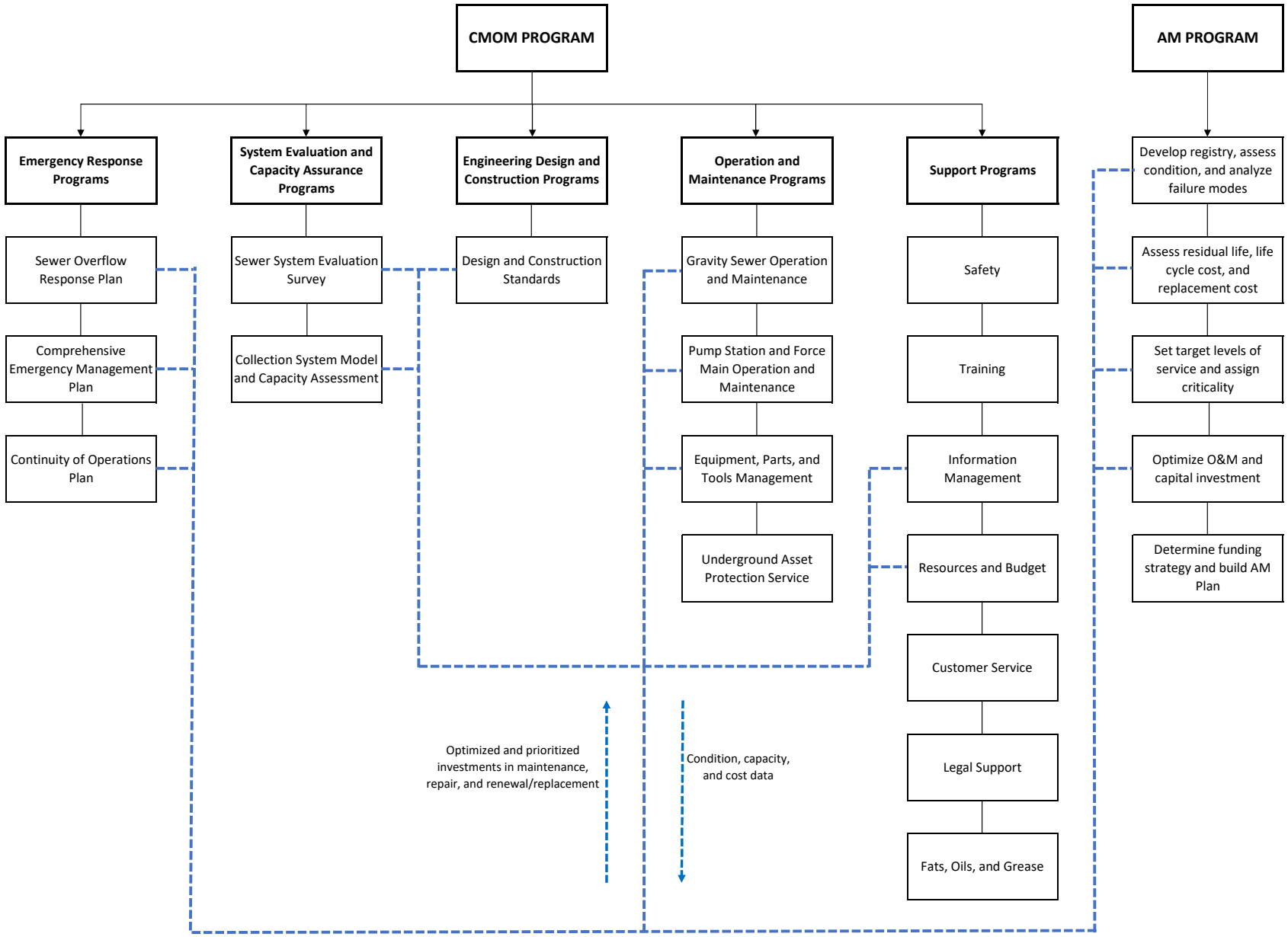
A1. Introduction

A1.1 Program Overview

The City of Fort Lauderdale, hereafter City, entered into Consent Order (CO) Number 16-1487 with the Florida Department of Environmental Protection (FDEP) Office of the General Council on September 29, 2017. The CO identifies corrective actions, with completion deadlines, to improve sanitary sewer service within the City. Paragraph 6(i) of the CO required the City develop and submit an Asset Management and Capacity, Management, Operation and Maintenance (AM-CMOM) Development Plan to FDEP by August 28, 2018. The CO further specifies that the AM-CMOM Program is due to FDEP within 18 months of receipt of FDEP comments on the AM-CMOM Development Plan.

The Program described herein addresses the CMOM components of the City's AM-CMOM Program. While Asset Management and CMOM overall are closely related, CMOM focuses primarily on activities that involve day-to-day operations and maintenance (O&M) of the collection system to prevent sewer spills, whereas the primary focus of the AM program is the long-term life cycle of assets and sustained performance. It is important to note that, in terms of actual implementation, the AM and CMOM programs are closely related as depicted in **Figure A1-1**. As the AM Program is presented in entirety as **Part B** along with specific introductory material, the following paragraphs focus on the CMOM elements of the AM-CMOM Program.

Figure A1-1. City of Fort Lauderdale AM-CMOM Program Structure



The CO specifically references the United States Environmental Protection Agency (EPA) publication EPA 305-B-05-002, *Guide for Evaluating Capacity, Management, Operation, and Maintenance (CMOM) Programs at Sanitary Sewer Collection Systems* (hereafter, EPA Guide) as a required guidance document for the City's CMOM program, and notes the availability of other EPA references online. While EPA guidance allows for flexibility on the part of each utility in establishing CMOM programs, in all cases CMOM will entail the implementation of standard operation and maintenance activities in conjunction with information management requirements to address the following goals:

- Properly manage, operate and maintain all parts of the collection/transmission system at all times.
- Provide adequate capacity to convey base and peak design flows throughout the system.
- Take all feasible actions to prevent Sanitary Sewer Overflows (SSOs), or discharges, and mitigate the impacts on the environment and public health of any such releases.
- Notify the public and other directly affected parties of any sewer system overflows or discharges.

The City's CMOM program is intended to address these four basic goals through a well-developed system of operational best practices that assure the sustained performance of the wastewater collection/transmission system over time.

A1.2 CMOM Program Development

The City's CMOM Program is designed to achieve the goals of CO compliance and improved collection/transmission system operation and maintenance to prevent overflows and discharges. The Program is written in accordance with the previously referenced *Guide for Evaluating Capacity, Management, Operation, and Maintenance Programs at Sanitary Sewer Collection Systems* (EPA 305-B-05-002). For clarity and to facilitate development of the CMOM Program, programmatic elements were organized into sub-programs as listed below.

1. Emergency Response Programs
    a. Sewer Overflow Response Plan
    b. Comprehensive Emergency Management Plan
2. System Evaluation and Capacity Assurance Programs
    a. Sewer System Evaluation Survey
    b. Collection System Model and Capacity Assessment
3. Engineering Design and Construction Programs
    a. Design and Construction Standards
4. Operation and Maintenance Programs

a. Gravity Sewer Operation and Maintenance
b. Pump Station and Force Main Operation and Maintenance
c. Equipment, Parts, and Tools Management
d. Underground Asset Protection Service

5. Support Programs
    a. Safety
    b. Training
    c. Information Management
    d. Budgeting
    e. Customer Service
    f. Legal Support
    g. Fats, Oils, and Grease

Each sub-program is described in detail in the remaining sections of this report. **Table A1-1** below illustrates how the sub-programs correlate to the referenced EPA guidance document.

Table A1-1: EPA Guidance Mapping to Report Sections

CMOM Components (per EPA guidance document)	Report Section Reference (Section No. and Title)
General Information – Collection System Description	A1. Introduction
Continuing Sewer Assessment Plan	A3. System Evaluation and Capacity Assurance
Collection System Management	A6. Support Programs
Organizational Structure	A1. Introduction
Training	A6. Support Programs
Communication and Customer Service	A6. Support Programs
Management Information Systems	A6. Support Programs
SSO Notification Program	A2. Emergency Response
Legal Authority	A6. Support Programs
Collection System Operation	A5. Operations and Maintenance
Budgeting	A6. Support Programs
Compliance	A1. Introduction
Water Quality Monitoring	A1. Introduction
Hydrogen Sulfide Monitoring and Control	A5. Operations and Maintenance
Safety	A6. Support Programs
Emergency Preparedness and Response	A2. Emergency Response
Modeling	A3. System Evaluation and Capacity Assurance

CMOM Components (per EPA guidance document)	Report Section Reference (Section No. and Title)
Engineering – System Mapping and As-Built Plans	A4. Engineering Design and Construction
Engineering – Design	A4. Engineering Design and Construction
Engineering – Capacity	A4. Engineering Design and Construction
Engineering – Construction	A4. Engineering Design and Construction
Lift Station Operation	A5. Operations and Maintenance
Lift Stations – Inspections	A5. Operations and Maintenance
Lift Stations – Emergencies	A5. Operations and Maintenance
Lift Stations – Emergency Response and Monitoring	A5. Operations and Maintenance
Lift Stations – Recordkeeping	A5. Operations and Maintenance
Lift Stations – Force Mains and Air/Vacuum Valves	A5. Operations and Maintenance
Equipment and Collection System Maintenance	A5. Operations and Maintenance
Maintenance Budgeting	A6. Support Programs
Planned Maintenance	A5. Operations and Maintenance
Maintenance Scheduling	A5. Operations and Maintenance
Maintenance Right of Way	A5. Operations and Maintenance
Sewer Cleaning	A5. Operations and Maintenance
Sewer Cleaning – Cleaning Equipment	A5. Operations and Maintenance
Sewer Cleaning – Chemical Cleaning and Root Removal	A5. Operations and Maintenance
Parts Inventory	A5. Operations and Maintenance
Equipment and Tools Management	A5. Operations and Maintenance
Management Information Systems – Performance Indicators	B1. Asset Management
Sewer System Evaluation Survey (SSES)	A3. System Evaluation and Capacity Assurance
SSES – Internal TV Inspection	A3. System Evaluation and Capacity Assurance
SSES – Survey and Rehabilitation	A3. System Evaluation and Capacity Assurance
SSES – Sewer Cleaning Related to I/I Reduction	A3. System Evaluation and Capacity Assurance
SSES – Flow Monitoring	A3. System Evaluation and Capacity Assurance
SSES – Smoke Testing and Dyed Water Flooding	A3. System Evaluation and Capacity Assurance
SSES – Manhole Inspection	A3. System Evaluation and Capacity Assurance
Rehabilitation	A3. System Evaluation and Capacity Assurance
Manhole Repairs	A3. System Evaluation and Capacity Assurance
Mainline Sewers	A3. System Evaluation and Capacity Assurance
Asset Management Core Questions	B. Asset Management
Current State of System Assets	B2. Asset Management
Required Level of Service	B1. Asset Management
Assets Critical to Sustained Performance	B4. Asset Management

CMOM Components (per EPA guidance document)	Report Section Reference (Section No. and Title)
Minimum Life Cycle Cost	B3. Asset Management
Long-Term Funding Strategy	B5. Asset Management

To the extent applicable, each sub-program has been developed and documented to include the elements summarized in **Table A1-2**.

Table A1-2: Sub-Program Elements

Sub-Program Element	Description
Purpose and Description	Why the program exists. Tasks, procedures, and mechanisms to accomplish the work.
Responsibilities, Resources, and Training	Responsibilities carried out by program employees, resources to achieve program goals, and specific skill requirements and instruction for employees.
Information Management and Continuous Improvement Process	Documentation to be collected and used to promote program goals. Procedures to evaluate program performance to identify opportunities for improvement. This element includes, where applicable, goals and performance measures designed to assess progress toward achievement of program goals; some programs do not have a specific performance measure whereas others have multiple measures. Section A7 addresses performance measures for all sub-programs.
Implementation Plan	For those programs requiring further development, an implementation plan with specific activities is outlined.

As part of CMOM Program development, an evaluation of the City's current CMOM-related activities and practices was conducted relative to the criteria listed in the EPA guidance documents. The assessment included interviews with various City representatives to review and further document existing practices and procedures. Relevant available documentation was also reviewed to allow assessment of each CMOM program component. This information included organizational charts, job descriptions, skills assessment checklists, budgets and other financial data, ordinances, policies, safety procedures, preventative maintenance procedures, SSO reporting and response procedures, other Standard Operating Procedures (SOPs), listing of known trouble spots, specifications, inventories, and other records. This documentation was used along with additional information learned during the interviews to develop a summary of current CMOM activities and practices.

In addition to assorted documentation and interviews as noted, two parallel City initiatives/programs warrant particular mention in association with CMOM-related "best practices":

ISO 9001

The City is certified under the ISO 9001:2015 Quality Management System. ISO 9001 is a set of quality standards that help guide over one million companies and organizations in over 170 countries, with the goal of ensuring quality is built into their management systems. Quality standards include a focus on meeting the expectations of customers, continual improvement, involved leadership, hiring and retaining engaged and mission-driven staff, and providing high quality services through a process-centered approach. Principles include collaboration across departments, ensuring accountability and transparency, and measurement of results through performance management and process improvement.

The City's Executive Strategy Team reviews identified areas for improvement and potential process improvements at regular meetings. This includes a focus on meeting the objectives established in the City's strategic plan, the Commission Annual Action Plan, and the annual budget as well as addressing requirements/expectations as informed by the annual Neighbor Survey.

Fort Lauderdale's ISO 9001 program is particularly relevant to the City's CMOM Program by virtue of the organizational and procedural framework it provides. The City has already invested significant effort in activities such as compilation of strategic management and control documents (both internally developed and available from sources external to the City), monitoring of key actions and schedules related to professional licenses for personnel and calibration of equipment, and development of an extensive list of SOPs that address activities ranging from processing of complaints to field personnel safety and procedures for routine maintenance and emergency response in the Wastewater Collection and Transmission System (WCTS). While some of the SOPs were subjected to further development under the CMOM Program, the existing framework has served as an extremely useful basis.

Effective Utility Management

The City adopted Effective Utility Management (EUM) principles in 2017 in daily operation and management of the Utility Division. *Effective Utility Management: A Primer for Water and Wastewater Utilities*, is the foundation of this approach. The EUM Primer was authored by experienced utility professionals and is intended to distill their expertise into a framework to help utilities identify and address their most pressing needs through an incremental, continual improvement management approach. The EUM framework provides a process for assessing, managing, and measuring a utility's performance to address a utility's opportunities and challenges regardless of size, budget, or other utility-specific characteristics.

The EUM Primer has four primary components intended to form the basis for a complete cycle of effective and sustainable utility management:

1. **Ten Attributes of Effectively Managed Water Sector Utilities**. Attributes providing clear reference points intended to help utilities maintain a balanced focus on all important operational areas.
2. **Five Keys to Management Success**. Approaches intended to help utilities maximize their resources and improve performance, thereby creating a workplace culture that sustains a robust foundation for strong performance in the Ten Attribute areas.
3. **Where to Begin – A Self-Assessment Tool**. A systematic self-assessment tool to help utility managers and staff evaluate their operations and identify where to begin improvement efforts.
4. **Getting to Work – Implementation of Effective Utility Management.** The Implementation section focuses on a continual improvement cycle and describes how a utility's self-assessment results can support continued planning, implementation of effective practices, measuring performance, and adjustments over time. It includes (a) a description of essential components of the EUM cycle, (b) a guide for measuring performance, (c) resources to support EUM implementation, and (d) steps for creating an Improvement Plan.

Key attributes of the City's ongoing EUM Program implementation are in alignment with CMOM Program principles and support the CMOM Program effort under the CO.

A1.3 City of Fort Lauderdale Public Works Department

The City's Public Works Department is a large provider of infrastructure services in Broward County and is responsible for delivering many of the critical services and programs that affect the daily lives of residents. The Department produces high quality drinking water; collects and treats wastewater; manages solid waste including recycling, garbage, and yard waste; and oversees construction projects that provide direct neighborhood benefits related to streets, drainage, sewers, parks, buildings, parking facilities, fire stations, streetscapes, neighborhood improvements, and more. The Public Works Department is comprised of the following:

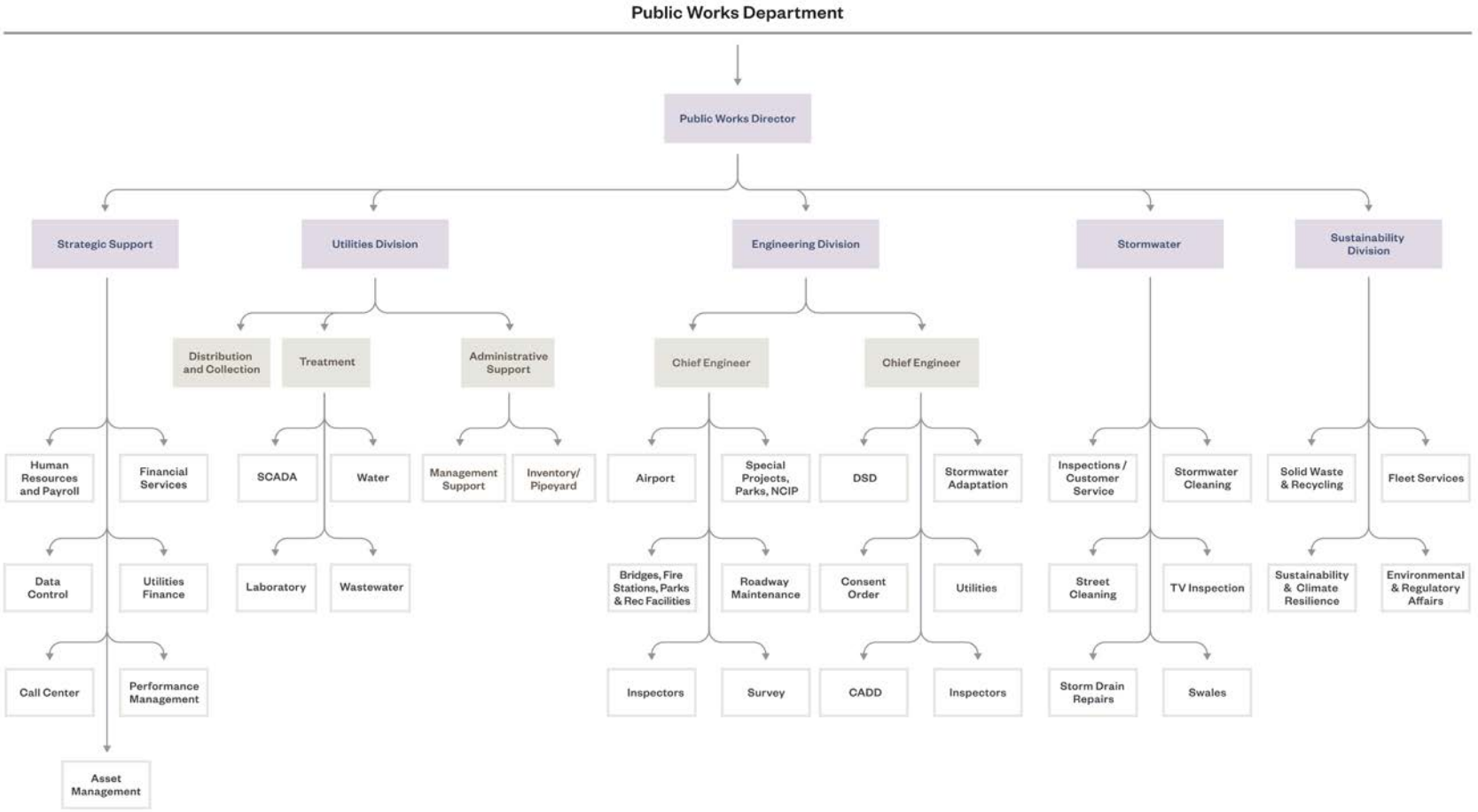
- **Engineering**. The Engineering Division is responsible for project management and implementation of upgrades and improvements to City infrastructure including sidewalks, seawalls, bridges, fire stations, water management facilities, sewer management facilities, stormwater drainage, parks, and beaches.
- **Sustainability**. The Sustainability Division is charged with implementation of the Citywide Sustainability Action Plan, optimizing conservation and efficiency within City operations, and providing essential environmental services. The Division is organized into five sections to meet its mission: Sustainability and Climate Resilience; Environmental Services and Regulatory Affairs; Solid Waste and Recycling; Fleet Services; and, Stormwater Operations. Internally, these sections promote a cultural shift

toward sustainable decision-making and integration of associated considerations into the budget process and procurement practices. The Division also serves as an internal business consultant to other City departments to integrate sustainable practices and climate resiliency into daily operations. Externally, the Division is filtering sustainable initiatives throughout the community, providing education on sustainable activities, increasing recycling, enhancing the tree canopy, improving the economic and environmental viability of the City, and working to make the region more resilient to the effects of climate change.

- **Utilities**. Within the Utilities Division, the Distributions and Collections (D&C) Section is responsible for operation, maintenance, repair, and improvements to the water distribution system as well as the wastewater collection and pumping system; the Treatment Section provides residents with safe and efficient water treatment along with wastewater treatment and disposal; and, the Environmental Laboratory, accredited through the National Environmental Laboratory, provides sampling and testing services to the City and its large users 365 days a year.
- **Administrative and Strategic Support**. Administrative and Strategic Support provides financial, budgeting, payroll/personnel, grant management and administrative support to the Department and includes the Citywide neighbor call center that delivers service and neighbor support 24 hours a day, 365 days a year.

The Public Works Department is committed to providing reliable, cost-effective, and sustainable services to Fort Lauderdale residents. Goals and best practices deriving from the CMOM Programs described herein are being incorporated into the Department's mission and operations going forward. **Figure A1-2** depicts the organizational Structure of the City's Public Works Department.

Figure A1-2: Public Works Department Organizational Structure



A1.4 Service Area Description

The total sewer service area of Fort Lauderdale comprises approximately 482 miles of gravity sewer, 174 pump stations, 3 repump stations, and 111 miles of force mains. Most of the collection system is over 50 years old. Sanitary flows are conveyed to the George T. Lohmeyer Wastewater Treatment Plant (GTL WWTP) for treatment and disposal. Fort Lauderdale also provides treatment and disposal for wastewater collected by portions of unincorporated Broward County as well as Port Everglades and the Cities of Davie, Tamarac, Oakland Park, and Wilton Manors. **Figure A1-3** depicts the City's wastewater service area.

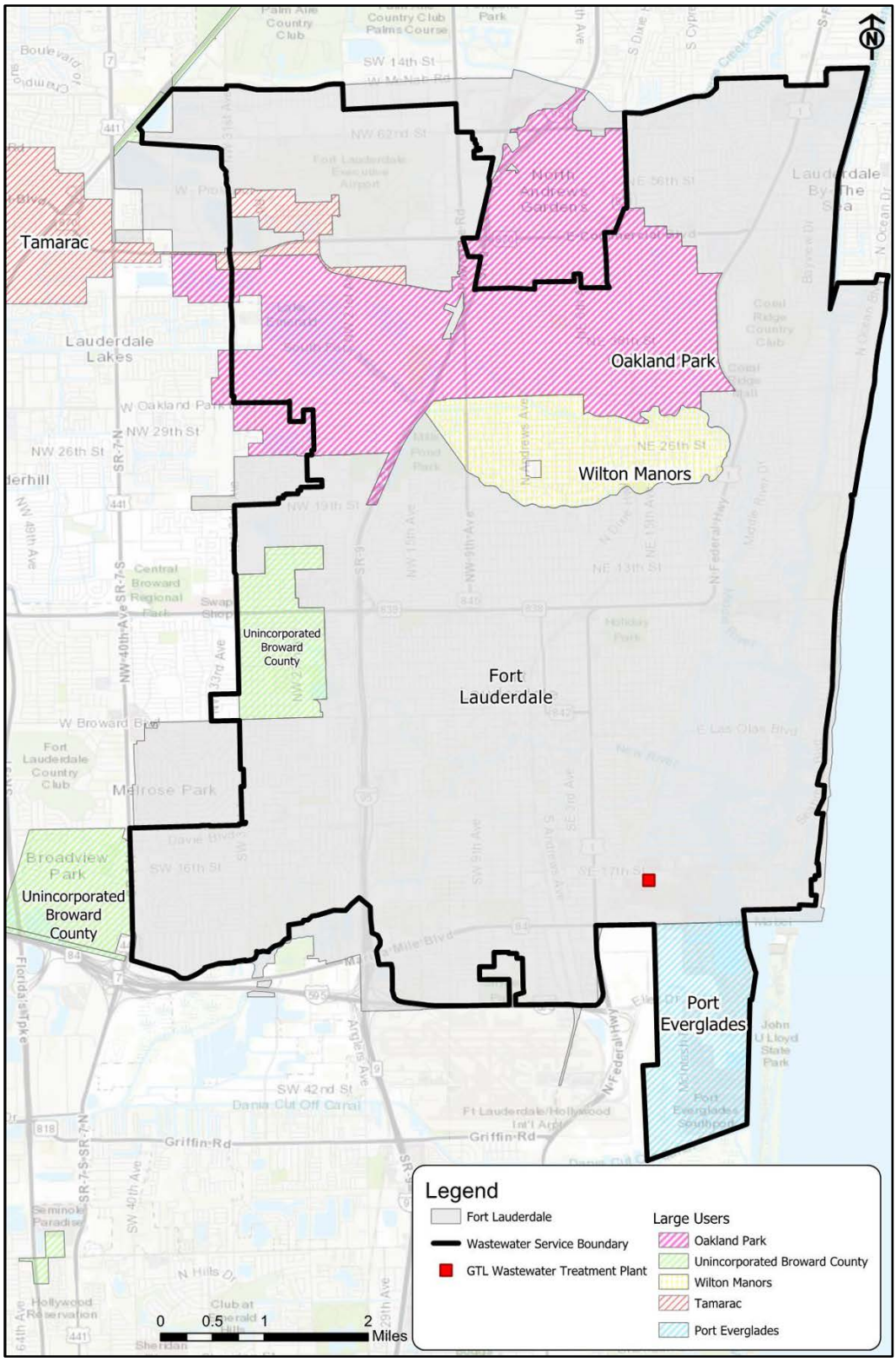


Figure A1-3: Fort Lauderdale Wastewater Service Area

A1.5 Organizational Structure

The Wastewater Collection and Transmission System is maintained within the Public Works Department as described above. **Figure A1-4** depicts a citywide organizational chart identifying the Public Works Department along with other departments comprising the City's overall organization for delivery of services to residents.

CITY OF FORT LAUDERDALE ORGANIZATIONAL CHART

WE BUILD COMMUNITY

CITY OF FORT LAUDERDALE NEIGHBORS

MAYOR AND CITY COMMISSIONERS
Mayor Dean J. Trantalis
Commissioner Heather Moraitis, District I
Vice Mayor Steven Glassman, District II
Commissioner Robert L. McKinzie, District III
Commissioner Ben Sorensen, District IV

ADVISORY BOARDS/ COMMITTEES

CITY CLERK
Jeffrey A. Modarelli

CITY MANAGER
Chris Lagerbloom

- Agenda Coordinator
- Budget/CIP & Grants
- Community Redevelopment Agency
- Nighttime Economy
- Real Estate

CITY ATTORNEY
Alain E. Boileau

CITY AUDITOR
John Herbst

INTERIM ASSISTANT CITY MANAGER
Vacant

- Housing & Community Development
- Office of Professional Standards
- Structural Innovation

DEPUTY CITY MANAGER
Roberto "Rob" Hernandez

- Neighbor Support
- Strategic Communications

Chief Financial Officer
Linda Short

- Accounting & Financial Reporting
- Utility Billing & Collection
- Procurement
- Revenue & Debt
- Business Tax

INFORMATION TECHNOLOGY SERVICES
Andrew Parker

- Application Services
- IT Security
- GIS
- Communications
- Mail Services
- Infrastructure & Operations
- Police ITS

HUMAN RESOURCES
Tarlesha Smith

- Talent Management
- Employee Relations
- Risk Management

POLICE
Rick Maglione

- Office of the Chief
- Operations
- Support Services
- Investigations

FIRE-RESCUE
Rhoda Mae Kerr

- Office of the Chief
- Operations

PUBLIC WORKS
Raj Verma

- Engineering
- Sustainability
- Utilities

PARKS & RECREATION
Philip Thornburg

- Special Facilities & Administration
- Recreation
- Parks
- Marine Facilities
- Facilities Maintenance

TRANSPORTATION & MOBILITY
Ben Rogers

- Transportation
- Executive Airport
- Parking Services

SUSTAINABLE DEVELOPMENT
Anthony Gregory Fajardo

- Building Services
- Code Enforcement
- Economic & Community Reinvestment
- Urban Design & Planning

Revised: 6/27/2019

Section A2

Emergency Response

A2. Emergency Response

Three CMOM programs are related to Emergency Response as follows:

- Sanitary Sewer Overflow Response Plan.
- Comprehensive Emergency Management Plan.
- Continuity of Operations Plan.

A2.1 Sewer Overflow Response Plan

A2.1.1 Purpose and Description

Rapid response to overflows and discharges helps minimize negative impacts to public health, water quality, the environment, and private property. The Sanitary Sewer Overflow Response Plan (SSORP) is designed to ensure that appropriate resources are applied to all SSOs immediately upon awareness of the incident.

The purpose of the SSORP is to establish and document standardized processes and procedures to:

- Protect public health and the environment by reducing the effects of SSOs
- Provide a coordinated response to SSOs
- Improve communication at all levels, including external communication with regulatory agencies, property owners, and the media

SSORP goals are to:

- Efficiently respond to, clean up, and minimize the impact of SSOs and Building Backups
- Promptly notify potentially impacted public, customers, and agencies during and following SSO and Building Backup events through coordinated communications and outreach
- Accurately report SSO and Building Backup information and data, especially estimated volumes, durations, causes, and potential impacts
- Proactively prevent, reduce, or otherwise control SSOs and Building Backups to protect public health and the environment
- Provide high quality customer service
- Maximize regulatory compliance

The City's SSORP identifies measures to mitigate the impacts of an SSO and to protect public health and the environment. The SSORP is included as **Appendix AA** of this report.

A2.1.2 Responsibilities, Resources, and Training

The City has developed detailed plans to mobilize labor, materials, tools, and equipment to correct or repair any condition that may cause or contribute to an unpermitted discharge. **Table A2-1** is an overview of the emergency response plan elements, City staff responsible for each element, and the SSORP section that addresses the plan element. As detailed in the SSORP, these roles may be delegated depending on the magnitude and the potential impact of the spill event.

Table A2-1: Personnel Responsible for Implementing Response Procedures

Response Plan Element	Responsible Party	SSORP Section
Dispatch Field Investigation Crew and contact Utilities Division Manager, Environmental and Regulatory Affairs, and Strategic Communications Office	Customer Service Call Center	3.2
Verify that discharge is an SSO	On-call Field Investigation Crew	4.1
Notification of Key Personnel	Customer Service Call Center	3.2
Contain Overflow	Field crews led by the D&C Manager[1]	4.2.1
Correct Overflow	Field crews led by the D&C Manager[2]	4.2.2
Clean-Up Procedures for Public SSO	Field crews led by the D&C Manager[1]	4.2.3
Respond to spills within the GTL fence line	Field crews led by the GTL WWTP Manager	4.1.2
Clean-Up Procedures for Building Backup	Contractor	4.2.3
Verbal notification to agencies	Environmental and Regulatory Affairs	5.3.1
Written notification to agencies	Environmental and Regulatory Affairs	5.3.2
Public and media communications	Strategic Communications Office	5.2
Sample Collection (if applicable)	Environmental and Regulatory Affairs	6.1
Sample Lab Work (if applicable)	Environmental Lab Staff	6.1
Follow-up Volume Determination	D&C Manager	6.3
Follow-up Cause Determination	D&C Manager	6.4

1Authority is delegated to an Incident Commander as deemed appropriate by the D&C Manager.

2 Circumstances may arise when the City relies on the support of private-sector construction assistance. This is particularly true in cases involving large pipes buried to such depths as may require sheet piling and dewatering, or aerial force main canal crossings that require heavy equipment not owned by the maintenance or repair units. These non-standard operations may be assigned to heavy construction contractors on City's list of pre-approved emergency contractors.

The City conducts routine SSORP training workshops with managers and key personnel to review established emergency response activities and current SSORP procedures and protocols. The training is led by the Environmental and Regulatory Affairs (ERA) Section. All CMOM program staff members receive formal training, specifically involving staff with responsibilities for each phase of SSO response including:

- Receiving initial incident notifications
- Mobilizing to the field in response of reported incidents

- Reporting to the proper authorities and managing follow-up sampling and documentation as applicable

Training workshops are held on an as-needed basis to achieve the following goals:

- Provide new or reassigned personnel who may be involved in a discharge event with an overall understanding of the response actions.
- Inform staff following any changes or updates to regulations or policy.
- Serve as a refresher on emergency response procedures, safety, and public health/environmental protective measures.

The presentation used for the 2019 SSO Training is provided in the SSORP. Training sessions and attendees are documented and tracked as a performance measure.

A2.1.3 Information Management and Continuous Improvement Process

The City maintains all records documenting response actions taken and measures to prevent the SSO from recurring. These records are maintained for a period of at least five years. Specifically, the required records include:

- Q-Alert work order records
- Broward County and FDEP reports and forms
- Water quality sampling results
- Building backup and claims documentation

These materials are retained and stored under the City records management archival and retention protocols for electronic and paper documents and records. As part of the GIS-centric Cityworks implementation, the City will also retain additional information including work order detail and incident locations.

The City has adopted a number of initial Key Performance Indicators (KPIs) to meet SSORP goals, and to ensure that successes are properly documented and reported. These KPIs will assess the overall effectiveness of the SSORP and enable the City to make adjustments in the program to achieve the established performance goal. **Table A2-2** presents the KPIs that the City will employ to measure, track, and report performance of the SSO and Building Backup reporting, response, and prevention activities, along with the initial target for each. These performance measures are calculated monthly and subject to semi-annual and annual evaluations.

Table A2-2: Performance Goals

Key Performance Indicator	Target
Annual average SSO response time[1]	90 minutes
Annual average SSO control time[2]	
For small diameter gravity sewers	90 minutes
For large diameter gravity sewers	120 minutes
For force mains	120 minutes
For pump stations	4 hours
For Regional Pump Stations[3]	8 hours
Annual number of SSO events per 100 miles of gravity sewer[4]	< 7 per 100 miles
Annual number of pump station related SSO events per 100 pump stations[5]	< 1 per 100 pump stations
Annual hours of SSORP preparedness training per employee[6]	1 hour

Table Notes:

[1]Average of the time from the initial notification at the Customer Service Call Center until the time the City response crew arrives on-site for all confirmed SSO events, excluding Building Backups, occurring during the previous year.

[2]Average of the time from the City response crew arrival on-site until the time of SSO discharge, excluding Building Backups, from the stated asset is stopped for SSO events occurring during the previous year.

[3]Regional Pump Stations are stations categorized as "regional" through a combination of station function and geographic location. Regional stations typically receive flow from other lift stations and were frequently constructed to replace small package-type wastewater treatment facilities that had been acquired by the City.

[4]Annual number of confirmed gravity sewer related SSO events divided by the year-end total miles of gravity sewer within the wastewater collection system for the previous year.

[5]Annual number of confirmed pump station related SSO events divided by the year-end total number of the City owned and maintained pump stations within the WCTS for the previous year.

[6]Total hours of SSORP preparedness training divided by the number of City staff assigned to SSO response crew duties during the previous year.

The performance measures will be evaluated annually, and lessons learned will be noted to enable the City to continuously improve the SSORP and other programs. The review of KPIs will also include review of other CMOM Programs, changing conditions, revisions to regulatory requirements, and other factors that may impact the SSO response, reporting, or prevention activities. A formal annual meeting to review KPIs is suggested in the implementation plan. As the SSORP matures, less frequent evaluations may be recommended.

A2.1.4 Implementation Plan

The majority of the SSORP is fully implemented at this time. Below presents the implementation plan for development of specific additional activities. Note the Reference Number corresponds to the specific activity/task as presented in Part C, *Program Schedules*.

A2.1-1 Add SSO locations and associated SSO information to the current GIS database.

A2.1-2 Establish a formal annual KPI review meeting to evaluate possible SSORP modifications/improvements, define associated implementation procedures, and assess progress in implementation of previously adopted modifications/improvements.

A2.2 Comprehensive Emergency Management Plan

A2.2.1 Purpose and Description

The City of Fort Lauderdale developed a Comprehensive Emergency Management Plan (CEMP) outlining procedures for responding to a disaster. The CEMP is a confidential document, which is only distributed and accessible to specific City employees. The CEMP addresses preparedness and response for utility operations as well as City operations more broadly.

The CEMP establishes a complete framework for planning the actions needed to protect the welfare of the community from the effects of emergencies and disasters. The plan defines the policies, organizational structure and responsibilities, and operational concepts necessary for the City to accomplish this purpose. The CEMP is intended to provide guidance during all phases of emergency management including preparedness, response, recovery and mitigation.

The City's CEMP was developed in accordance with Florida Statutes Chapter 252, which mandates counties in the State of Florida to develop and maintain a CEMP that is consistent with the state-level CEMP and its associated programs. The design of the City of Fort Lauderdale CEMP also reflects this objective.

The CEMP outlines procedure for responding to both natural and human-caused disasters. Natural hazards that could affect the City's water and wastewater system are as summarized below.

Natural	Human
• Coastal and interior flooding • Drought • Extreme cold • Extreme heat and sun • Hurricanes • Thunderstorms and lighting • Tornadoes	• Hazardous materials spills or releases • Urban fires • Terrorism

A2.2.2 Responsibilities, Resources, and Training

In the event of a disaster, the City will immediately deploy resources to assist the City's population, protect property, prevent further damage, and preserve valuable environmental resources. Response resources will be generated from areas of the City that have not been impacted by the disaster as well as from Broward County, the State, and if necessary the federal government to achieve an adequate level of emergency response.

The City's Domestic Preparedness and Emergency Management Bureau (DPEMB) is responsible for implementing the CEMP and ensuring that that the City is prepared to respond, recover from, and mitigate any hazardous situations that the government, neighborhoods, institutions and businesses may need to confront. The DPEMB is also responsible for developing, organizing, and facilitating classroom training and disaster preparedness exercises for the City.

A2.2.3 Information Management and Continuous Improvement Process

The City maintains all records documenting response actions taken and follow-up measures. These materials are retained and stored under the City records management archival and retention protocols for electronic and paper documents and records.

The City periodically re-evaluates and updates the CEMP, when deemed appropriate or as needed to meet the requirements of the legislation.

A2.2.4 Implementation Plan

The CEMP will not be modified as part of CMOM implementation.

A2.3 Continuity of Operations Plan

A2.3.1 Purpose and Description

The City of Fort Lauderdale Public Works Department (PWD) also developed a Continuity of Operations Plan (COOP) in accordance with recommendations provided in FEMA's Federal Continuity Directive 1 (FCD 1). The COOP is a confidential document focused on PWD procedures and is only accessible to PWD employees. The COOP establishes policy and guidance to ensure the execution of mission-essential functions in the event that an emergency threatens or incapacitates operations and requires the relocation of specific personnel and essential facility functions.

The purpose of the COOP is to establish the capability to ensure continuation of essential functions across a wide range of potential emergencies, particularly when a primary facility is either threatened or inaccessible. COOP objectives include the following:

- Ensure the continuous performance of essential functions/operations during an emergency. Ensure that PWD staff are prepared to respond to and recover from emergencies, mitigate the associated impacts, and provide critical services in an environment that is threatened, diminished, or incapacitated. Provide a means of information coordination to ensure uninterrupted communications with City staff and externally to all identified critical neighbors and stakeholders.
- Protect essential facilities, equipment, records, and other assets.
- Reduce or mitigate disruptions to operations.

- Prevent or minimize loss of life and damage to property.
- Designate principals and support staff to be relocated.
- Guide and facilitate decision-making for COOP execution and subsequent conduct of operations. Provide timely direction, control, and coordination to the PWD leadership and other critical individuals before, during, and after an event or upon notification of a threat.
- Promote timely and orderly recovery from emergency operations and resumption of normal operating conditions as soon as possible, depending on circumstances and the threat environment.

Situations having the potential to require COOP implementation are as summarized below.

• Biological Hazards • Bomb Threats • Civil Unrest • Cyber Security Attacks • Fire in Buildings • Flooding • Hazardous Materials Accidents	• Hurricanes or Tropical Storms • Power Interruption • Severe Thunderstorms • Technological System Failures • Transportation Accidents • Terrorist Threat or Attack

A2.3.2 Responsibilities, Resources, and Training

The COOP is maintained by the Public Works Department. All four Divisions within Public Works (Utilities, Engineering, Administrative and Strategic Support, and Sustainability) have responsibilities within the COOP including the following activities:

- Conduct pre- and post-incident assessments of public works and infrastructure.
- Execute emergency contract support for life-saving and life-sustaining services.
- Provide technical assistance to include engineering expertise and construction management.
- Conduct emergency repairs to damaged public infrastructure and critical facilities.
- Coordinate emergency response efforts with Department of Homeland Security (DHS)/Federal Emergency Management Agency (FEMA) and other state, federal and local agencies as needed.

A2.3.3 Information Management and Continuous Improvement Process

The City maintains all records documenting response actions taken and follow-up measures. These materials are retained and stored under the City records management archival and retention protocols for electronic and paper documents and records.

The City periodically re-evaluates and updates the CEMP, when deemed appropriate or as needed to meet the requirements of the legislation. In accordance with emergency management principles, a viable COOP must achieve the following standards and capabilities:

- Be maintained at a high level of readiness.
- Be capable of implementation, both with and without warning.
- Be operational no later than 12 hours after activation.
- Be capable of maintaining sustained operations for up to 30 days.
- Utilize existing local, state, or federal government infrastructure to maximum advantage.

A2.3.4 Implementation Plan

The COOP will not be modified as part of CMOM implementation.

Section A3

System Evaluation and Capacity Assurance Programs

A3. System Evaluation and Capacity Assurance Programs

Two CMOM programs are related to System Evaluation and Capacity Assurance as follow:

- Sewer System Evaluation Survey.
- Collection System Model and Capacity Assessment.

A3.1 Sewer System Evaluation Survey

A3.1.1 Purpose and Description

Purpose

The Sanitary Sewer Evaluation Survey (SSES) program is central to several of the specific level of service targets affecting the gravity collection system identified in the Asset Management Program (see Part B), specifically including the following:

- Provide uninterrupted sanitary sewer service without back-ups or overflows.
- Limit excessive infiltration and inflow (I/I).
- Provide suitable maintenance and replacement of aging components to meet present and future demands.
- Develop and manage business processes to update asset condition on an ongoing basis.

Specific objectives of the SSES and I/I reduction program are summarized below.

- Continue I/I reduction to decrease system wastewater flows and (a) lower the costs of collection, pumping, treatment, and disposal; (b) reduce the potential that I/I may overburden the system and lead to overflows; and (c) increase service reliability and system capacity for the benefit of current and future customers.
- Maintain quality and reliability of service to wastewater customers through early identification and correction of problems in the system.
- Create additional system capacity for base and peak flows.
- Reduce long-term sewer infrastructure preservation costs by proactively repairing lines prior to advanced degradation.
- Reduce high-cost emergency repairs by identifying and repairing lines in a state of very poor condition or imminent failure.
- Focus and conserve resources by identifying and prioritizing short- and long-term actions to address structural deficiencies in the system, and by lowering priority for those portions of the system that are in good condition.

- Strengthen preventive O&M activities by identifying lines that are susceptible to recurring blockages due to surcharging, excessive grease buildup, dips, inadequate slopes, offset joints, or heavy root intrusion; these lines can then be placed on a program of regular maintenance cleanings to pre-empt a potential blockage and SSO.
- Reduce costs from SSO response including in-home backups and related cleanup expenses.
- Reduce potential enforcement liability, both by reducing the probability of SSOs and through the creation of an *affirmative defense*; that is, a demonstration that the utility has a program in place to avoid SSOs.

The City's commitment to continuing investigation and rehabilitation activities in the wastewater collection system supports the objective of maintaining a well-functioning and reliable collection system to provide improved service to the community at a lower cost to the utility. Section 6 discusses related O&M procedures.

Description

Paragraph 6(d) of the CO requires that the City complete the I/I reduction projects listed in Exhibit B of the CO, to reduce flows and lower peak demands and stresses on the system during rain events. As this work is required to be completed by September of 2020, the City is currently focusing its SSES and I/I reduction program on the Exhibit B collection basins. These were previously identified as representing top priorities for I./I reduction, and include Basins A07, A18, A19, A21, D40, and D43. A figure depicting sanitary sewer basins within the City is provided in Section 4.2.1. As part of this program, the City has prequalified multiple specialty rehabilitation contractors to enable competitive solicitation and award of task orders on an expedited basis, and is managing an ongoing corrective action program consisting of excavated repairs and cured-in-place lining of gravity mains and laterals as well as manhole rehabilitation.

Following completion of the referenced Exhibit B basins, the City intends to continue the SSES and I/I reduction program throughout the gravity collection system using a stepwise methodology as outlined below.

1. Compare system-wide water usage and wastewater flow records for recent years. Characterize the overall system based on I/I severity and the approximate proportions of infiltration, inflow, and wastewater.
2. Develop a wastewater flow database for each pump station using the best available methods. In general, the City's SCADA system will be utilized to develop flow hydrographs for pump stations, using date-and-time-stamped level data along with wet well fill volumes.
3. Analyze wastewater flow data considering selected wet weather events and periods of tidal influence, as well as the "night flow" time period between 1:00 AM and 5:00 AM when actual wastewater flow from customers is minimal and the majority of flow is infiltration (and in the case of wet weather, inflow). Groundwater elevation is also

integrated into this analysis.

4. Prioritize basins by I/I severity so that follow-up inspection and rehabilitation work can be focused on those areas where the greatest I/I reduction potential exists. Inspection work in priority basins will include smoke testing to identify sources of inflow as well as manhole inspections and closed-circuit video inspection of gravity mains and laterals. Night flow isolation may be used in specific instances to allow expedited identification of portions of the gravity system generating the highest I/I flows.
5. Process, evaluate, and electronically store the results of inspection activities. Estimate flow rates associated with I/I sources and develop repair recommendations with preliminary repair cost estimates.
6. Prioritize the recommended rehabilitation work based on cost-effectiveness and other factors. Rehabilitation of a collection system main line, manhole or service line is typically termed "cost-effective" when the cost of rehabilitation to remove a given amount of extraneous flow is less than the cost of continuing to transport, treat, and dispose of that same amount of extraneous flow over some specified number of years. In addition to cost-effectiveness, factors such as structural condition, public nuisance, health hazards, system hydraulics, and operation and maintenance demand may become the determining factor as to whether a given repair is assigned a higher priority for rehabilitation.
7. Organize the sewer rehabilitation activities into task assignments to be implemented through the bid awards or piggyback contracts as applicable. Each task assignment includes the scope of work, working drawings, estimated quantities, schedule requirements, and any unique services required of the contractor. The City has previously used an expedited bidding process with pre-qualified contractors as noted.
8. Following completion of rehabilitation activities, conduct flow monitoring under varied wet and dry weather conditions, groundwater elevations, and tidal conditions as applicable to assess the effectiveness of the I/I reduction work.

While the City generally expects to establish investigation and rehabilitation priorities as outlined above, other factors may affect prioritization including considerations related to the criticality of major drainage basins, Nominal Average Pump Operating Time (NAPOT) readings, and other conditions concerning the collection system overall. It is noted that the City also has a goal of cleaning and televising the entire collection system on a ten-year cycle, and has deployed two full-time trucks/crews for that purpose. In addition to addressing emergencies and cleaning sewer line segments that are known to have chronic problems, this allows the City to evaluate sewer condition and identify sources of I/I as well as structural issues requiring correction. Accordingly, condition assessment information generated through this routine cleaning/televising program will also influence prioritization for follow-up investigation and/or corrective action.

The City's CCTV trucks utilize Pipe Logic and Granite software to capture the video and record defects and observations using the industry standard NASSCO Pipeline Assessment Certification Program (PACP) coding. PACP has clearly defined defect codes and a scoring system for pipe condition in terms of both structural and O&M criteria. In addition to defects, the inspections data records contain other valuable asset information such as length, materials, sizes, and location of lateral connections. Therefore, the City's routine cleaning/televising program also supports its level of service objectives of providing suitable maintenance and replacement of aging components as well as updating asset condition on an ongoing basis.

A3.1.2 Responsibilities, Resources, and Training

The SSES program is primarily managed by Public Works Department engineering staff, although the routine cleaning/televising program is conducted by Distribution/Collection personnel in the Utilities Division using City-owned vehicles and equipment as noted. Investigation and rehabilitation work for the CO Exhibit B basins has relied heavily on contracted resources via the use of pre-qualified contractors.

As the SSES program is expanded to encompass the gravity collection system overall, allocation of responsibilities and the need for additional resources and training will require reassessment. This consideration is addressed under Implementation Plan below.

A3.1.3 Information Management and Continuous Improvement Process

The City maintains and stores all records based on records management archival and retention protocols for electronic and paper documents and records. In the case of SSES-related inspection and rehabilitation activities, the Cityworks Asset Management System (AMS) is intended to provide key support related to long-range planning, life-cycle costing, proactive operations and maintenance, and capital replacement planning activities as outlined below.

- Provide residence for the gravity system asset inventory in ArcGIS geodatabases.
- Support existing City-defined service requests, work orders, and inspections. Provide full life-cycle management of work order and asset management information requirements.
- Store all service request, work order and inspection data for gravity sewers and provide integration with gravity sewer CCTV software.
- Track operation and maintenance costs including labor, equipment, and materials; asset condition and risk scores; and, system performance to inform budgeting as well as repair/renewal/replacement needs and priorities.
- Allow future integration with the Assetic suite of decision support tools, to further extend the Cityworks AMS solution and provide the ability to predict and analyze asset risk, develop long-term infrastructure investment plans, and inform asset management decision processes.

The City will periodically evaluate the effectiveness of the SSES and I/I reduction program using documented flow reductions and other criteria. Methodologies will be adapted as required to ensure that the objectives of the program are being promoted and achieved.

A3.1.4 Implementation Plan

While portions of the SSES Program are fully implemented at this time, an implementation plan for development of specific additional activities is intended as outlined herein. Note that the Reference Number corresponds to the specific activity/task as presented in Part C, *Program Schedules*.

A3.1-1 Formally designate SSES Program management and support staff. Develop SOPs for flow data analysis, basin prioritization, manhole inspection, smoke testing, video review/interpretation, and repair selection/prioritization.

A3.1-2 In view of system-wide program goals, assess the need for additional resources and training. This assessment should specifically include consideration of resources and training to ensure that Cityworks is being used to its full potential in support of the program.

A3.1-3 Establish a formal SSES Program review meeting to identify lessons learned, evaluate possible modifications/improvements and define associated implementation procedures, and assess progress in implementation of previously adopted modifications/improvements.

A3.2 Collection System Model and Capacity Assessment

A3.2.1 Purpose and Description

Paragraph 6(j) of the CO requires that the City conduct a capacity evaluation of the collection/transmission system including all gravity mains, pump stations, and force mains and submit a Capacity Evaluation Report (CER) to document the work. The CER is required to summarize the capacity of the City's wastewater collection system under the storm event specified in the CO and identify pipelines and/or pump stations with insufficient capacity for current and projected demands.

For the capacity evaluation of the City's gravity collection system, a desktop analysis of the gravity lines for each basin was performed in Microsoft Excel. The gravity system in each basin was analyzed individually to study its capacity under a 6-inch of rainfall in 24 hours using the South Florida Water Management District rainfall distribution. The rainfall is distributed using the South Florida Water Management District's 24-hour rainfall distribution.

Next, to perform the capacity evaluation of the City's force main system and pump stations, a Consent Order Wastewater Transmission Model (COWTM) was developed using Innovyze® InfoWater modeling software. To populate the model, existing facility information was derived

from the City's GIS 2018 Database, the City's as-built drawings, and other City records. The hydraulic model was then hydraulically calibrated to confirm that the computer simulation will accurately estimate the operation of the transmission system under dry weather flow and wet weather flow conditions. The calibration consisted of comparing simulated pressures, levels and flows with actual observed data during a significant rain event and during dry weather. As a result of the comparison, certain model parameters were adjusted such that the predicted values more closely matched measured SCADA values.

Inflow hydrographs were developed for each pump station using estimates for each of three flow components: base sanitary flow (BSF), groundwater infiltration (GWI), and rain-derived inflow and infiltration (RDII). Base sanitary flow was determined after analyzing GTL flows in HazenQ and subtracting GWI. HazenQ is a proprietary modeling software developed by Hazen and Sawyer to review and analyze timeseries data, including wastewater and rainfall information. Also, GWI was determined by evaluating a linear relationship between GWI estimates in HazenQ and a factor "K" defined for all basins based on pipe characteristics. Lastly, RDII was estimated by the RTK method which involves creating 3 triangular hydrographs to describe the fast, medium, and slow RDII responses.

Two wet weather flow scenarios meeting the CO design storm event were then evaluated, and the scenario judged to present a more realistic scenario for the City was chosen to supply the model. The selected scenario simulates the June 2017 rainfall event with total rainfall of 6-inches in 24 hours and represents the actual rainfall event occurring between June 5-8, 2017. Capacity assessment criteria are as summarized below.

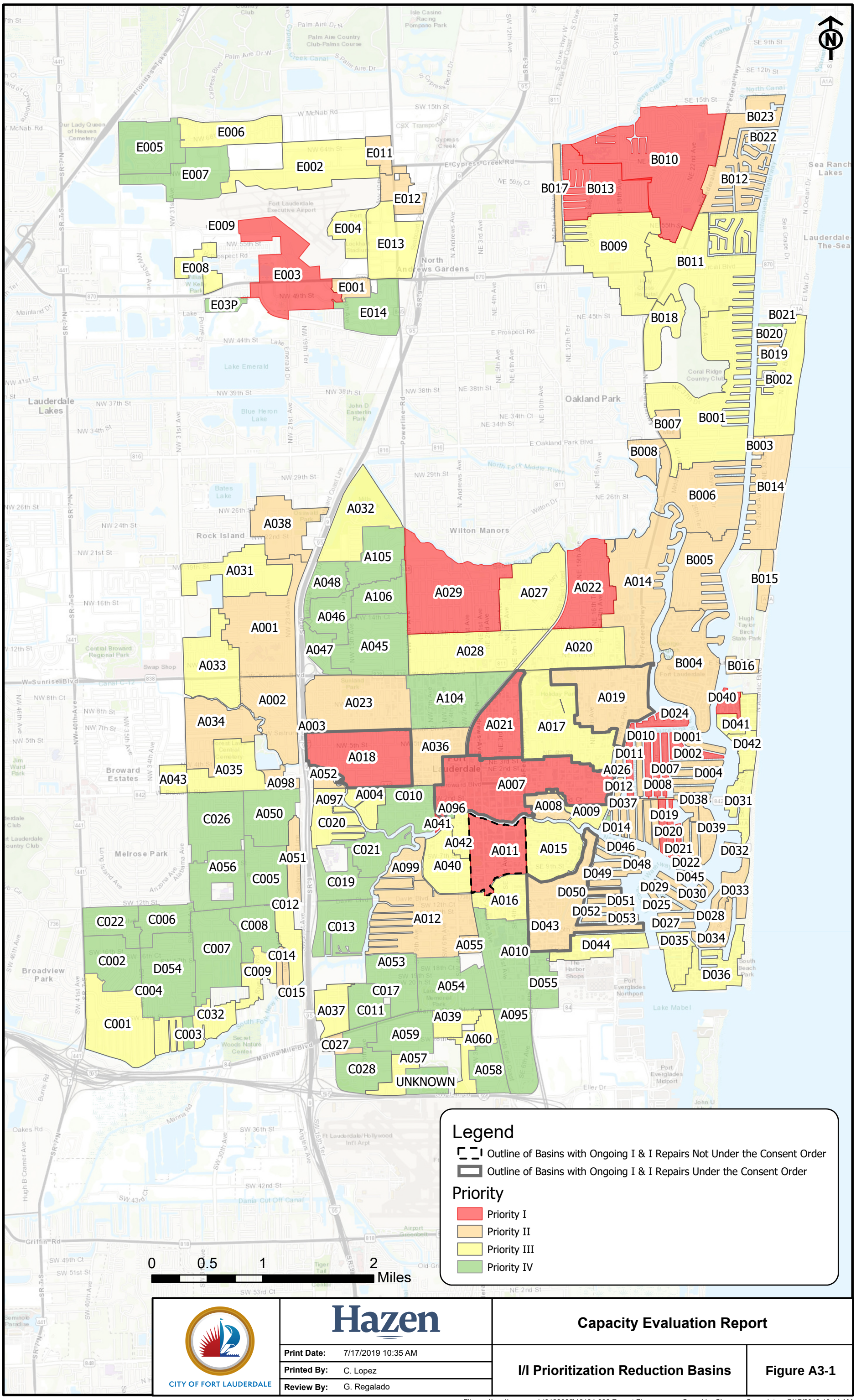
Assessment Criteria	Reference for Comparison
Force main velocity	Less than 8 feet per second (fps)
Head loss in the force main	Less than 50 feet per 1,000 feet of force main
Pump station run time	Pump station run time during dry conditions
Maximum level in wet well of pump station	Groundwater Elevation: 0.2 foot below the average groundwater elevation in the basin
Maximum level in wet well of pump station	Ground Elevation: 1 foot below ground elevation at the pump station slab

Model results for the selected scenario are as summarized below.

1. Ninety-nine percent of the force mains meet the velocity and head loss requirements.

2. Twenty of the 177 pump stations modeled do not meet the groundwater criteria.
3. Fifteen of the 177 pump stations modeled do not meet the ground elevation criteria.

The CER presents recommendations for upgrading system components that do not meet the evaluation criteria. The CER further identified basins estimated to have a larger I/I component for prioritization in the City's I/I reduction program, due to the importance of reducing the RDII component of flows to avoid SSOs. Priority levels were assigned based on model results to certain basins as depicted in **Figure A3-1.**



Plot date: 7/17/2019 10:35 AM By: CLopez
Serivce Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

CITY OF FORT LAUDERDALE

Hazen

Capacity Evaluation Report

Print Date:	7/17/2019 10:35 AM
Printed By:	C. Lopez
Review By:	G. Regalado

I/I Prioritization Reduction Basins

Figure A3-1

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The CER was prepared as part of the City's Project 12368, Sewer Design and Implementation Program, Task Order 08, and was submitted July 22, 2019.

A3.2.2 Responsibilities, Resources, and Training

The City has a Development Review Committee (DRC) that reviews new development for concurrency with sewer capacity and other factors. The DRC is made up of City staff representing various City departments and divisions including Urban Design & Planning, Engineering, Transportation, Sanitation, Police and Fire, among others who provide their respective discipline's input regarding development applications subject to the development review provisions of the City's Code.

The Collection System Model and Capacity Assessment was initiated by Public Works Department engineering staff, working in conjunction with contracted resources for hydraulic model development, calibration, and demand scenario simulation.

As findings and recommendations from the model are refined and prioritized for design and implementation, allocation of responsibilities and the need for additional resources and training will require reassessment. This consideration is addressed under the Implementation Plan below.

A3.2.3 Information Management and Continuous Improvement Process

The City retains all project records under the City records management archival and retention protocols for electronic and paper documents and records. The Consent Order Wastewater Transmission Model, developed using Innovyze® InfoWater modeling software, is subject to City Information Technology (IT) policies concerning storage, access and backup.

The model will require periodic re-evaluation and updating as improvements are constructed in the system and the physical infrastructure changes. Similarly, alternative modelling scenarios may require evaluation in the event of changes to design storms, assessment criteria, and/or operational imperatives. In cases where certain assumptions were necessary to achieve buildout of the model within the modelling software, or for calibration and modelling of selected flow conditions, such assumptions will be replaced with verified field data as asset attributes are more comprehensively defined and overall data collection efforts gain maturity.

A3.2.4 Implementation Plan

The CER presents recommendations for upgrading system components that do not meet the evaluation criteria as noted. The CER further identified basins estimated to have a larger I/I component for prioritization in the City's I/I reduction program, due to the importance of reducing the RDII component of flows to avoid SSOs. Based on this evaluation, a series of follow-on tasks are required relating to the prioritization and timing of the recommended improvements as summarized below. It is noted that related activities were initiated during 2019 under an extension of modeling services, including development of a Capital Improvement Project list as well as SOPs for allocation approvals. Note that the Reference Number corresponds to the specific activity/task as presented in Part C, *Program Schedules*.

A3.2-1 Formally designate management and support staff for implementation of the recommended pump station and force main improvements. Develop a prioritization, taking into account timing and potential benefits of related I/I reduction efforts.

A3.2-2 In view of the ongoing need for the City to maintain an accurate and calibrated hydraulic model, as well as to periodically assess alternative improvements and demand scenarios, determine a strategy regarding resources and training. Such a strategy should reflect an appropriate blend of in-house capabilities and contracted specialty expertise.

A3.2-3 Review existing SOPs to ensure adequate procedures are in place to evaluate the ability of gravity collection piping, pump stations, and force mains to accommodate requests for new service and/or additional capacity. SOPs should specifically include procedures to conduct hydraulic modeling using appropriate flow data, and processes to update the hydraulic model as needed to evaluate and track capacity requests and reservations.

A3.2-4 Establish a formal Pump Station Improvement Program review meeting to identify lessons learned, evaluate possible modifications/improvements and define associated implementation procedures, and assess progress in implementation of previously adopted modifications/improvements.

Section A4

Engineering Design and Construction Program

A4. Engineering Design and Construction Program

A4.1 Design and Construction Process

A4.1.1 Purpose and Description

The Engineering Department has implemented a standard design and construction process for all upgrades and new construction affecting the City's infrastructure. Guiding this process are Design and Construction Standards that provide detailed requirements for all sewer construction projects, to ensure that materials and installation practices meet the City's technical specifications and completed installations will perform as intended.

Depending on project locations, jurisdiction may fall under the State of Florida, Florida Department of Transportation, Broward County, a private railroad company, or even federal authority. Each has its respective permits and standard details. The standard details for the City can be found on the City's website (https://www.fortlauderdale.gov/) and are provided for reference in **Appendix AB**. Projects must also follow the City's Code of Ordinances, found on https://library.municode.com/fl/fort_lauderdale, that lists the minimum standards for construction work. If the project is under jurisdiction of the City, the Contractor must additionally submit a Maintenance of Traffic (MOT) permit to the City's Transportation and Mobility (TAM) department.

The City has various design documents listing requirements for materials, installation, and acceptance testing for proposed sanitary sewer collection system work. Similar documents list requirements for new potable water and stormwater assets. The engineering documents include 73 pages of standard details for lift stations, gravity, sewers, force mains, storm drains, water mains, and paving. Engineering staff review proposed designs for adherence to these requirements, and O&M staff are periodically consulted to confirm acceptability of proposed product submittals and substitutions.

City personnel self-perform construction on a limited basis, typically involving excavated point repairs or replacement of existing system components. Internal documentation includes an SOP with guidelines for self-performed upgrades and repairs to pump stations. The SOP also addresses planning and pre-construction activities, construction-phase inspection, and post-construction integration into the City's Supervisory Control & Data Acquisition (SCADA) system. With reference to materials, the City maintains a warehouse with all standard items needed for sewer repairs, and an SOP provides guidelines for conducting and maintaining vehicle and shop tools and repair parts inventories.

The City also performs construction inspection and acceptance testing of collection and pumping system assets constructed by contractors, with engineering personnel available to advise as needed on specific issues. Construction acceptance testing is set in motion following notification

of readiness by the contractor and includes appropriate oversight by construction inspection personnel.

Depending on the scope of a project, the process of notifying city residents of activities and construction updates may employ one of the City's Public Information Officers (PIOs) and involve meetings with Homeowner's Associations, the publishing of phone numbers for residents to call, the placement of project-specific information on the City's website, and the use of informational door hangers in the project area. The City also sends out newsletters to residents as a part of the "Go Big Go Fast" program, described on the City's website as "a comprehensive initiative designed to improve, upgrade, and enhance our City's wastewater system," and updates LauderWorks, a web based construction mapping tool for public use.

A4.1.2 Responsibilities, Resources, and Training

At the start of a project, the City assigns a Project Manager from the Public Works Department and decides whether the project will be designed in-house, assigned to a general services/on-call consultant, or competitively awarded via a Request for Qualifications (RFQ). The RFQ route is used most commonly for larger design projects, and the City's Project Manager will assume management responsibility for the technical and financial aspects of the consultant's performance as well as oversee adherence to established project schedules.

For construction work, inspection may be performed by a qualified in-house City inspector or inspection personnel provided by an engineering consultant. Construction work is coordinated closely with the Department of Sustainable Development (DSD), the building department for the City. City inspectors receive training in the City's design and construction standards as well as safety-related field considerations.

A4.1.3 Information Management and Continuous Improvement Process

Documentation during the design and construction process includes the Design and Construction Standards, as-built drawings, and mapping applications. As-built drawings are stored on the City's server in PDF format and are being added to the Sewer Atlas. The Sewer Atlas is a searchable web mapping application utilized by the City to support operation and maintenance functions and provide data for engineering practice. As described elsewhere, the City is currently implementing the Cityworks AMS software to establish expanded work order and asset management capabilities. Cityworks interfaces with a Geographical Information Systems (GIS) database that maps wastewater system assets and contains detailed asset attribute information such as materials, diameters, and installation dates. The scope and accuracy of the GIS database are being continually improved as assessment work is performed throughout the system and more detailed information becomes available. The City is also making as-built records available through GIS to improve access to specific asset information. Information gathered in the field by means of surveying, Subsurface Utility Exploration (SUE), or Ground Penetrating Radar (GPR) is forwarded to the GIS Section for verification and inclusion into the GIS.

Design and construction processes are subject to continuous evaluation to ensure the City's performance objectives are being achieved, and product and material reviews are required on a regular basis to confirm the acceptability of items proposed for sewer system projects.

A4.1.4 Implementation Plan

Several actions were identified for possible improvement to the City's design and construction procedures as listed below. As a result of its self-assessment process under the CMOM program development, the City identified the engineering design component and associated standards as being of medium maturity and criticality and therefore medium priority for further improvement. The construction component was assessed as being of high maturity and medium criticality, and therefore of lower priority for further improvement. Note that the Reference Number as shown below corresponds to the specific activity/task as presented in Part C, *Program Schedules*.

A4.1-1 Review existing forms, details, and SOPs to ensure adequate guidance is in place for conducting design reviews and involvement of O&M staff in the design review process, standardization of equipment and sewer system components, confirming acceptability of proposed product submittals and substitutions, and consistency with additional commitments and demands related to CO compliance and AM-CMOM Program implementation. Specifically included should be checklists for construction inspection (updated for current standard specification) and acceptance testing of collection and pumping system assets, guidelines for self-performed upgrades and repairs to pump stations, and procedures for warranty tracking and associated inspection.

A4.2-2 Implement a life cycle cost analysis for new designs, at the planning or preliminary design stage, particularly for larger projects.

Section A5

Operation and Maintenance Programs

A5. Operation and Maintenance Programs

Four CMOM programs are related to collection system O&M as follow:

- Gravity Sewer Operation and Maintenance
- Pump Station and Force Main Operation and Maintenance
- Equipment, Parts, and Tools Management
- Underground Asset Protection Service

Section 6 discusses these O&M programs and concludes with a summary of associated SOPs developed by the City.

A5.1 Gravity Sewer Operation and Maintenance

A5.1.1 Purpose and Description

The primary elements of gravity collection system O&M include cleaning, condition assessment, and repair. Multiple field crews are involved in these procedures, and the City has developed SOPs for key tasks. The basic organization of the City's gravity sewer O&M operations is shown in **Figure A5-1**.

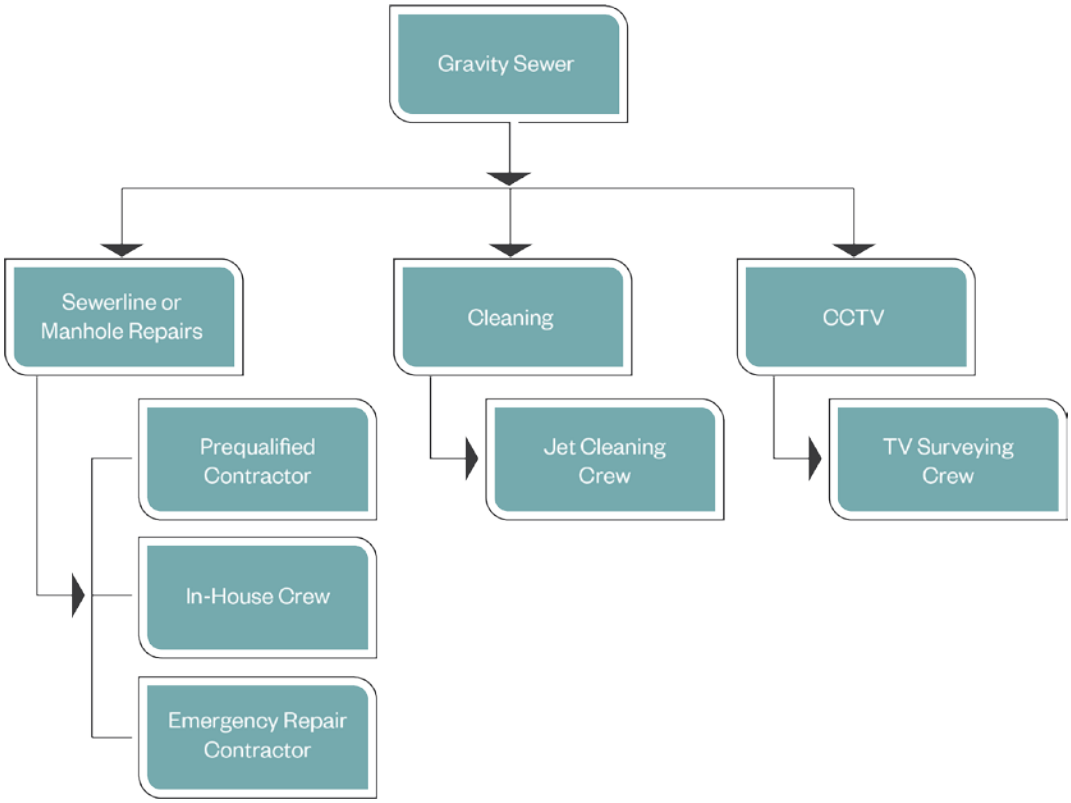

Figure A5-1: Gravity Sewer Operations and Maintenance Personnel

Cleaning is performed to remove accumulated materials that could otherwise cause stoppages. For cleaning and TV surveying (CCTV) are performed by in-house Jet Cleaning and TV Survey Crews, respectively. Notably, the City has a goal of cleaning and televising the entire collection system on a 10-year cycle. The D&C Section has deployed two full-time crews and operates five vactor-jetter trucks for sewer cleaning for this reason. The City also utilizes sewer cleaning contractors as a part of the SSES and rehabilitation program.

When a break or stoppage occurs, depending on the nature and complexity of the event, in-house crews are dispatched to correct the issue or an emergency repair contractor is employed. Stoppages are diagnosed to determine cause for the benefit of future operations.

Currently, sewer laterals are spot-treated using RootX chemical treatment when root-related issues arise. Mechanical root removal is also performed when needed in association with cleaning, televising, and rehabilitation activities. The D&C Section does not have a formal root control program but has identified this as a goal. In a related effort, the City is planning to amend its tree planting ordinance to include reduction of potential impacts to City utilities.

Repair, rehabilitation, and replacement work is performed on gravity sewer components as needs are identified and prioritized throughout the system. The need for manhole repairs is discovered during manhole inspection or routine cleaning/televising, or as a result of customer complaints. The City completes manhole repairs using in-house resources as well as outside contractors.

Repair methods utilized have included frame and cover repairs, chimney seals, cementitious lining, epoxy lining, bench and channel repairs, and full manhole replacement. Manhole repair priorities are determined based upon operational needs, observed partial or complete failures, and engineering requests. The City installs manhole cover inserts/dishes in portions of the system, with an emphasis on coastal and low-lying, flood-prone areas susceptible to flooding during wet weather.

When mainline sewers needing rehabilitation are identified through the City's cleaning/televising program, customer complaints, or in response to emergencies, the methods used include excavated point repairs, cured-in-place lining of manhole-to-manhole segments, cured-in-place sectional liner installation for localized repairs, and in some cases full pipe replacement. Priorities are determined based upon operational needs, observed conditions, and engineering requests. The City has a list of prequalified contractors to perform a complete range of gravity sewer repairs, although excavated repair and replacement work can also be done using in-house forces. Following repairs, CCTV is used to inspect the work. Post-repair CCTV is typically performed by the City for in-house repairs, and by contractors for contracted repairs.

A5.1.2 Responsibilities, Resources, and Training

Gravity sewer O&M is managed by the D&C Section as noted. Each in-house crew consists of a Lead Service Worker/Crew Chief and several service workers. The Lead Service Worker/Crew Chief distributes an area map organizing each day's operational work. Completed work is documented and submitted to the Lead Service Worker/Crew Chief along with any completed area maps.

Training for gravity sewer O&M is accomplished using the City's SOPs and on-the-job training. SOPs describe procedures for main breaks or stoppages as well as daily operations for the Jet Cleaning Crew and CCTV Crew. Related SOPs are provided in Section 5.5 and Appendix AC. The D&C Section has also initiated National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification Program training for collection system workers to ensure industry standards are followed.

The City's SSORP is another resource utilized for training. It describes a process by which supervisors maintain and continuously update a list of "hot spots" requiring more frequent cleaning. Cleaning crews perform emergency cleaning first, followed by "hot spots", and then devoting remaining time to cleaning and televising in other parts of the system. The SSORP also describes a process for "root cause analysis" for SSO events in which preventive measures can be determined and implemented.

A5.1.3 Information Management and Continuous Improvement

The City plots stoppage and break locations on GIS maps and correlates these locations with other data such as pipe size, material, and age. Sewer cleaning records include date and time, cause of stoppage, method of cleaning, location of stoppage or routine cleaning activity, identity

of cleaning crew, and further actions necessary/initiated. Repair records are maintained for all repairs, and entered into the City's GIS system as appropriate.

During CCTV work, the Service Worker operating the camera system enters all pertinent information, saves data, and prints any necessary reports. Service Workers deliver survey DVDs and reports to necessary parties. If the hard drive storing survey information is nearly full, a Service Worker saves the data to the office computer and returns the empty hard drive to the truck.

Routine cleaning/televising or rehabilitation programs occasionally identify inconsistencies between the City's maps and actual conditions in the field. When this occurs, the City's GIS specialists are informed so that improvements can be made to the maps.

It is expected that Cityworks, when fully implemented, will also be used to help manage and document gravity sewer O&M, and procedures may require some degree of re-evaluation as the shift to Cityworks occurs. Cityworks will be used to track cleaning, CCTV, root control, spills, time, equipment and labor.

A5.1.4 Implementation Plan

Several activities are identified for implementation as described herein. As a result of its self-assessment process under the CMOM program development, the City judged the Gravity Sewer cleaning and CCTV program to be of high priority. Low to medium priorities were assigned to chemical cleaning and root removal, and rehabilitation of manholes and mainline sewers. Note that the Reference Number as shown below corresponds to the specific activity/task as presented in Part C, *Program Schedules*.

A5.1-1 Programmatically join sewer cleaning and inspection work to system-wide inspection and I/I analysis and assess associated resource needs. Diversion of resources to emergencies and "hot spots" may hinder routine cleaning goals from being achieved, and therefore crews may require additional resources in the event that demands from customer complaints or emergency jobs prevent scheduled routine cleaning goals from being achieved.

A5.1-2 Develop a formal plan and procedure for root control as part of the collection system preventative maintenance program. Create a root control SOP as a part of the formal root control program.

A5.1-3 Review existing rehabilitation contracts to ensure that a full range of manhole repair needs can be addressed for repair/rehabilitation/replacement (RRR) priorities arising from the manhole inspection program. Assess the City's ability to undertake manhole repairs using in-house resources. Develop contractor unit price pay items for manhole rehabilitation.

A5.1-4 Develop a Continuous Sewer Assessment Program (CSAP) to replace the current ten-year inspection cycle, with some sewers inspected more or less frequently based on need and condition. The CSAP should build on the initial risk analysis and consist of a data-driven, condition-based program of continuous sewer assessment and rehabilitation.

A5.1-5 Create database and GIS layers to map the occurrence of reported blockages, SSOs, and permit violations. Consider entering SSO reports into Cityworks.

A5.1-6 Coordinate program with Cityworks implementation. Develop reports within Cityworks as the software is implemented to track performance measures.

A5.2 Pump Station and Force Main Operation and Maintenance

A5.2.1 Purpose and Description

Pump Stations

The City owns and operates 177 unmanned pump stations in its sanitary sewer system. Sixteen pump stations are equipped with provisions to accept portable emergency generators while six have on-site generators. During power outages, other stations are maintained using a vacuum truck, portable electric generator, or portable bypass pump. At this time, 149 of the 177 pump stations are equipped with SCADA, and SCADA is being expanded to bring in the remaining stations.

Pump station run times are recorded manually between one and three times a week, depending on the pump station, and level alarms are routinely monitored in SCADA. SOPs have been developed to address basic mechanical and electrical maintenance tasks along with required recordkeeping during these visits. SOPs and Standard Maintenance Procedures (SMPs) are used for inspection and preventive maintenance at pump stations. These include testing of automatic transfer switches as well as operating generators under load.

D&C workers perform planned or preventative maintenance (PM) on lift stations and establish frequency of PM based on historical information and observations. Implementation of a program to routinely inspect and perform PM on force mains and air/vacuum valves has been identified as a goal by operations personnel and is referenced in the implementation plan. Unplanned or corrective maintenance (CM) is performed as needed. Lift stations with back-up generators are given a higher priority than other collection system assets, but priority is otherwise determined by staff on a case by case basis.

Force Mains

A Force Main Condition Assessment (FMCA) and associated concerns are being addressed under a separate and ongoing program under the CO.

Paragraph 6(h) of the CO requires that the City submit a FMCA Plan to FDEP to be implemented following approval. The FMCA Plan was prepared as part of City Project No. 12419, and was developed under Task Order 4 of the Sewer Design and Implementation Program Manager agreement. Upon completion and City acceptance, the plan was submitted to the FDEP on July 26, 2018. FDEP provided comments on the Force Main Condition Assessment Plan on August 3, 2018 and a revised plan was submitted on September 4, 2018.

The plan presented a tiered approach to the condition assessment, which was conducted in three phases:

- Phase 1 – Development of Risk Matrix and Development of Implementation Plan
- Phase 2 – Implementation of the Force Main Condition Assessment
- Phase 3 – Force Main Condition Assessment Report

Under Phase 1, a desktop condition assessment of the City-owned force mains was conducted. From this assessment, segments of force main were identified as not requiring any additional field assessment due to their low or high likelihood of failure. As part of Phase 2, those who scored somewhere in between where identified to be further evaluated using a Tier 1 field assessment as defined in the FMCA Plan. Phases 1 and 2 were completed on January 23, 2020, ahead of the CO deadline of February 3, 2020. Phase 3, the FMCA Report, was completed and delivered to FDEP on March 23, 2020. A further explanation of the results of the FMCA are detailed in Section B4.3 Force Mains.

A5.2.2 Responsibilities, Resources, and Training

Pump station and force main repair, rehabilitation, and replacement work is done using in-house and contracted resources, with larger and more complex work generally being performed by contractors.

The D&C Section maintains full-time responsibility for pump station operations, with support by electrical technicians as well as Process Control Engineering for SCADA support. Pumps and equipment are documented with manuals and cut sheets, and SOPs address routine mechanical and electrical maintenance requirements as noted. The importance of creating and maintaining documentation is emphasized in the SOPs. Additionally, O&M manuals are kept at the maintenance shop for all lift stations.

The Pump Station and Force Main O&M-related SOPs are summarized in Section A5.5 and Appendix AC. These address Wet Well Crew operations and maintenance, pipe plugging, procedures to be followed when a pump is out of service, pump station routine maintenance, valve testing and maintenance procedures, and SCADA upgrades. Air release valve testing and maintenance is a key activity in force main O&M as failures of these valves can be a cause of SSOs.

Training for pump station and force main O&M is accomplished using the City's SOPs and on-the-job training. The City's SORP also provides detailed guidelines for pump station

emergencies, and includes responses to be taken during power outages or pump failures. The guidelines include a mandatory contact list as well as escalation conditions for mobilizing emergency contractors if City crews are unable to resolve the particular problem. The SORP additionally proposes performance measures including target response times for emergency events involving pump stations. Moreover, there is a general Emergency Operating Procedure for pump stations. The acceptable response time during a power failure (e.g. time to overflow) is documented for each pump station and available to first responders.

A5.2.3 Information Management and Continuous Improvement

The majority of pump stations are monitored with a modern telemetry system (SCADA), which keeps track of pump run status, high level, emergency high level, and phase monitoring. Staff routinely monitor this data to ensure proper pump performance. Historical SCADA data are archived and available for retrieval and analysis. The City is in the process of expanding SCADA to the remainder of the system.

During onsite pump station inspections, elapsed run time is recorded for use in assessing flows and pump performance, and station condition is checked. A checklist is utilized during inspection and findings are recorded. Visual assessment of pump run logs and SCADA reports is used to determine if a pump has excessive run times or if other operational concerns are indicated. Further, operations logs are kept at each lift station (generally in the motor control center cabinet), as well as maintenance logs. Maintenance staff provide paper inspection reports to supervisors who generate work orders as needed based on conditions.

Once implemented, Cityworks will be used for asset inventory, to track lift station service requests and work orders. This will enable the City to establish a PM program based on real data including reasons for maintenance, electrical usage, and other key indicators. Both PM and CM utilize logs as a resource to conduct maintenance, and it is expected that this will also be recorded using Cityworks.

The City has a GIS shapefile of the force mains, along with as-built drawings for most force mains.

A5.2.4 Implementation Plan

Several activities are identified for implementation as described herein. As a result of its self-assessment process under the CMOM program development, the City judged pump station operations for the City to be of medium maturity and high criticality (high priority) and associated recordkeeping to be of high maturity and medium criticality (low priority). Note that the Reference Number as shown below corresponds to the specific activity/task as presented in Part C, *Program Schedules*.

A5.2-1 Maintain and update existing records of technical specifications of each pump station within the system, including at minimum: the number, type, manufacturer,

model, impeller size, serial number, horsepower, normal full load amperage and operating voltage of pumps; the pump curves along with the rated and typical operating points for the pump station; wet well dimensions and nominal operating levels as well as dry well dimensions where applicable, the nominal station voltage; the type, manufacturer, rating, and pertinent serial numbers for pump controls and variable speed drives; the type and capabilities of the installed remote reporting and control system; the type, ratings, voltage, speed, model number, and fuel type for generators where applicable; and upstream and downstream pump stations where applicable. Cityworks implementation, as currently planned, will address this item.

A5.2-2 Maintain and update existing written preventative O&M schedules and procedures addressing predictive inspection and service for all pump stations to (a) record information from the elapsed time meters and pump start counters; (b) observe and document wet well conditions including grease and/or debris accumulation; (c) confirm and/or adjust wet well level control elevations; (d) record system pressure; (e) check SCADA and alarm components; (f) check stand-by power sources, with emergency generators to be test run; (g) check motor electrical system for line voltage, current draw, and resistance of windings; and (h) identify maintenance needs. Cityworks implementation, as currently planned, will address this item.

A5.2-3 Maintain and update existing written standard emergency/reactive O&M procedures addressing: criteria used to determine the necessity for and nature of emergency operations and maintenance, methods for notification and activation of emergency repair personnel, use of portable generators and portable bypass pumps where applicable, evaluation of the need for additional equipment for emergency/reactive operations based on the station flow and operational characteristics and the ease or difficulty of employing various emergency operations at the station, evaluation of the need for on-site standby power, standard forms, reporting procedures and performance measures for emergency/reactive O&M.

A5.2-4 Document the extent to which any required services are to be provided by an outside entity, the competencies and resources that the outside entity or entities will provide, and the utility's means of immediately notifying the service provider upon detection of a problem.

A5.2-5 Consider provision of digital tablets for maintenance staff to access Cityworks records and enter work order information from the field. Cityworks implementation, as currently planned, will address this item.

A5.2-6 Evaluate the potential for Cityworks to support automated or detailed analysis using run time data or other data available through SCADA.

A5.2-7 Leverage Cityworks to support an optimized planned or preventive maintenance on pump stations, specifically to provide a data-driven mechanism to track and

schedule preventive and corrective maintenance, reasons for maintenance, electrical usage, and related data. This objective is also a focus of the AM program.

A5.2-8 Leverage Cityworks to help document and report maintenance backlog and O&M performance, along with amount/percentage of funding used for reactive versus preventive maintenance. Cityworks implementation, as currently planned, will address this item.

A5.3 Equipment, Parts, and Tools Management

A5.3.1 Purpose and Description

The City maintains an inventory of spare parts, equipment, and supplies to support collection system O&M. Division Chiefs or Section Supervisors determine what tools are needed by a worker or crew to complete job responsibilities, following which the inventory is assigned to the crew team leader or worker. The D&C Section also maintains a stock of manhole castings, pipe, couplings, traffic cones, tools, personal protective equipment (PPE), and other items needed for the WCTS operation. Utilities Managers, Supervisors, Chiefs, and staff all comply with preventive maintenance schedules including equipment and vehicle maintenance during scheduled service intervals. In specific instances, the City salvages specific equipment parts when equipment is place out-of-service and not replaced.

Fleet Services provides monthly notification to all City Departments of required vehicle PM. This report includes the vehicle number, description, mileage intervals, responsible supervisor, and PM due date. Fleet maintenance employees and mechanics then perform vehicle and equipment maintenance services.

The City's SOPs address vehicles, shop tools, and repair parts inventory. The City's equipment-related SOPs are provided in Section A5.5 and Appendix AC. The City's equipment policies are fundamental in that they addresses responsibility for any item that is assigned to a Crew Member, ranging from radios to steel saws and backhoes. Other forms created by the City related to equipment, parts, and tools are listed below.

- Report of Damage to City Property (related to PW-UTL-DC-GEN-EQ-11 &15)
- Supervisor's Accident Report
- Fixed Assets Disposal Form
- Notice of Liability Accident
- Procedure for replacing tools

A parts inventory is maintained by the warehouses to keep track of all parts and tools needed for O&M. Parts are logged out when taken by maintenance personnel and logged back in when the work is complete. The inventory keeps track the location, usage, and ordering of spares. For

parts not kept in inventory, the City has a readily available source or supplier. The City attempts to maintain available supplies to allow for two point repairs in any part of the system at any given time.

Equipment maintenance is split between in-house resources and contract services depending on the specific equipment and service required. Spare parts are located in a central warehouse location and most equipment is stored at the maintenance depot at the Fiveash Water Treatment Plant. Notably, the City has developed a list of critical tools and equipment for operation and maintenance as part of its Hurricane Preparedness planning.

A5.3.2 Responsibilities, Resources, and Training

Responsibility for equipment, parts, and tools is maintained at the level of those personnel who use such equipment, parts and tools in their job duties. On-the-job training is provided on a regular basis and related SOPs have been developed as noted.

A5.3.3 Information Management and Continuous Improvement

It is expected that Cityworks, when fully implemented, will be used to help keep track of inventory for the most in-demand equipment, tools, and materials through use of the Cityworks Storeroom module. Procedures will require re-evaluation as the shift to Cityworks occurs.

A5.3.4 Implementation Plan

As a result of its self-assessment process under the CMOM program development, the City identified a need to assess whether procedures for management of equipment, tools, and materials could potentially be improved. Current procedures were judged to be of medium maturity and medium criticality, and accordingly a medium priority is assigned for further development of the program. Note that the Reference Number as shown below corresponds to the specific activity/task as presented in Part C, *Program Schedules*. It is important to note that personnel do feel they have access to the necessary equipment and tools to perform all aspects of collection system operation and maintenance.

A5.3-1 Evaluate the potential for Cityworks to support and optimize inventory management. The possible benefits of analyzing usage and associating materials and costs to preventive or corrective maintenance of particular assets should also be considered. It is recommended that an inventory management system be created that includes a list of critical equipment and spare parts, including both a list and storage location for critical equipment and spare parts stored by the utility, as well as a list of sources where critical spare parts and equipment not stored by the utility may be obtained to permit repairs in a reasonable amount of time. Written procedures for updating the critical equipment and spare parts inventories no less frequently than once a year should be included. Cityworks implementation, as currently planned, will address this item.

A5.3-2 Ensure that inventory analysis includes assessment of the frequency of usage of each part, how critical each part is, and how difficult each part is to obtain when determining how many to keep in stock.

A5.4 Underground Asset Protection Service

The City of Fort Lauderdale participates in the State of Florida's Sunshine State One-Call program to prevent damage to its underground assets by locating and marking underground lines prior to construction or other excavations that may occur.

A5.4.1 Purpose and Description

As a utility owner, Fort Lauderdale is required by the State of Florida to participate in the state-wide one-call program, pursuant to the Underground Facility Damage Prevention and Safety Act (Chapter 556, Florida Statutes). "Sunshine State One-Call of Florida, Inc.," was created as a not-for-profit corporation, and each operator of an underground facility in Florida is required to participate as a member operator. The purpose of the system is to receive notification of planned excavation or demolition activities and to notify member operators of the planned excavation or demolition activities. The system provides a single toll-free telephone number within the state which excavators can use to notify member operators of planned excavation or demolition activities.

Anyone preparing to excavate is required by law to call Sunshine 811 to have all underground utilities located and marked before digging. Sunshine 811 coordinates the calls and notifies all utilities of the planned excavation area. Fort Lauderdale is required to mark tickets, if necessary, within 48 hours.

More detailed information on procedures for locating existing utilities is found in the City's SOP, *PW-UTL-DC-GEN-LOC-1- Locating and Marking Existing Services* (pending adoption). Sewer tickets are assigned to a marking crew, which consists of workers from the Sewer Department who are internally-trained to locate utility infrastructure. Sewer Department staff follow best practices in the SOP for utility marking. The marking crew uses record drawings and appropriate tools such as transmitters/locators, metal detectors, and measuring wheels to locate the underground utility and mark it using green paint for sewer and stormwater, blue paint for water, and white paint when marking out a dig area.

A5.4.2 Responsibilities, Resources, and Training

The Utilities Division is responsible for implementing the underground asset protection program. On-the-job training, meetings and workshops are provided for technicians who perform this work.

A5.4.3 Information Management and Continuous Improvement

Sunshine 811 tickets are received via D&C Section personnel for processing, and records are maintained in Section files.

A5.4.4 Implementation Plan

Underground utility locating and marking procedures will not be modified as a part of CMOM implementation.

A5.5 Standard Operating Procedures

D&C SOPs guide personnel through typical O&M tasks and are a useful resource for training. They address responsibilities of the crew members and supervisor, tools and equipment needed, documentation requirements, and policy perspectives. This section briefly summarizes the SOPs related to wastewater collection and pumping system O&M. Complete versions of the referenced SOPs are provided in Appendix AC. SOPs are organized into the following functional areas:

- General
- O&M Procedures
- Chief Field Work, Duty Lists, and Overtime
- Communications, Purchasing, and Licensing
- Construction
- Contractors
- Equipment
- Events
- Locating
- Reporting
- NSF
- Safety

General

- PW-UTL-DC-AA-3-Purpose, Objectives, & Organization of the Public Works Policy & Standards Manual
    - Purpose, objectives, and organization of the Public Works Policy & Standards Manual.
- PW-UTL-DC-AA-4-Record of Training Form
    - Form provided during training sessions to record date, topic, recommendations, instructor certification, and employees who were present.
- PW-UTL-DC-AA-5-Annual Certification of SOPs

  - Certification that employees received and read SOPs.

- PW-UTL-DC-AA-6-State Distribution System Licensing Requirement Form
  - Certification that the memorandum on State licensing requirements for Utilities Senior Utilities Serviceworker, Utility Crew Leader, and Utility Service Representatives was read and understood.

- PW-UTL-DC-AA-7-Acknowledgement Form
  - Certification that an attached form has been read and understood.

O&M Procedures

- PW-UTL-DC-COL-HM-1-Wastewater Force Main Break Maintenance Procedures
  - Steps for repairing and cleaning force main breaks or stoppages. Includes steps to report the spill, determine the spill location, bypass flow if necessary, employ equipment, determine depth of spill, and sanitize and deodorize the area.

- PW-UTL-DC-COL-HM-2-Wastewater Gravity Main Break Maintenance
  - Steps for repairing and cleaning force main breaks or stoppages. Includes steps to report the spill, determine the spill location, bypass flow if necessary, employ equipment, determine depth of spill, and sanitize and deodorize the area.

- PW-UTL-DC-COL-OVP-1-Pump Down
  - Procedure to be used by Wet Well Crew if a pump is out of operation. Includes requirements for tanker drivers and transportation of sewage.

- PW-UTL-DC-COL-PC-1-Pump Station Upgrade to SCADA
  - Process for upgrades and repairs to pump stations at different phases of a project including planning, pre-construction, construction, and post-construction.

- PW-UTL-DC-COL-PM-1-Wastewater Pump Station Maintenance Procedures
  - Methodology to maintain clean and well-functioning pump stations. Describes preventative maintenance schedules, pump station alarms, pump station checklist, definition for critical pump stations, and emergency procedures in the event of a pump station failure.

- PW-UTL-DC-COL-PM-2-Valve Exercising Procedures for Valves 10” and Larger
  - Guidelines for how to identify inoperative valves and restoring functionality, verify accuracy of atlas information versus actual field conditions, verify the count of the number of turns it takes to operate a particular valve, and identify the valve by address and by Global Positioning Systems coordinates.

- PW-UTL-DC-COL-PM-3-Wastewater Pump Station Maintenance Procedures
    - Process to maintain the pump station electrical system including utility policy, costs and benefits of preventative maintenance and scheduled repairs, documentation procedures, preventative maintenance schedules, and emergency procedures.
- PW-UTL-DC-COL-SLC-1-Jet Cleaning Crew Daily Operations
    - Daily operations for the Jet Cleaning Crew including personnel responsibilities, daily scheduling, and documentation requirements.
- PW-UTL-DC-COL-SLC-2-Routine Sewer Line Jet Cleaning and Jet Cleaning for TV Survey
    - Jet Cleaning Crew process for cleaning a gravity main including parking, setting up maintenance-of-traffic, opening manholes, personnel responsibilities during the cleaning process, closing manholes, and cleaning up.
- PW-UTL-DC-COL-TV-1-TV Survey Crew Daily Operations
    - Daily operations for the TV Crew and coordination with Jet Cleaning Crew including personnel responsibilities, daily scheduling, and documentation requirements.
- PW-UTL-DC-COL-TV-2-Routine TV Survey
    - Process for surveying gravity main including personnel responsibilities, setting up maintenance-of-traffic, opening manholes, contacting Station Mechanics if necessary, setting the footage counter, using the tractor, saving data, and documentation requirements.
- PW-UTL-DC-COL-WS-1-Wet Well Crew Daily Operations
    - Daily operations for Wet Well Crew including personnel responsibilities, daily scheduling, procedures when no vehicles are available, contact procedures for pump station issues, and documentation requirements.
- PW-UTL-DC-COL-WS-2-Wet Well Cleaning
    - Procedure for Wet Well cleaning including personnel responsibilities, coordination with pump station chief, procedures for confined space entry if needed, parking, maintenance-of-traffic, visual inspection, and “plug-off” procedure if required.
- PW-UTL-DC-COL-WS-3-Plugging a Pipe
    - Guidelines to plug a pipe within a manhole to stop water flow.

Chief Field Work, Duty Lists, and Overtime

- PW-UTL-DC-GEN-DTY-1- Chief Field Work
    - Guidelines to improve communication between Supervisors, Chiefs, and Field Crews. Provides schedules for Chiefs, crew rotations, recording, and Chief general duties.
- PW-UTL-DC-GEN-DTY-2-Heavy Equipment Call Out List
    - Staffing levels, compensation, response time, and documentation for after-hours events involving heavy equipment workers.
- PW-UTL-DC-GEN-DTY-3-Duty Mechanic Call Out List
    - Staffing levels, compensation, response time, and documentation for after-hours events involving mechanical workers.
- PW-UTL-DC-GEN-DTY-4-Management D&C Duty Foreman List
    - Staffing levels, compensation, response time, and documentation for after-hours events involving management representatives.
- PW-UTL-DC-GEN-DTY-5-Pump Station Call Out List
    - Staffing levels, compensation, response time, rotations, assignment to a pager, appropriate vehicles, and vehicle supplies for after-hours events involving service workers.
- PW-UTL-DC-GEN-DTY-6-Service Worker Voluntary Call Out List
    - Staffing levels, compensation, response time, volunteer list, and documentation for after-hours events involving volunteer service workers.
- PW-UTL-DC-GEN-DTY-7-Vacuum Truck Operator Call Out List
    - Staffing levels, compensation, assistance requests, response time, and documentation for after-hours events involving vacuum truck operators.
- PW-UTL-DC-GEN-DTY-8- Electrician Duty List
    - Staffing levels, compensation, response time, acceptable replacements, volunteer list, and documentation for after-hours events involving Public Works CMS Industrial Electricians.
- PW-UTL-DC-GEN-DTY-9- Scheduled Overtime
    - Communication procedures needed for scheduling, approving, and completing *scheduled* overtime work including the contents of the email required, who to

send it to, when to send it, if responses are necessary, and the additional phone call required.

- PW-UTL-DC-GEN-DTY-10- Emergency Overtime
    - Communication procedures needed for scheduling, approving, and completing *emergency* overtime work including the contents of the email required, who to send it to, when to send it, if responses are necessary, and the additional phone call required.
- PW-UTL-DC-GEN-DTY-11-Utility Service Representative Call Out List
    - Staffing levels, compensation, response time, acceptable replacements, and documentation for after-hours events involving Utility Service Representative.
- PW-UTL-DC-GEN-DTY-12-Operational Emergency Staffing
    - Uniform response procedures for operational emergencies to ensure adequate and appropriate staff availability, set best management practices for optimizing employee schedules to ensure safe working conditions, and establish shift durations and overtime equality.

Communications, Purchasing, and Licensing

- PW-UTL-DC-GEN-CPL-1-Cell Phone Policy
    - Defines appropriate office and field cell phone use by distinguishing employees who receive a cell phone allowance from those who don't and the cell phone guidelines for each, what cell phone policy is during the operation of heavy equipment, driving a vehicle, performing physical labor, or overseeing a work area, and what a violation of this policy entails.
- PW-UTL-DC-GEN-CPL-2-Email Response Procedure
    - Standardizes email response to City Commission and City Manager's offices to ensure accuracy of information provided. Specifies requirements for the D&C Chief.
- PW-UTL-DC-GEN-CPL-3-Requisition Authorization (RA) for Contracted Services
    - Guidelines for using a Requisition Authorization (RA) to pay for contracted services including materials that should be paid for, responsibility of Public Works finance to complete and finalize the RA, processing of the RA, and personnel signatures.
- PW-UTL-DC-GEN-CPL-4- Requisitions

  - Requisition requirements including signatures, fund, department, division, index/project code number, sub-object number, address, service request number, stock number, quantity desired, unit, and description.

- PW-UTL-DC-GEN-CPL-5-Department Licensing
  - Florida Administrative Code requirements regarding departmental licensing including who should have their license and confirmation of license validity.
- PW-UTL-DC-GEN-CPL-6-Safety Shoes Procedures
  - Procedures for obtaining safety shoes including requests for new shoes, shoe inspections, purchase limits, how to fill out a voucher, and paperwork requirements.

Construction

- PW-UTL-DC-GEN-CT-1-Pipe Crew Restoration
  - Pipe restoration procedures including blow-off installation and asphalt placement.
- PW-UTL-DC-GEN-CT-2-Staging Area
  - Guidelines for selecting and operating staging areas for an extended construction project including the Chief's responsibilities, who to notify, communication with property owners, material storage, daily inspections, and how to leave the site upon completion.
- PW-UTL-DC-GEN-CT-3-Roadway Closures and Maintenance Practices to Reduce Pollutants
  - Guidelines for planned and unplanned closures along with methods to reduce pollutants during roadway maintenance including what departments to notify, field crew responsibilities, tasks to complete during dry weather only, protection of storm drain inlets, waste debris removal, water minimization, and material storage.
- PW-UTL-DC-GEN-CT-4- Laying Asphalt
  - Detailed procedure for laying asphalt including Lead Service Workers responsibilities, setting up MOT, when to lay down asphalt, debris removal, the leveling, packing, and tacking of asphalt, and the documentation of activities.
- PW-UTL-DC-GEN-CT-5-Letters to Neighbors Affected by D&C Construction
  - Steps for notifying property owners affected by construction including when to send the notification and what the notification will contain.

- PW-UTL-DC-GEN-CT-6-Excavation or Pavement Cuts in City Street of Right of Way
    - Timeline for completion, who to notify, and dispatch to customer service for work involving excavation or pavement cuts in the City right of way.
- PW-UTL-DC-GEN-CT-7-Trenching and Excavating
    - Instructions for trenching or excavating on a job site including Lead Service Worker responsibilities, setting up MOT, visual site inspection, appropriate tools to use, and rock placement for managing groundwater.
- PW-UTL-DC-GEN-CT-8-Flasher Coordination Responsibility
    - Procedures for flasher activity, personnel coordination, requests for flashers, flasher surveillance, and the rule of no partial transfers between locations.
- PW-UTL-DC-GEN-CT-9-Concrete Restoration
    - Guidelines for concrete restoration during sidewalk/easement repairs including the use of the QAlert system, timelines, requirement for MOT and PPE, responsibilities for community builders, utilization of downtime, maintenance of job sites, vehicles, and work areas, debris removal, safety instructions, and step-by-step restoration procedures.

Contractors

- PW-UTL-DC-GEN-CON-1-Valve Exercising Contractor Customer Field Operations
    - Procedures for dealing with Priority or Routine Valve work orders including the use of the QAlert system, printing and assignment of work orders, Service Worker site verification, what to do if valve is frozen or spins freely, assignment to operations staff, how less critical valves are addressed, utilization of the program Crystal Report, and organizing valves in a spreadsheet.
- PW-UTL-DC-GEN-CON-2-Inspections of Contractor Exercising Valves
    - Guidelines for inspecting a contractor exercising valves with personnel responsibilities during inspection, documentation, procedures for critical and less critical valves, how to organize a list of critical/less critical valves, service request assignment, and timeline for valve repair/replacement.
- PW-UTL-DC-GEN-CON-3-Atlas Sections Provided to Contractor
    - Guidelines for presenting Atlas sections to a contractor for the purpose of working on infrastructure including approval of atlas sections, notification of GIS employees, how to store atlas sections, and responsibilities of the D&C supervisor.

- PW-UTL-DC-GEN-CON-4- Tracking Completed Tasks by Contractors
    - Procedures for tracking work that has been contracted out and completed including guidelines for submitting an invoice and the responsibility of the D&C Chief to update and track tasks that accurately reflect the quantity of work completed.

Equipment

- PW-UTL-DC-GEN-EQ-1-Equipment Policy
    - Policy that each D&C Crew Member is responsible for the equipment assigned to assist them with their daily tasks.
- PW-UTL-DC-GEN-EQ-2-Daily Vehicle Maintenance
    - How vehicles should be maintained on a daily basis including service worker responsibilities, daily vehicle inspection process, and daily vehicle cleaning and maintenance.
- PW-UTL-DC-GEN-EQ-3-Jet Truck Daily Vehicle Maintenance
    - Guidelines for daily vehicle maintenance by the Jet Cleaning Crew including vehicle inspection, checking truck supplies, maintaining debris filter, and taking the vehicle to repair shop if needed.
- PW-UTL-DC-GEN-EQ-4-TV Survey Crew Daily Vehicle Maintenance
    - Guidelines for daily vehicle maintenance to be done by the TV Survey Crew including inspecting the vehicle visually, listening to any truck abnormalities, refueling and restocking, truck supplies, and taking the vehicle to repair shop if needed.
- PW-UTL-DC-GEN-EQ-5- Wet Well Crew Daily Vehicle Maintenance
    - Guidelines for daily Wet Well Crew vehicle maintenance including visual inspections, checking truck supplies, and filter cleaning.
- PW-UTL-DC-GEN-EQ-6-Equipment Hauling and Towing
    - Procedures for safe hauling and towing of Public Works equipment.
- PW-UTL-DC-GEN-EQ-7-Air Masks
    - Guidance for breathing protection including air mask storage, air mask and hose inspections, valve/regulator/hose repairs, procedure for service requests, supervisor responsibilities, assistance with specialize training, tank refilling, and documentation.

- PW-UTL-DC-GEN-EQ-8-Purchase Procedure- Tools and Equipment and Request Form
    - Procedures for the purchase of first issue new and replacement of worn or lost tools and equipment including personnel responsibilities, starting a request form, replacement considerations, and property control and retirements.
- PW-UTL-DC-GEN-EQ-9-Tools and Equipment Request Form
    - Form to request tools or equipment that need to be ordered as described in "PW-UTL-DC-GEN-EQ-8".
- PW-UTL-DC-GEN-EQ-10-Preventative Maintenance of Vehicles
    - Guidance for Preventive Maintenance consisting of scheduled servicing, inspections, and vehicle repairs to prevent potential problems, maximize vehicle availability, and proactively avoid or reduce vehicle breakdowns.
- PW-UTL-DC-GEN-EQ-11-Vehicle and Shop Tools, and Repair Parts Inventory
    - Guidelines for conducting and maintaining vehicle and shop tools and repair parts inventories including vehicle inventory guidelines, what to consider for a vehicle inventory, items to inventory, personnel responsibilities, guidelines for damaged or stolen tools, and procedures for retiring tools and equipment.
- PW-UTL-DC-GEN- EQ-12-Vehicle Tools Inventory Log
    - Vehicle inventory categorizing item name and description, make, model, serial #, asset tag, purchase data, purchase or estimated cost, quantity, and count.
- PW-UTL-DC-GEN-EQ-13-Shop Inventory
    - Procedure for conducting and maintaining shop inventories including shop inventory guidelines, what to consider for a shop inventory, items to inventory, personnel responsibilities, guidelines for missing or damaged stolen tools, and procedure for retiring tools and equipment.
- PW-UTL-DC-GEN- EQ-14-Shop Tools Inventory Log
    - Shop inventory categorizing each items name and description, make, model, serial #, asset tag, purchase data, purchase or estimated cost, quantity, and count.
- PW-UTL-DC-GEN-EQ-15-Missing, Damaged, Vandalized, and Stolen Property Procedure
    - Guidelines for missing, damaged, vandalized, or stolen City property including crew responsibilities, reporting procedures, risk management requirements, how to fill out a report of damage form, and missing property considerations.

- PW-UTL-DC-GEN-EQ-17-Vehicle Inspection Form Procedure
    - Procedures for completing inspection forms and when to fill them out.
- PW-UTL-DC-GEN-EQ-18-CDL Inspection Form
    - Checklist needed for vehicle inspection including inspection of the exterior, lights, engine compartment, vehicle operation, and interior.
- PW-UTL-DC-GEN-EQ-19-Vehicle Equipment & Tools Security
    - Basic rules for keeping City vehicles and equipment properly secured including procedures for locking vehicles, equipment and tools storage, and responsibility of personnel.

Events

- PW-UTL-DC-GEN-EVT-1-Determining an Affected Area During an Event
    - Guidelines to determine what areas are affected by an event including responsibilities of the Utility Field Representative, communication with GIS representative, and the responsibilities of the GIS representative.
- PW-UTL-DC-GEN-EVT-2-Sanitary Sewer Overflow (SSO) Procedure
    - SSO Policy and SSO form including the procedure for the First Responder and Manager, Customer Service Representative, Environmental Service Representative, and Public Information Specialist in recording an SSO and notifying the chain of command.
- PW-UTL-DC-GEN-EVT-3-Discharge and Overflows
    - Procedures to repair a leak or stop an overflow to reduce impact to the environment including determining the source, the process to stop the leak or overflow, redirecting of flow, notifying Environmental Resources Section, material removal, and inspection of storm drain structures.
- PW-UTL-DC-GEN-EVT-4-Rain Event Policy
    - Policy to be followed in the event of significant rainfall including procedures for crews to check storm basins before and during significant rainfall.
- PW-UTL-DC-GEN-EVT-5-Sewer Overflow Response Plan
    - SSORP as described in Section 2.1 and shown in Part B.
- PW-UTL-DC-GEN-EVT-6-Hurricane Plan Procedures

- Procedure for the Public Works Department in the case of a Hurricane including employee responsibilities, engineering bureau/divisional plans, administration service, technical services, customer operations, D&C responsibilities, treatment, and environmental resources.

Locating

- PW-UTL-DC-GEN-LOC-1-Locating and Marking Existing Services
  - Location of existing services including setting up MOT, the responsibility of the Utility Field Representative, use of appropriate tools, and how to mark service locations.
- PW-UTL-DC-GEN-LOC-2-Locating Paint on Decorative Surfaces
  - When and how to use Locating paint on a decorative service including the definition of decorative surfaces, using offset marks, using the minimum standard under Florida Statute, and contacting the excavator/representative to clarify marking locations.

Reporting

- PW-UTL-DC-GEN-RP-1-Distribution & Collection SRS Reporting Policy
  - Policy to record and report activities to the SRS including a description of the Waste Transporters Monthly Report, the Waste transfer station monthly report, and the Chief's responsibility to ensure the reports are submitted.

NSF

- PW-UTL-DC-GEN-NSF-6-NSF NSF Certification Quiz
  - Training quiz for staff that tests an understanding of National Sanitation Foundation (NSF) certifications.

Safety

- PW-UTL-DC-GEN-SFT-1-Pipe Saws and Cutting Equipment Safety
  - Safety concerns for the use of pipe saws and other cutting equipment including personnel responsibilities for pipe cutting activities, appropriate PPE, and when saws should be serviced.
- PW-UTL-DC-GEN-SFT-2-Safety Meeting Policy
  - Performance and tracking of safety meetings including personnel responsibilities during safety meetings, meeting materials, and meeting schedules.
- PW-UTL-DC-GEN-SFT-3-Safety Vest Policy

  - Responsibilities regarding safety vests and procedures for vest replacement.

- PW-UTL-DC-GEN-SFT-4-Working on Private Property
  - Guidelines for working on private property. Defines private property and what must be done prior to beginning the work or entering a structure.
- PW-UTL-DC-GEN-SFT-5-Respiratory Protection Program
  - Guidelines for selection of proper equipment and how to determine the need for respiratory protection equipment. Describes use, storage, and care of appropriate PPE. Describes use of engineering controls to reduce exposures as well as personnel responsibilities.
- PW-UTL-DC-GEN-SFT-6-Lock-Out_Tag-Out
  - Requirements and procedures to safeguard workers from the release of hazardous energy (electrical, mechanical, hydraulic, pneumatic, chemical, or thermal) from machines and equipment during servicing and maintenance.
- PW-UTL-DC-GEN-SFT-7-Hot Work Safety Policy
  - Minimum requirements for performing Hot Work (e.g. welding, hot riveting, soldering, etc.) during repair, maintenance, and construction activities. Outlines the use, storage, and care of Hot Work equipment and PPE. Sets guidelines for Hot Work designated areas and how to close out Hot Work. Defines responsibilities of the Hot Work Supervisor, Hot Work Operators, and a Fire Watch person to observe Hot Work.
- PW-UTL-DC-GEN-SFT-8-Hearing Conservation Program
  - Requirements to protect hearing in the workplace. Defines and addresses high noise exposure, noise level testing procedures, the use of noise level signage, availability of hearing protection, audiometric testing on employees, and hearing conservation training.

Section A6

Support Programs

A6. Support Programs

A6.1 Safety

A6.1.1 Purpose and Description

The safety program is designed to create a safe work environment for D&C workers by assigning roles to personnel for supervising and managing safety procedures and training. The purpose and goal of the safety program is to stress the importance of safety to D&C employees via safety training. The utility has written and online procedures for lockout/tagout, Material Safety Data Sheets (MSDS), chemical handling, confined spaces permit program, trenching and excavations, biological hazards in wastewater, traffic control and work site safety, electrical and mechanical systems, pneumatic and hydraulic systems safety.

A6.1.2 Responsibilities, Resources, and Training

Crew leaders are responsible for ensuring their crews are properly trained in safety. Managers communicate with field personnel on safety procedures via written communications and classroom training. The goal of safety training is to inform and update employees on proper procedures for handling equipment and performing field work. The City's Risk Management Department provides training, equipment, and an evaluation of procedures and O&M supervisors provide additional training. Additionally, the Human Resources Department conducts an annual compliance training addressing applicable standard procedures. At all safety meetings, sign-in sheets are used to document personnel in attendance, and records of training are maintained.

A standard list of safety supplies is summarized below. Supplies are maintained in storerooms located throughout the City. Materials and supplies commonly used by D&C workers are stocked at multiple storerooms to minimize travel time during the workday. Each storeroom implements physical and institutional controls for inventory management. The City is currently in the process of implementing a new Enterprise Resource Planning (ERP) software system, which will provide a centralized management of storerooms and inventories once in service. Additionally, the City maintains a list of required tools and supplies for each vehicle used for fieldwork. A D&C worker is responsible for checking the required supplies and restocking each truck when needed.

- Supplies
    - Rubber/disposable gloves
    - Safety glasses
    - Rubber boots
    - Hard hats
    - Antibacterial soap
    - First aid kit
    - Full body harness

  - Protective clothing
  - Respirators and/or self-contained breathing apparatus
- Equipment
  - Confined space ventilation equipment
  - Tripods and non-entry rescue equipment
  - Fire extinguishers
  - Equipment to enter manholes
  - Portable crane/hoist
  - Atmospheric testing equipment
  - Oxygen sensors
  - Traffic/public access control equipment
  - 5- minute escape breathing devices
  - Safety buoy at activated sludge plants
  - Gas detectors
  - Respirators and/or self-contained breathing apparatus
  - Lower explosive limit (LEL) meters
  - Fiberglass or wooden ladders for electrical work

Safety SOPs break down the responsibilities, resources, and training for each type of work. They are provided in Section A5.5 and Appendix AC. As shown in **Figure A6-1**, some personnel listed in the SOPs include general positions such as Crew Leader/Chief, D&C manager, and Safety and Training Supervisor as well as more specific roles such as a Competent Hot Work Supervisor who is responsible for safe Hot Work.

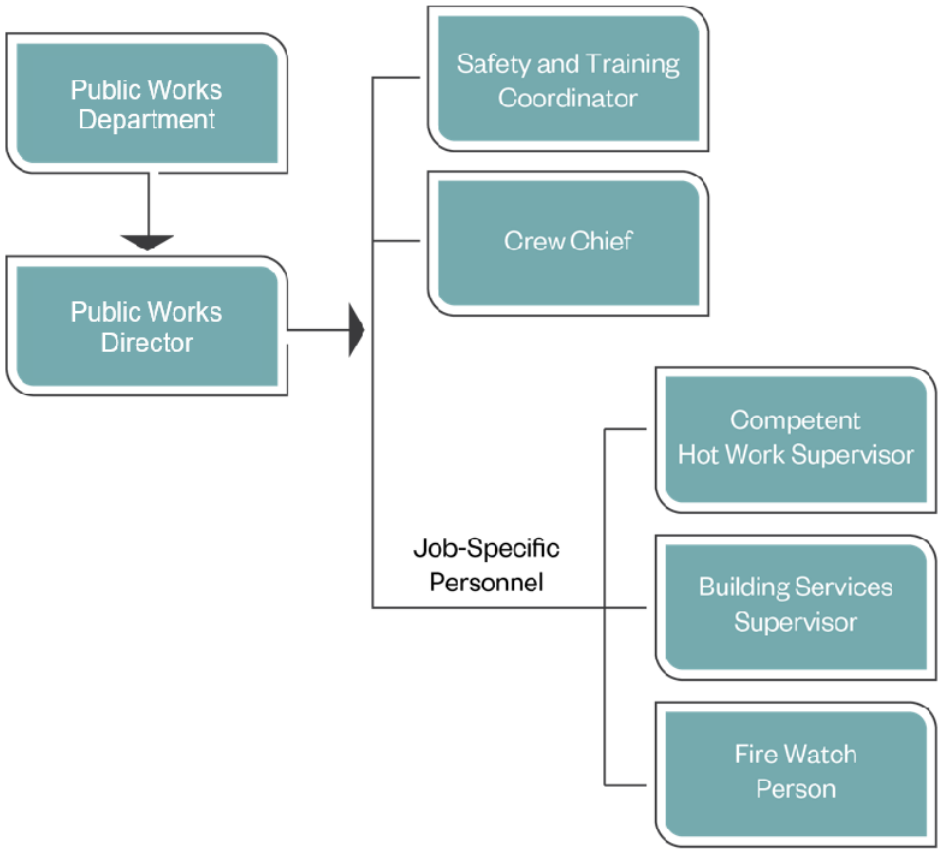

Figure A6-1: Public Works Department Safety Personnel

A6.1.3 Information Management and Continuous Improvement Process

Personnel Development Plans (PDPs) are used to define staff training requirements, document completed training, and identify expiration dates and refresher training needs. The City tracks selected performance metrics from the training program in the ClearPoint, a citywide cloud-based performance tracking suite. Additionally, safety procedures are reviewed and updated as needed during the regular annual SOP review and revision process.

A6.1.4 Implementation Plan

The City of Fort Lauderdale's Safety Program reflects a commitment on the part of utility managers concerning the importance of the program and a correspondingly high maturity of implementation. While practices are subject to ongoing review to ensure that improvements are made when warranted, the program overall is judged to be fully implemented and no plans are currently defined to improve safety procedures.

A6.2 Training

A6.2.1 Purpose and Description

Job training is essential for successful O&M and is required to safely perform inspections, follow replacement procedures, and lubricate and clean parts and equipment. The City has a formal training program that addresses its fundamental mission, goals, and policies. The program incorporates equipment manufacturer training, other external training, and on-the-job training to cover the areas typically found in collection system work. The City's on-the-job training uses standard operating and standard maintenance procedures wherever possible, and each training program identifies the types of training required and offered. Areas that require training include safety, routine line maintenance, confined space entry, traffic control, record keeping, electrical and instrumentation, pipe repair, bursting, cured-in-place pipe inspection, public relations, SSO/emergency response, lift station operations and maintenance, CCTV work, and trench/shoring work. Some programs have formal curricula as required for compliance or certification. Where applicable, mandatory training requirements identified for key employees are noted in the detailed job description.

A6.2.2 Responsibilities, Resources and Training

Training opportunities cover a broad range of topics and are selected for personnel based upon duties and experience. Training is provided either through the City's in-house training program or by selected third parties when required. Completed training is continuously tracked by administrative staff within the Public Works Department via "Record of Training" forms. Additionally, the City maintains an in-house continuing education program.

A6.2.3 Information Management and Continuous Improvement Process

As stated in Section A6.1, PDPs are used to define staff training requirements, completed training, and expiration dates. Completed training is recorded in the form of a "Record of Training" sheet and is shown in **Appendix AC**. Testing, demonstrations, and refresher courses are used to assess the effectiveness of job training and identify opportunities for improvement of the training process.

A6.2.4 Implementation Plan

As a result of its self-assessment process under the CMOM program development, the City identified a need to assess whether the training delivered to personnel could potentially be improved. Note that the Reference Number as shown below corresponds to the specific activity/task as presented in Section 9 of the CMOM Program Plan, *Program Schedules*. The training program was judged to be of medium maturity and medium criticality, and accordingly a low-to-medium priority is assigned for further development of the program.

A6.2-1 Review and update SOPs and curricula for all essential on-the-job training.

A6.3 Information Management

A6.3.1 Purpose and Description

The City's ability to effectively manage its collection system relies fundamentally on access to the most current information concerning assets and facilities. The City utilizes a suite of tools for information management system and retrieval. The following key elements are the principal information management tools used by the City:

- The **ClearPoint Strategy** system is used by the City to track Key Performance Indicators, build dashboards and reports, and monitor progress toward achieving goals. The system functions as a Management Information System (MIS) by managing summary data from multiple sources, including work orders, customer service requests, maintenance, inspections, sewer system inventory, safety incidents, scheduled monitoring/sampling, compliance/overflow tracking, equipment/tools tracking, and part inventory.
- The City maps assets within the distribution and collection systems using a **Geographic Information System.** Hard copies of available record drawings are also kept on file and referenced, as are the Sewer Books, which are based upon legacy field drawings. GIS assigns each asset a unique asset identification system. Existing alternative identification systems (legacy IDs) are used in addition to the GIS-based unique identification method. Relevant information is available in GIS for most of the system including sizes, materials, lengths, elevation, and installation dates. Most of the information in the GIS was obtained from record plans, but there has been some field surveying of assets and that information has been added to GIS.
- As described elsewhere in this CMOM Program Plan, **Cityworks AMS** software is currently being implemented to provide the City with work order tracking capabilities and to facilitate better asset management. Assets must be created within GIS before associated records can be created in Cityworks, because Cityworks is a GIS driven program. This system is expected to go live in the year 2020. The City will be developing written instructions for managing and tracking records in Cityworks including work orders, inspections, maintenance, and inventory.

Other information management tools include:

- Supervisory Control and Data Acquisition systems covering the City's distribution and collection system, two water treatment plants, one wastewater treatment plant, and wellfields
- A Customer Information System (CIS) to manage billing and accounts system (Cayenta)
- A Customer Relationship Management (CRM) system to track complaints (QAlert)

- The Pipe Logic and Granite software applications for sewer inspection data
- Excel spreadsheets for maintenance and asset tracking.

The City uses three resources for document organization and sharing: Laudershare, Laserfiche, and a storage server. Laudershare is an implementation of Microsoft SharePoint that provides cloud-based, collaborative document sharing online. Laserfiche and the storage server are other resources to enable the City to manage documents, videos, photos and other content. All information resources mentioned are listed in **Figure A6-2.**

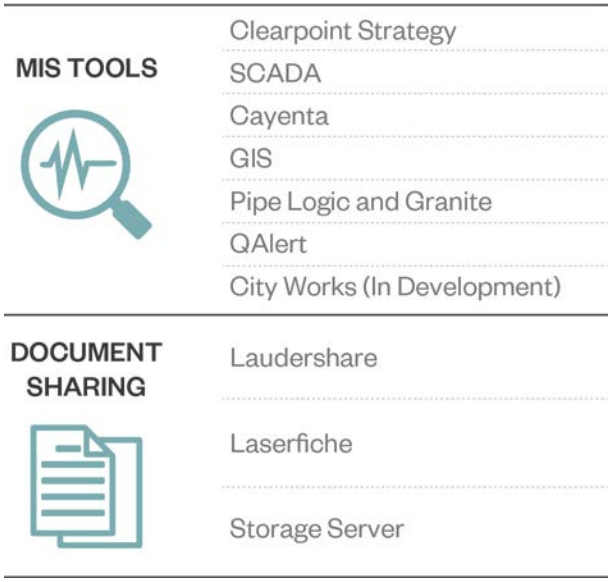

Figure A6-2: Information Management Resources

A6.3.2 Responsibilities, Resources and Training

Responsibility for the Information Management System has to date been dispersed broadly across the organization and involves personnel from Water Billing in the Finance Department (Cayenta), Strategic Support in the Public Works Department (QAlert), the IT Department (storage server, Laserfiche, GIS), the Division of Structural Innovation in the City Manager's Office (ClearPoint Strategy), and the D&C and Sustainability Divisions (Pipe Logic and Granite). Cityworks, which is intended to coordinate and receive inputs from the multiple other elements of the information system, is being implemented within the Public Works Department. The City's intention for Cityworks is to obtain external training for supervisors; supervisors will then implement on-the-job training for other personnel as required.

A6.3.3 Information Management and Continuous Improvement Process

Records related to the wastewater collection system and associated CMOM programs are maintained by the Distribution and Collection System Management and staff using Excel spreadsheets, paper records, and the GIS database. Records include all required information for the City to track maintenance and spare parts needs, and distinguish activities taken in response to an overflow event. Overflow events are documented in compliance with County and State requirements. Cityworks will assume greater importance in records management as the implementation proceeds.

For keeping track of overall goals and making sure that projects are kept on budget, KPIs are utilized in the program ClearPoint Strategy. The following is a list of the KPIs on ClearPoint Strategy:

- Budget Measures
- Community Builder's Perspective
- Financial Perspective
- Fuel Usage
- Internal Division Performance Measures
- Neighbor Perspective
- Sustainability Perspective
- Vision & Strategic Measures

Each objective is under the responsibility of either the Engineering, Sustainability, Administration, or Utility department. Additionally, each has several measures to track performance. Examples of the KPI “Budget Measures” are (1) the miles of milling resurfacing constructed, (2) the total linear feet of storm systems assessed for condition of pipe, and (3) the wastewater treated in million gallons per day per full time employee.

Notably, the City is currently engaged in a multi-phase mapping and data acquisition effort designed to capture data on all existing and in-construction force mains, gravity mains, isolation and other control valves, air release valves, access and conflict manholes, pump stations, and directional flow routes of each of these components to pump stations and the receiving facility. It is anticipated that the mapping and data acquisition program, as well as longer-term activities including mainline video inspection and manhole inspections, will result in continuous improvements in the quantity and accuracy of system mapping.

A6.3.4 Implementation Plan

Because of the relatively low maturity and high priority of the information management system and associated practices as identified in the City’s self-assessment under the CMOM program, multiple activities have been identified as part of an implementation plan. Note that the Reference Number corresponds to the specific activity/task as presented in Part C, *Program Schedules.*

A6.3-1 Implement consistency among work orders and customer complaints with respect to the level of detail recorded, nature of the event that prompted the work order or complaint, actions taken, scheduled preventative maintenance or inspections, and compliance/SSO tracking. Cityworks implementation, as currently planned, will address this item.

A6.3-2 Develop an SOP for creation/verification of assets in GIS, since Cityworks is a GIS-driven program and assets must be created within GIS before associated records can be created in Cityworks.

A6.3-3 Evaluate the potential for Cityworks to help with tracking and reporting of performance indicators as part of the Cityworks implementation. Review and adjust identified performance indicators as appropriate in view of evolving commitments and demands related to CO compliance and AM-CMOM Program implementation.

A6.3-4 Record maintenance procedures, including a listing of the minimum retention dates for different types of files, the formats for the files, the methods for long-term storage, data security, and provisions for secure off-site duplicate records.

A6.3-5 Create detailed description of personnel authorized to enter, read, create reports from, edit, and delete each of the different types of files in the MIS, as well as applicable training to assure security of operation.

A6.4 Budgeting

A6.4.1 Purpose and Description

The Public Works Department creates an annual budget of operating costs for capital and O&M expenses that provides line item details for labor, materials, and equipment. Budgeting begins with a revenue estimate, and staff generate applications for those projects they have identified as priorities. Management reviews the project applications in view of the funding available, and projects are selected for funding as a result of this process. It is expected that the AM-CMOM program and other related initiatives will shift the budgeting process away from reactive/emergency operations and towards more planned and predictive expenditures that reflect improved knowledge of condition-based needs in the collection system.

A6.4.2 Responsibilities, Resources and Training

The Public Works administration is in charge of their own budgeting process. In terms of funding, there are separate funds for distribution and for collections. The Central Regional fund (Funds 451/458) is utilized for wastewater treatment and disposal and is supported by the cities of Tamarac, Wilton Manors, Oakland Park, and Fort Lauderdale. A separate water and sewer system fund (Fund 454) finances CIP projects for the distribution and collection systems. A

portion of the water and wastewater revenues has historically been returned to the City's general fund.

One resource utilized in the budgeting process is the Comprehensive Utility Strategic Master Plan (CUSMP). The CUSMP identifies capital projects along with planning-level budget estimates, and proposes timing based upon priority. The City's most recent CUSMP concluded that a funding gap existed for needed sewer improvements. The City has recently obtained an ordinance to allow annual adjustments to utility rates as a part of an effort to address estimated funding needs.

The cost of the maintenance program is a significant part of the annual operating budget and is separate from other utility services. O&M staff develop annual budget estimates using past cost records and in-house knowledge of repair/replacement and upgrade needs. Both preventative and corrective costs are categorized. All maintenance costs are tracked to keep records of expenditures as accurate as possible, and division managers are responsible for staying within budgets. Notably, the City recently conducted a compensation study to evaluate local pay rates and staffing needs, and as a result of this adjusted titles/duties, personnel organization, and compensation.

Expenditure controls are limited because a significant portion of maintenance is performed on a corrective or emergency basis. The costs of major collection system repairs and alterations are capitalized as capital improvement projects for the annual operating budget.

The Public Works administration assesses the adequacy of user rates and the need to recommend user rate changes. User rates are calculated by potable water consumption, and user charges are evaluated and adjusted annually. The current rate for wastewater service is $3.90 per 1,000 gallons for users of less than 3,000 gallons per month and $8.63 per 1,000 gallons for users of 4,000 to 10,000 gallons per month. There is no commodity charge for users of greater than 10,000 gallons per month. To keep user rates updated, the City has an ongoing rate study.

A6.4.3 Information Management and Continuous Improvement Process

Annual budgets are provided in a Community Investment Plan (CIP) that schedules capital improvements and operations and maintenance projects. The CIP is organized to depict the spent and unspent balance per project as well as the budget for the current year and each of four years into the future. The City also conducts an annual revenue Sufficiency Analysis to determine the sufficiency of funding and make adjustments as required. Notably, the most recent CIP included a budgeted program for replacement of over-capacity pipes. The Distribution and Collection management consistently tracks spare parts, tools, and labor expenditures to assist in the preparation of the coming year's budget.

Financial tracking is performed by City finance personnel using the IBM FAMIS Financial Information System. The City is currently in the process of transferring these functions to a new Enterprise Resource Planning software package, Lawson Infor. It is anticipated that Infor will

become operational during 2020. At a future date, the new ERP will be integrated with Cityworks to increase the automation of cost tracking work orders.

Clearpoint Strategy is also used in the budgeting process and lists the following goals to improve the budgeting process:

- Annually Develop a Structurally Balanced Budget and CIP
- Invest Strategically in the City's CIP
- Develop and Monitor Structurally Balanced Budget Annually
- Coordinate the City's Quality Management System

A6.4.4 Implementation Plan

The City's self-assessment under the CMOM program characterized budgeting practices as being of medium maturity and high criticality. Accordingly, budgeting generally was given high priority for further development and multiple activities were identified as part of an implementation plan. Note that the Reference Number corresponds to the specific activity/task as presented in Part C, *Program Schedules*.

A6.4-1 Develop a plan to implement a capital reserve (sinking) fund as a way of saving for replacement of system components once they reach or exceed their service life.

A6.4-2 Develop standard operating procedures to track and record the percentages of predictive, preventative, corrective, and emergency maintenance as a part of the overall maintenance budget within the annual budget. Track and record the percent of the overall budget allocated to maintenance.

A6.4-3 Assess sufficiency of measures adopted to address the CUSMP conclusion that a funding gap existed for needed sewer improvements. Assess budget impacts associated with the goal of shifting the operations focus from corrective and emergency maintenance to predictive and preventive maintenance over a rolling five-year planning horizon. Ensure that budgets include maintenance backlogs.

A6.5 Customer Service

A6.5.1 Purpose and Description

The City has well-developed systems and policies related to customer service and public communications. The City's online portal, Lauderserv, allows detailed customer service requests to be submitted at any time. **Figure A6-3** shows the public facing Lauderserv service request portal. Customer service access is also provided on a 24-hour basis via telephone. The City's self-assessment under the CMOM program characterized customer service as having a high

degree of maturity in its current organization and wastewater-related practices including incident reporting, notification protocols, and escalation procedures involving the Public Affairs office.

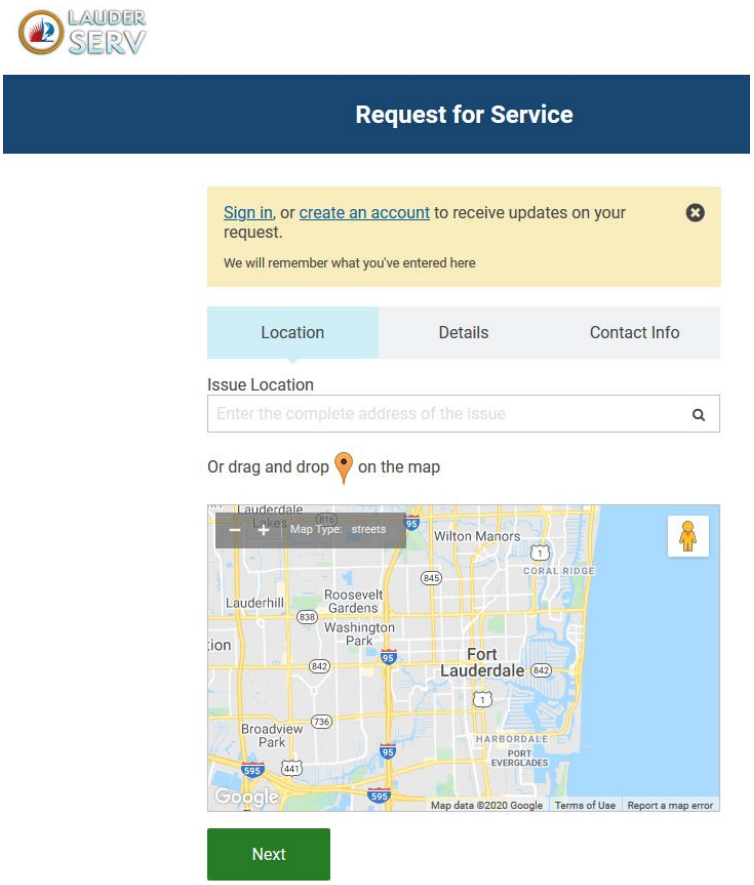

Figure A6-3: Public-facing Lauderserv service request portal

A6.5.2 Responsibilities, Resources, and Training

The Office of Strategic Communications, formerly Public Affairs, takes lead responsibility as an information resource center for the public and employees by developing and implementing public information strategies as well as coordinating internal communications. Responsibilities of the Office of Strategic Communications are as outlined below.

- Assist the City's departments with public education initiatives and special events.
- Draft, design and distribute all print and electronic materials including brochures, pamphlets, and fliers, to foster the public information strategies of all City departments.

- Develop and distribute to the media press releases about City activities, programs and news.
- Respond to all media and resident inquiries regarding City programs and events.
- Develop and distribute a monthly e-newsletter about City programs, services, events, and issues.
- Develop and manage postings on the City's social media accounts.
- Manage content on FLTV, the City's on-demand video library and cable-access channel.
- Create content on the back of City of Fort Lauderdale utility bill statements and fliers inserted in the utility bills.
- Develop messages that are recorded on the City's phone system monthly to inform callers about City, events, services, and programs.
- Develop, produce and place advertising including broadcast and print advertisements in local and national publications and venues.

Field crews also play an important role in customer service and communications. Personnel wear uniforms and vehicles/equipment are identifiable as City assets. Field crews also receive training in public relations as a part of the City's ongoing continuing education program, to improve communications with residents while field work is being conducted.

The Public Works web page is an important tool for establishing communication between the City and its residents. For informing the public about user rates, the City publishes rates annually on the public website (https://www.fortlauderdale.gov/departments/finance/utility-billing), along with public meeting information and frequently asked questions. Moreover, the "Code Red" automated calling system sends mass notifications by phone, email and text to keep citizens informed in the event of an evacuation, utility outage, main break, fire or flood, chemical spill, or other emergency situation. Section 5.1 of this document further describes public notifications and resources.

The number for the Customer Service Call Center is 954-828-8000. This phone line is active 24/7 and utilized for submitting customer service requests, providing an efficient yet comprehensive way to ensure minimal call time and promote customer satisfaction. Typical complaints for the City include odor and drinking water taste/color. The tracking system for these requests is called the QAlert system as previously noted.

The Customer Service-related SOPs are listed below.

- PW-UTL-DC-GEN-CPL-2- Email Response Procedure
    - Guides staff through written or oral responses to customers

- PW-UTL-DC-GEN-CT-5-Letters to Neighbors Affected by D&C Construction
    - Lists the notification procedures for D&C Work.

A6.5.3 Information Management and Continuous Improvement Process

The main resource for information management in the Public Works Department is the QAlert Customer Relationship Management system. QAlert records complaints and requests and allows Public Works to address them in a timely manner. The public submits complaints to Public Works through the 24-hour Customer Service Call Center and an online web portal, referred to as Lauderserv. **Figure A6-4** shows the QAlert Call Center service request input page. Service records via QAlert track the following information:

- Personnel who received the complaint or request
- Date and nature of the complaint or request
- Location of the problem
- Name, address, and telephone number of the customer
- Cause of the problem
- Responsible party to whom follow-up action is assigned
- The initial date of the follow up action
- Date the complaint or request was resolved
- Total days to end the problem
- Feedback to the customer

These service requests may be viewed on a map, as shown in **Figure A6-5**. Although there is currently no systematic procedure for utilizing QAlert data as the basis for maintenance scheduling, D&C management utilize these data to guide maintenance on an as-needed basis. The City also tracks the time to respond to a QAlert complaint or request. However, this will all change with the implementation of the Cityworks AMS. Service requests entered into QAlert will automatically generate a service request in Cityworks, which will be given to a crew to respond according to workflows being established as part of Cityworks implementation.

The number of neighbor calls to the 24-hour Customer Service Center are tracked throughout the year as a KPI on ClearPoint Strategy. The KPI also shows the percent differences in these calls from one year to another.

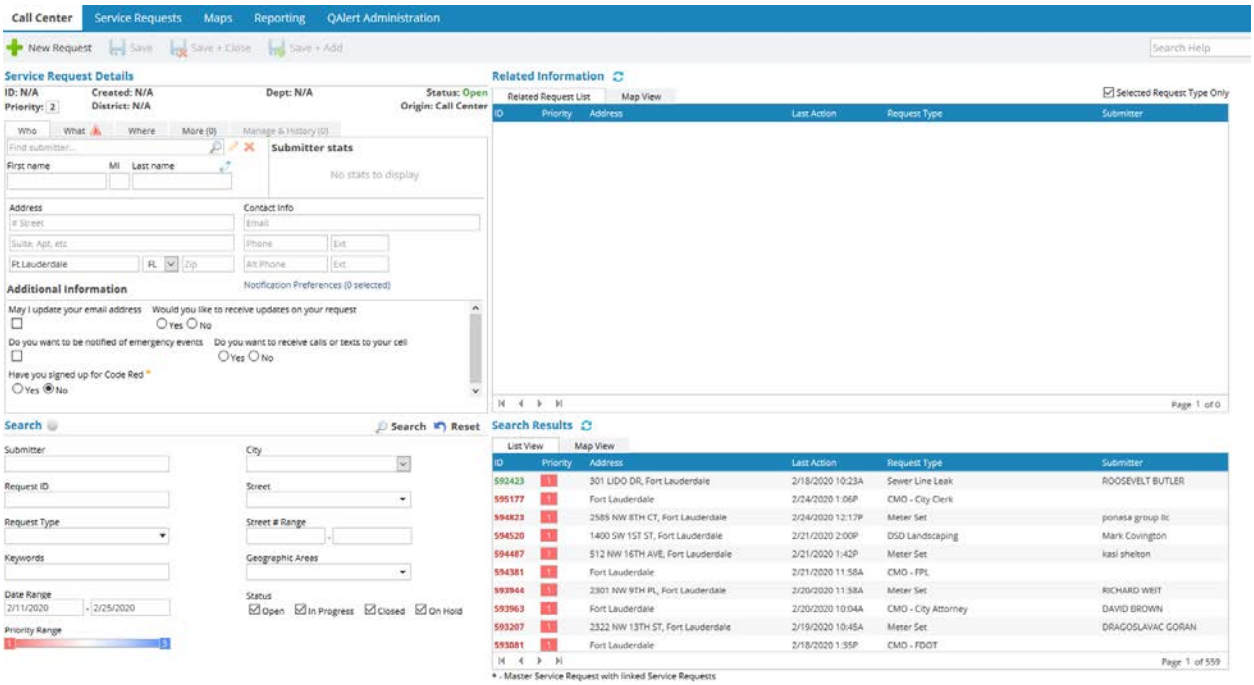

Figure A6-4: QAlert Call Center Service Request Input Page

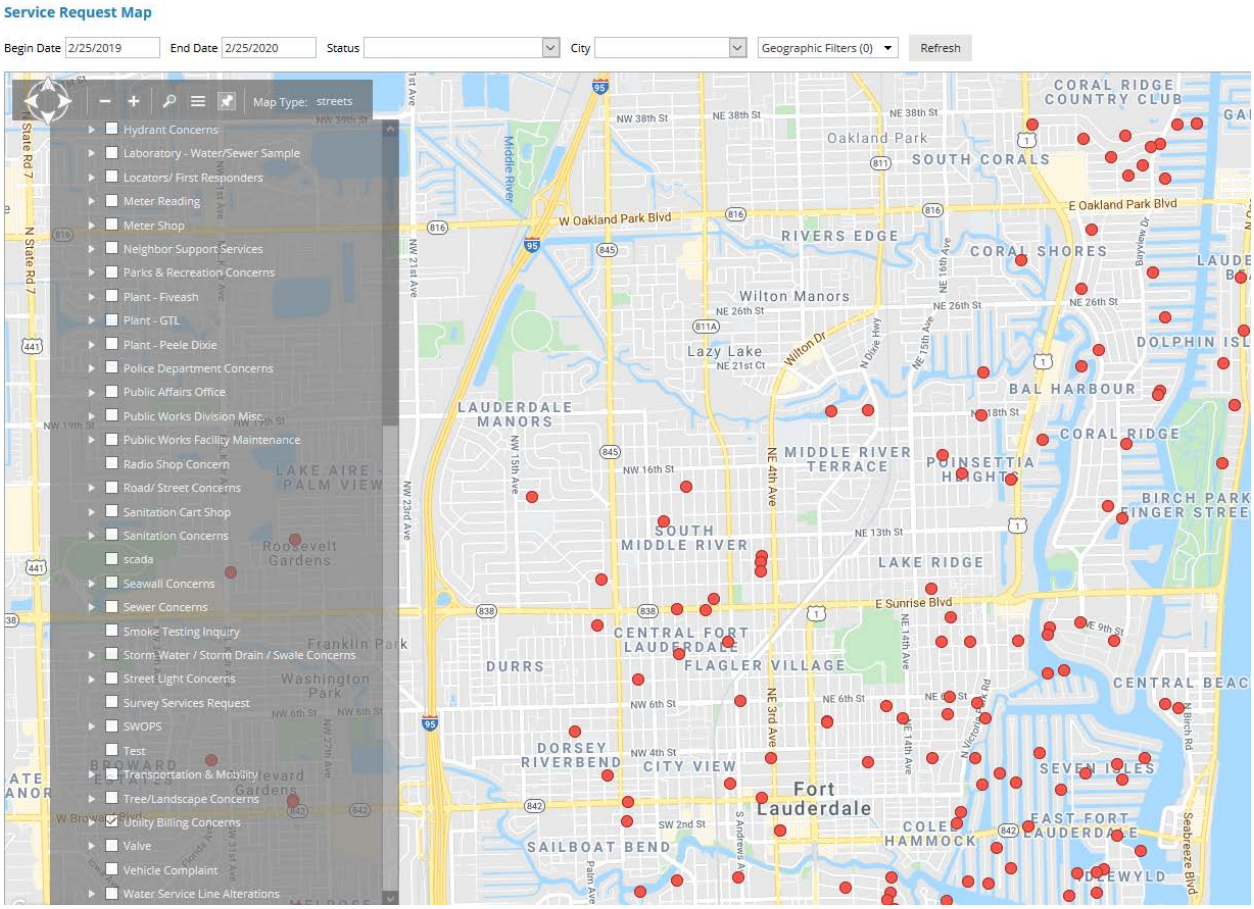

Figure A6-5: Example QAlert Service Request map

A6.5.4 Implementation Plan

Based on the well-developed nature of the City's Customer Service Program as noted, a limited number of items were identified for the implementation plan. Note that the Reference Number corresponds to the specific activity/task as presented in Part C, *Program Schedules*.

A6.5-1 Review public education and outreach programs in view of additional commitments and demands related to Consent Order compliance and AM-CMOM Program implementation.

A6.5-2 Implement QAlert integration into Cityworks AMS.

A6.5-3 Track the percentage of customer complaints resolved within a time period selected to reflect the City's responsiveness goals.

A6.6 Legal Support

A6.6.1 Purpose and Description

Fort Lauderdale has published rules, regulations, and ordinances, which place requirements on connections to the sanitary sewer system. Chapter 28, Article V of the City's Code of Ordinances establishes Sewer Use Regulations. The Sewer Use Regulations define pretreatment requirements, including the grease trap ordinance and industrial discharge requirements, application and permit issuance procedures, and reporting requirements. Wholesale user agreements are also in effect between the City and wholesale users that discharge to the sanitary sewer system: the Cities of Tamarac, Wilton Manors, and Oakland Park; the Town of Davie; and Broward County (Port Everglades and unincorporated areas). The wholesale users maintain their own collection systems, and service connections to those systems are governed by the wholesale users. There are formal agreements in place with all of the volume sewer customers. In general, it appears that agreements were last amended in 2001 or earlier.

The Fort Lauderdale Sewer Use Regulations contain inspection standards, pretreatment requirements, and sewer permits. The regulations also contain procedures and enforcement actions for standard items like fats, oils, and grease (FOG), fire and explosion hazards, oils or petroleum, corrosive materials, and materials which may cause impacts at the wastewater treatment plant. New connections are required to follow City standards, inspections, and approval, and the wholesale users are mandated to adopt an ordinance containing the provisions of the City of Fort Lauderdale's municipal sewer use ordinance or one which is at least as stringent.

A6.6.2 Responsibilities, Resources, and Training

Permits and Permit Conditions are tracked by the Department of Sustainable Development (DSD). The Large User Wastewater Agreements and the Sewer Use Ordinance (SUO) are resources that define the legal authority of the City and provide guidance for inspection standards, pretreatment requirements, and building/sewer permit issues. The Large User Wastewater Agreements indicate the annual average, peak flow rate, and the pretreatment and sampling requirements that are in effect. The Large User Wastewater Agreements can be renewed under different terms. The City Attorney's office is responsible for renewal and/or revision of these agreements.

A6.6.3 Information Management and Continuous Improvement Process

The City retains and stores all records and documents under the City records management archival and retention protocols for electronic and paper documents and records.

Re-evaluations and updates to the SUO and Large User Agreements are discussed under the implementation plan below.

A6.6.4 Implementation Plan

In accordance with the relatively low maturity and medium-level priority of the legal authority element of the City's operations as identified in the City's self-assessment under the CMOM program, an implementation plan task is defined as outlined below. Note that the Reference Number corresponds to the specific activity/task as presented in Part C, *Program Schedules.*

A6.6-1 Review Large User Agreements and the City's SUO for consistency with additional commitments and demands related to Consent Order compliance and AM-CMOM Program implementation.

A6.7 Fats, Oils, and Grease

A6.7.1 Purpose and Description

In February of 2017, prior to the CO, the City completed a Grease Trap Pilot Project analysis to assess the level of compliance with the existing ordinance and evaluate the need for a formal grease trap permitting and inspection program. The Pilot Project included field assessments of restaurants with grease traps, as well as a survey of the same properties to characterize existing grease trap maintenance operations and obtain owner/operator feedback on potential changes to the program. The surveys were completed by a representative of the property under inspection.

The City reached the following conclusions based on the field assessments and survey results:

- A dedicated grease trap program was not necessary at that time. Voluntary compliance and maintenance of grease traps were sufficient to prevent excessive grease from entering the City's sanitary sewer system.
- Revisions to the City's Sewer Use Ordinance were warranted to further define acceptable levels of maintenance and measures for enforcing compliance. A comparison to other utilities should be performed and amendments proposed if needed.

The CO also requires that the City's practices related to FOG control and enforcement be evaluated for alignment with EPA Guidance. In general, the EPA Guide specifies that sewer owners/operators should have an ordinance that contains **adequate grease control measures**. The grease control section of the SUO contains the requirement to install grease traps at appropriate facilities such as restaurants, as well as mandate that grease traps be properly maintained and pumped out on a regular basis. Periodic inspections of grease traps by collection system personnel, and the ability to enforce compliance through fines or other measures, are also be addressed.

Alignment of the City's existing practices with the EPA Guide and with other utility practices is reviewed in Appendix AD and summarized briefly herein.

A6.7.2 Responsibilities, Resources, and Training

Code Enforcement is responsible for inspecting FOG generators and enforcing the SUO. The SUO contains a procedure for notice of violation for FOG. It requires an explanation of the violation and a plan for the satisfactory correction and prevention thereof, to include specific required actions to the submitted by the user to the City. In general, the City has concluded that current practices for control and regulation of FOG are adequate to prevent FOG-related overflows.

A6.7.3 Information Management and Continuous Improvement Process

At this time, MS Excel spreadsheets are used to track FOG inspections. Additional information management measures are identified for consideration in the implementation plan, along with regular self-assessment concerning the effectiveness of FOG control policies. The FOG program will be periodically reviewed for effectiveness and any necessary enhancements will be implemented.

A6.7.4 Implementation Plan

Based on the City's CMOM self-assessment, the City concluded that an expanded FOG control program is not necessary at this time. the following actions would be evaluated for possible future implementation as warranted. Note that the Reference Number corresponds to the specific activity/task as presented in Part C, *Program Schedules*.

A6.7-1 To assess sources and problem areas, use the Geographic Information System to inventory and locate entities that produce FOG constituents and link the inventory to a complaint database that notes when FOG is responsible for blockages.

A6.7-2 Periodically revisit whether there is a need for implementation of mandatory measures including inspections, periodic grease pumping, penalties for violators, and "strong waste" monthly surcharges added to restaurant sewer bills to cover the cost of inspections and upgraded infrastructure.

A6.7-3 Periodically revisit whether there is a need for expansion of programs for compliance assistance and public education, along with establishment of KPIs to measure the effectiveness of the FOG Control Program. Concurrently evaluate programs and practices for management of rags and hygienic wipes.

Section A7
Program Evaluations

A7. Program Evaluations

Performance evaluations of Fort Lauderdale's AM-CMOM Program will be conducted annually to review successes and deficiencies and assess the need for program modifications. Each CMOM Program element will be evaluated for consistency with current practices and progress on improvement initiatives. Revised approaches will be defined and adopted in accordance with the results of these self-assessments. Changes in processes or documentation will be updated as appropriate in the CMOM Program.

As part of CMOM implementation, Fort Lauderdale will also track performance measures to allow for the ongoing evaluation of operations, maintenance and system performance criteria. The system performance data will be reviewed in conjunction with the program element performance measures identified in this document to identify any areas that may need adjustment, additional resources or increased emphasis.

Table A7-1 lists the performance measures that have been identified for implementation and will be reviewed annually as part of the CMOM Program performance evaluation. Note that a more detailed version of Table A7-1 is presented in the CSAMP, attached as Part B. Annual assessments are intended to provide an opportunity to reflect on the current year's performance data and compare results with the previous year's performance data to determine if there are any trends which may identify the need for program adjustments. Fort Lauderdale may modify the measures and targets as necessary to best track the goals of the CMOM Program.

Table A7-1. Performance Measures

No.	Metric organized by Effective Utility Management Attribute	Asset Management Program	Emergency Response Programs	System Evaluation and Capacity Assurance Programs	Engineering Design and Construction Programs	Operation and Maintenance Programs	Support Programs
1. Product Quality							
	Sewage Overflow Rate			X		X	
	Consent Order SSO Compliance			X		X	
2. Customer Satisfaction							
	Average Time to Address Incidents or Complaints		X			X	X
	First Call Resolution		X			X	X
	Overall Customer Satisfaction						X
3. Stakeholder Understanding and Support							
	SSO Reporting Compliance						X
	Wastewater Utility Spill/Abnormal Event Reports					X	
	Service Affordability	X					X
4. Financial Viability							
	Capital Expenditure (%)	X					
	O&M Expenditure (%)	X					
	R&R Program (%)	X					
	R&R Program (Equipment Replacement)	X					
5. Operational Optimization							
	O&M Cost per Volume of Wastewater Delivered	X					
	O&M Cost per Volume of Wastewater Processed	X					
	Energy Use per Volume Processed	X					
6. Employee and Leadership Development							
	Employee Turnover						X
	Certification Coverage (percent)						X
7. Enterprise Resiliency							
	OSHA-Recordable Injuries						X
	Critical Parts and Equipment Inventory					X	
8. Infrastructure Strategy and Performance							
	Wastewater Treatment Plant Dry Weather Influent BOD			X			
	Rainfall Dependent Infiltration and Inflow Rate			X			
	Collection System Inspection Rate - Gravity Mains (%)					X	
	Collection System Inspection Rate - Manholes (%)					X	
	Force Main Integrity					X	
	Preventive/Corrective Maintenance Ratio	X				X	
	Asset Renewal/Replacement Rate (%)	X					
	Air Release Valve Inspection and Testing Rate (%)					X	
	In-Line Valve Inspection and Testing Rate (%)					X	
	GIS Asset Attribution Rate (%)					X	X
	Preventive Maintenance Work Order Completion Rate (%)					X	
	Condition Assessment Coverage, Collection/Transmission (%)	X				X	
9. Community Sustainability							
	Service Affordability	X					X
	Bill Affordability - Median Household Income (%)	X					X
	Bill affordability - Lowest Quintile Household Income (%)	X					X
10. Water Resource Sustainability							
	I/I Contribution to System (%)			X			
	Deep Well Capacity Utilization (%)			X			

Appendix AA

Sanitary Sewer Overflow Response Plan

CITY OF FORT LAUDERDALE

CITY OF FORT LAUDERDALE

WASTEWATER CONSENT ORDER PROGRAM

SANITARY SEWER OVERFLOW RESPONSE PLAN

OGC No. 16-1487
City Project No. 12367
Hazen Project No. 43194-011
November 25, 2019

Hazen

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List of Acronyms

Acronym	Definition
AM	Asset Management
ARV	Air Release Valve
BCEPGMD	Broward County Environmental Protection and Growth Management Department
BCEMD	Broward County Emergency Management Division
City or CFL	City of Fort Lauderdale
CFR	Code of Federal Regulations
CMOM	Capacity, Management, Operation, and Maintenance
CMS	Central Maintenance Shop
CO	Consent Order
D&C	Distributions and Collection System
DEM	Division of Emergency Management
DOH	Department of Health
EPA	Environmental Protection Agency
ERA	Environmental and Regulatory Affairs
ERP	Emergency Response Plan
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FDOH	Florida Department of Health in Broward
FIC	Field Investigation Crew
FM	Force Main
FS	Florida Statutes
GPS	Global Positioning System
GTL	George T. Lohmeyer
KPI	Key Performance Indicators
NELAC	National Environmental Laboratory Accreditation Conference
O&M	Operations & Maintenance
PS	Pump Station

Acronym	Definition
psi	pounds per square inch
PWD	Public Works Department
QA/QC	Quality Assurance/Quality Control
SCADA	Supervisory Control and Data Acquisition System
SCO	Strategic Communications Office
SFWMD	South Florida Water Management District
SSO	Sanitary Sewer Overflow
SSORP	Sanitary Sewer Overflow Response Plan
SWO	State Watch Office
USACE	US Army Corps of Engineers
USCG	US Coast Guard
USFWS	US Fish and Wildlife Service
WWTP	Wastewater Treatment Plant

1.0 Introduction

1.1 AM CMOM Program

The City of Fort Lauderdale (City) entered into Consent Order (CO) Number 16-1487 with the Florida Department of Environmental Protection (FDEP) Office of the General Council on September 29, 2017. The CO identifies corrective actions, with completion deadlines, to improve sanitary sewer service within the City. Paragraph 6(k) of the CO requires the City develop and submit an Asset Management and Capacity, Management, Operations and Maintenance (AM-CMOM) Program.

AM focuses on overall risk exposure, and ways to minimize the cost of balancing risk with a desired level of service. The primary elements of an AM program are more capital focused and involve sustained performance and the long-term life cycle of assets.

CMOM focuses on activities that involve day-to-day operations and maintenance of the collection system to prevent sewer spills. The Sanitary Sewer Overflow Response Plan (SSORP) was developed as a component of the City's CMOM Program.

1.2 Purpose and Goals

The City Public Works Department prepared this Sanitary Sewer Overflow Response Plan (SSORP) to prevent, reduce, or otherwise control sanitary sewer overflows (SSOs).

The purpose of the SSORP is to establish and document standardized processes and procedures:

- To protect public health and the environment by reducing the effects of SSOs;
- To provide a coordinated response to SSOs; and
- To improve communication at all levels, including external communication with other agencies, property owners, and the media.

The SSORP goals are to:

- Efficiently respond to, clean up, and minimize the impact of SSOs and Building Backups;
- Promptly notify potentially impacted public, customers, and agencies during and following SSO and Building Backup events through coordinated communications and outreach;
- Accurately report SSO and Building Backup information and data, especially estimated volumes, durations, causes, and potential impacts;
- Proactively prevent, reduce, or otherwise control SSOs and Building Backups to protect public health and the environment;
- Provide high quality customer service; and
- Maximize regulatory compliance.

The regulations that drive the agency response procedures are Florida Administrative Code (FAC) Chapter 62-604.550, FAC Chapter 62-62.610, Section 403.077 of the Florida Statutes (FS), and Section 27-58(b)(3), Chapter 27 of the Broward County Code of Ordinances.

The primary purpose of the State Watch Office (SWO) within Florida's Division of Emergency Management (DEM) is to record, analyze, and share information with Federal, State, and County agencies and entities. Under FAC Chapter 62-604.550, the SWO within Florida's DEM must be notified of any unauthorized release or spill of wastewater to surface or ground water or any other abnormal event that:

- Results in a discharge in excess of 1,000 gallons
- Or endangers public health or the environment

Additionally, under FAC Chapter 62-604.550, the FDEP must be notified of any unauthorized release or spill that:

- Results in a discharge of 1,000 gallons per incident or less

GTL WWTP is permitted by the State of Florida under Permit FLA041378. FAC 62-62.610 covers all aspects of reporting requirements, including fines and accessibility for regulatory agencies during an abnormal event at the WWTP.

Under Section 403.077 of the Florida Statutes (FS), a release must be reported via a Public Notice of pollution through the FDEP if the unauthorized discharge:

- Reaches waters of the State
- And is reportable to the SWO

Under Section 27-58(b)(3), Chapter 27 of the Broward County Code of Ordinances, the Broward County Environmental Protection and Growth Management Department (BCEPGMD) must be notified of all abnormal events, including sanitary sewer spills, that:

- Could cause unsafe or inadequate treatment plant operation
- Are not in accordance with the Broward County Code of Ordinances

The Broward County GTL WWTP License (WWTP – 0700 New) also requires that BCEPGMD be notified within 8 hours if a private system malfunctions or has the potential to result in an overflow, and sampling results must be provided within 24 hours.

The City of Fort Lauderdale has adopted the policy to report all spills to the FDEP and BCEPGMD, regardless of volume. A Public Notice of Pollution is also completed for all spills.

The City has adopted a number of initial Key Performance Indicators (KPI) to meet SSORP goals, and to ensure that successes are properly documented and reported. These KPIs will assess the overall effectiveness of the SSORP and enable the City to make adjustments in the program to achieve the established performance goal. **Table 1-1** presents the KPIs that the City will employ to measure, track, and report performance of the SSO and Building Backup reporting, response,

and prevention activities, along with the initial target for each. These performance measures are calculated monthly and subject to semi-annual and annual evaluations.

Table 1-1: Performance Goals

Key Performance Indicator	Target
Annual average SSO response time[1]	90 minutes
Annual average SSO control time[2]	
For small diameter gravity sewers	90 minutes
For large diameter gravity sewers	120 minutes
For force mains	120 minutes
For pump stations	4 hours
For Regional Pump Stations[3]	8 hours
Annual number of SSO events per 100 miles of gravity sewer[4]	< 7 per 100 miles
Annual number of pump station related SSO events per 100 pump stations[5]	< 1 per 100 pump stations
Annual hours of SSORP preparedness training per employee[6]	1 hour

Table Notes:

[1]Average of the time from the initial notification at the Customer Service Call Center until the time the City response crew arrives on-site for all confirmed SSO events, excluding Building Backups, occurring during the previous year.

[2]Average of the time from the City response crew arrival on-site until the time the SSO discharge, excluding Building Backups, from the stated asset is stopped for SSO events occurring during the previous year.

[3]Regional Pump Stations are stations categorized as "regional" through a combination of station function and geographic location. Regional stations typically receive flow from other lift stations and were frequently constructed to replace small package-type wastewater treatment facilities that had been acquired by the City.

[4]Annual number of confirmed gravity sewer related SSO events divided by the year-end total miles of gravity sewer within the wastewater collection system for the previous year.

[5]Annual number of confirmed pump station related SSO events divided by the year-end total number of the City owned and maintained pump stations within the wastewater collection and transmission system for the previous year.

[6]Total hours of SSORP preparedness training divided by the number of City staff assigned to SSO response crew duties during the previous year.

1.3 Appendix Organization

SSORP Appendices are organized in a manner that is intended to make information easy to find and thereby facilitate emergency preparedness and response. For this reason, references to the appendices may not appear sequentially in the document.

Appendices are grouped into the following categories:

- Appendix A: Response Procedure Workflow and ERP Checklist
- Appendix B: Reporting Forms
- Appendix C: Communications and Contact Information
- Appendix D: Operation of City Valves
- Appendix E: Overflow Volume Estimation
- Appendix F: Wastewater Collection and Transmission System Maps

1.4 SSORP Review and Maintenance

The performance measures will be evaluated annually, and lessons learned will be noted to enable the City to continuously improve the SSORP and other programs. The review will also include review of other CMOM Programs, changing conditions, revisions to regulatory requirements, and other factors that may impact the SSO response, reporting, or prevention activities. As the SSORP matures, less frequent evaluations may be recommended.

2.0 System Organization and Resources

2.1 Response and Notification Personnel

SSO response activities are the responsibility of the Utilities Distribution and Collection Systems (D&C) Manager when the SSO event relates to gravity sewer, force main, and pump station assets. The Water and Wastewater Treatment Division Manager has the primary responsibility to respond to SSOs related to treatment plant assets within the GTL WWTP fence line. SSORP reporting activities are the responsibility of the Environmental and Regulatory Affairs (ERA) within the Sustainability Division.

The City has developed detailed plans to mobilize labor, materials, tools, and equipment to correct or repair any condition that may cause or contribute to an unpermitted discharge. **Table 2-1** provides an overview of the emergency response plan elements, City staff responsible for each element, and the SSORP section that addresses the plan element. As noted in the following sections, these roles may be delegated depending on the magnitude and the potential impact of the spill event. The current response procedure workflow, including responsible parties, is summarized in **Appendix A-1**.

The City of Fort Lauderdale's Emergency Response Plan (ERP) is a confidential document that outlines internal procedures in the event of various emergencies within the utility. Checklist 27 relating to SSO response is provided for reference in **Appendix A-2**.

Table 2-1: Personnel Responsible for Implementing Response Procedures

Response Plan Element	Responsible Party	SSORP Section
Dispatch Field Investigation Crew and contact Utilities Division Manager, Environmental and Regulatory Affairs, and Strategic Communications Office	Customer Service Call Center	3.2
Verify that discharge is an SSO	On-call Field Investigation Crew	4.1
Notification of Key Personnel	Customer Service Call Center	3.2
Contain Overflow	Field crews led by the D&C Manager[1]	4.2.1
Correct Overflow	Field crews led by the D&C Manager[2]	4.2.2
Clean-Up Procedures for Public SSO	Field crews led by the D&C Manager[1]	4.2.3
Respond to spills within the GTL fence line	Field crews led by the GTL WWTP Manager	4.1.2
Clean-Up Procedures for Building Backup	Contractor	4.2.3
Verbal notification to agencies	Environmental and Regulatory Affairs	5.3.1
Written notification to agencies	Environmental and Regulatory Affairs	5.3.2
Public and media communications	Strategic Communications Office	5.2
Sample Collection (if applicable)	Environmental and Regulatory Affairs	6.1
Sample Lab Work (if applicable)	Environmental Lab Staff	6.1
Follow-up Volume Determination	Distribution and Collections Manager	6.3
Follow-up Cause Determination	Distribution and Collections Manager	6.4

[1]Authority is delegated to an Incident Commander as deemed appropriate by the D&C Manager.
[2] Circumstances may arise when the City relies on the support of private-sector construction assistance. This is particularly true in cases involving large pipes buried to such depths as may require sheet piling and dewatering, or aerial force main canal crossings that require heavy equipment not owned by the maintenance or repair units. These non-standard operations may be assigned to heavy construction contractors on City's list of pre-approved emergency contractors.

2.2 Preparedness Training

The City currently holds routine SSORP training workshops conducted with managers and key personnel to review established emergency response activities and current SSORP procedures and protocols. The training is led by the ERA Division for Utilities employees and other affected City agencies including Customer Service, ERA, and Engineering. These workshops are held on an as-needed basis, and are meant to achieve the following goals:

- to provide new or reassigned personnel who may be involved in a discharge event with an overall understanding of the response actions
- to inform staff following any changes or updates to regulations or policy
- as a refresher on emergency response procedures, safety, and public health/environmental protective measures

The presentation used for the 2019 SSO Training is provided in **Appendix C-1**.

Different levels of emergency response have been, and will continue to be, executed for all wastewater spill events. These spill events share many common response elements. Accordingly, emergency first responders initiate the response procedure workflows as appropriate.

3.0 Identification of Sanitary Sewer Overflows

3.1 Receipt of SSO Notification

Possible SSOs are identified by various sources including the general public, City staff, and SCADA alarms. In all cases, the City's 24-Hour Customer Service Center is responsible for receiving and routing the SSO notification. Contact information for the Customer Service Center is presented in **Table 3-1**.

Table 3-1: 24-Hour Customer Service Center Contact Information

Means of Contact	Contact Information
Address	949 NW 38th Street Fort Lauderdale, FL 33309
Phone	(954) 828-8000
Fax	(954) 828-7791
Request for Service via Webpage	www.fortlauderdale.gov/lauderserv

All notifications are routed via the City's Q-Alert system. Q-Alert is a work order system that assigns a work order number to all calls received and notifies a pre-determined list of recipients via email based on the type of alert.

3.1.1 By General Public

The most common identification source is when a customer or the public calls the Customer Service Call Center to report a problem such as an overflowing manhole, a foul-smelling discharge, a pump station alarm horn or light, a slow-draining or stopped drain, or a backed-up drain. The Customer Service Call Center receives calls seven days a week, 24 hours a day. An observer may also report an SSO via the LauderServ customer service request webpage, which prompts the user for location of the issue, a written description of the issue, photos of the issue, and the user's contact information. Once the report is received by Customer Service, a Q-Alert is sent to Operations.

3.1.2 By City

Potential overflow events may be directly identified by City staff, who are directed to inform the Customer Service Call Center of potential SSOs using the contact information in **Table 3-1**. The City's Public Works radio channel information is also provided in **Appendix C-2**. After the Call Center receives the call, the same internal notification process is initiated as described above for a report received from the general public.

3.1.3 By SCADA Alarm

Potential overflow events may also be identified by the City's automatic Supervisory Control and Data Acquisition (SCADA) system alarms activated by the City's remote monitoring systems. The SCADA system alarms are continuously monitored by Customer Service Call Center staff. Call Center staff are responsible for initiating field response protocols based on the nature of those alarms.

3.2 Internal Notification

Upon receipt of a report of a possible SSO event, the Call Center is responsible for dispatch of Field Investigation Crews (FIC). Two FICs are available during normal working hours and one FIC is available during non-working hours.

The FIC assesses the problem and verifies if an unpermitted discharge is occurring or has occurred. By mobile communication, the FIC reports the findings back to the Customer Service Call Center. Once the SSO is confirmed by the FIC, the City's Call Center ensures the on-call ERA staff and the D&C Manager are aware of the event via a Q-Alert notification. For spills within the GTL WWTP, the Water and Wastewater Treatment Division Manager is notified. The Call Center also is responsible for notifying the Strategic Communications Office (SCO), and sending an e-mail to Key Personnel as listed in **Appendix C-3.**

For spills in the public distribution and collection system, the D&C Manager leads the field response activities or delegates an Incident Commander (also referred to as designee) depending on the type of SSO, impact of SSO, and the availability of management staff. The designated Incident Commander is responsible for making repair decisions and directing the field crew to begin operations to contain, correct, and clean up the discharge. Based on the type and extent of the SSO, the Incident Commander will contact other Division Managers and dispatch additional field personnel as needed to implement appropriate controls. For spills within the GTL WWTP, the Water and Wastewater Treatment Division Manager or a delegated Incident Commander leads field response activities.

When needed, other Division Managers will assume associated leadership roles to ensure that temporary bypasses, diversions, and emergency flow controls are implemented. While containment, repair, and cleanup procedures are on-going, the Incident Commander is responsible for providing updates to the Customer Service Call Center who will report to other parties as necessary.

The ERA Program provides services to protect, enhance, and restore environmental resources in the City. One role relating to wastewater infrastructure is to act as the local delegated authority for implementation of the Permitted Programs. ERA staff will use information provided by D&C field staff to verify if the SSO has impacted any structures that may affect surface waters, and are responsible for contacting and coordinating with the Environmental Lab Staff to ensure proper

initiation of SSO water quality sampling protocols. The ERA assesses the severity of the reported event and possible impacts to the public or the environment.

Internal notification responsibilities are summarized in **Table 3-2**, along with the SSORP section in which the referenced procedure is discussed.

Table 3-2: Internal Notification Responsibilities

Internal Notification Procedure	SSORP Section
Potential Overflow is first noticed	3
Public, City Staff, or SCADA alerts Customer Service Call Center of a potential overflow	
Customer Service Call Center notifies and dispatches Field Crews	
Customer Service Call Center notifies the Distribution and Collections System Division Manager	
Customer Service Call Center notifies Environmental and Regulatory Affairs	
The Distribution and Collections System Division Manager notifies other Division Managers as applicable	
Field Crew Verifies SSO	4.1
Field Crew Reports back to Customer Service Call Center and Division Manager	
Customer Service Call Center notifies Environmental and Regulatory Affairs	
Customer Service notifies Strategic Communications Office	
Customer Service sends an email to specified Key Personnel	
Division Manager directs Field Crew to Begin to Contain, Correct, and Cleanup	4.2
Division Manager or Incident Commander dispatches additional field personnel (if applicable)	
Division Manager or Incident Commander provides an update to the Customer Service Call Center	
Environmental and Regulatory Affairs contacts the Environmental Lab Staff	

4.0 Response Procedures

4.1 Verification Protocol

In responding to potential SSO incidents reported to the Customer Service Call Center, the FIC assesses the problem and reports back to the Call Center immediately upon verification of a wastewater release or discharge.

Once the FIC confirms an SSO, the D&C Manager or designee directs the field response activities and makes an initial SSO volume range determination to define the type of public or agency notification required. **Appendix E-1** describes an initial, in-field method for estimating the volume of a spill. Based on this initial field estimation, the Call Center initiates the notifications as defined in detail in Section 5. Agency liaison is handled by the ERA Program personnel and supported by the Call Center and field staff. **Figure 4-1** provides a summary of the verification protocol.

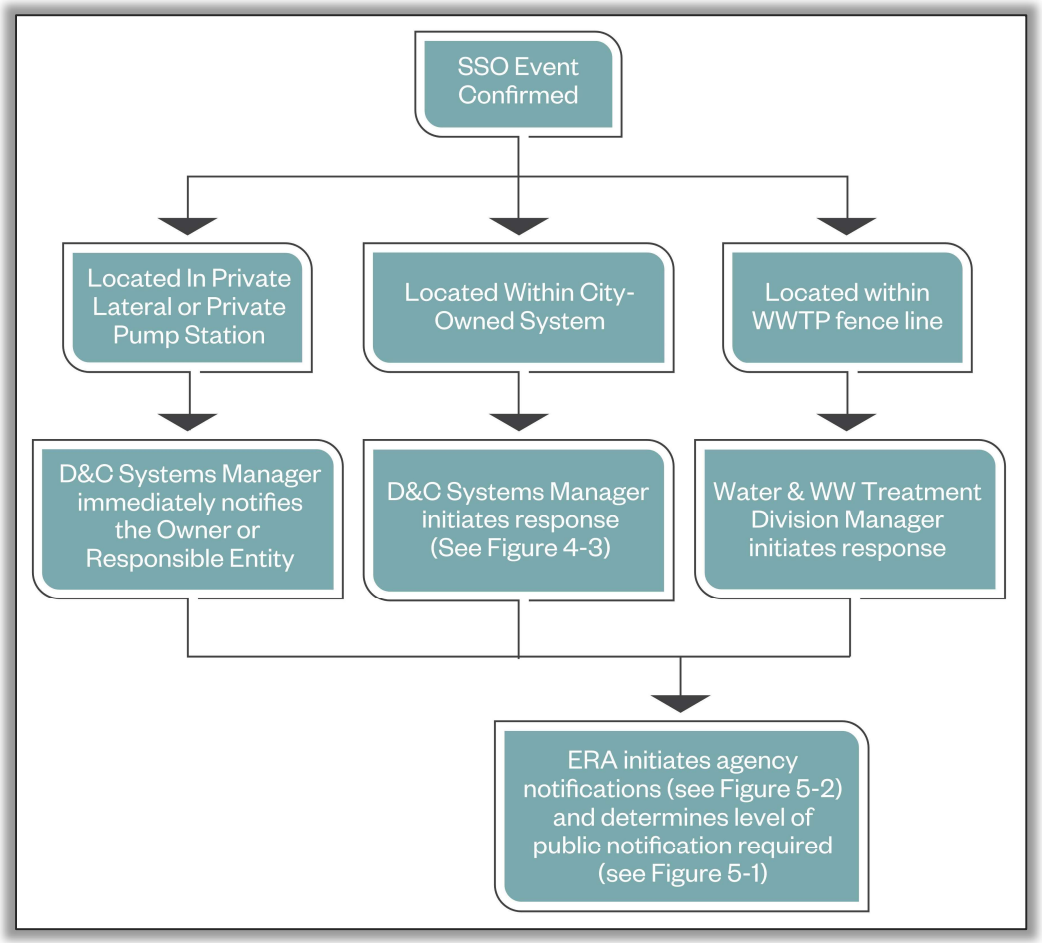


Figure 4-1: SSO Verification Protocol Workflow

4.1.1 Private System

If the SSO is determined to have been caused by a failure in a private lateral or privately-owned lift station, the D&C Manager or designee will immediately notify the property owner or other responsible entity. The D&C Manager or designee will also notify ERA to initiate necessary actions for implementing the required agency reporting and notification procedures.

4.1.2 GTL WWTP

Spills within the GTL WWTP fence line are considered abnormal events and are subject to agency notifications in the same manner as spills within the D&C system. Emergency response to a report of an SSO within the GTL WWTP fence line is coordinated by the Water and Wastewater Treatment Division Manager or designee. The Water and Wastewater Treatment Division Manager will contact other Division Managers and other Department of Public Works personnel as necessary to implement cleanup and remediation actions, including the ERA.

4.1.3 City-Owned System

Emergency response to a report of an SSO within the City-owned wastewater collection and transmission system is coordinated by the D&C Manager and assisted by the Assistant Public Works Director for Utilities and the D&C Supervisor. The D&C Manager will contact other Division Managers and other Department of Public Works personnel as necessary, including the ERA. The D&C Manager or Incident Commander will dispatch personnel and equipment as required to implement cleanup and remediation actions. **Appendices F-1**, **F-2**, **F-3**, and **F-4** provide maps of the City's wastewater gravity piping, pump stations, valves, and previous force main break locations, respectively.

4.1.4 Building Backup

As with the SSO emergency response protocols, the City's Building Backup emergency response protocols start with the Customer Service Call Center. The Customer Service Call Center follows a script to assess, at least on an initial basis, whether it is a City responsibility or a private problem, and to explain the City's billing process related to response actions. Since the customer is responsible for repair and maintenance of the private lateral and for keeping the public lateral free of obstructions, the customer is responsible for calling a plumber to resolve those issues. If the customer calls a plumber who correctly determines the issue was a public sewer issue or required public lateral repair, the City repairs the public lateral and Risk Management reimburses the customer for reasonable plumber's fees associated with the work. The City bills the customer for service calls that are determined to be in the customer's area of responsibility, such as private lateral problems or public lateral obstructions caused by the customer.

Building Backup emergency response follows the same protocols as the SSO emergency response, after it is determined that the event is a Public Building Backup rather than a Private Building Backup in accordance with the Customer Service Call Center scripts. When the cause is determined to be associated with the private lateral or the building plumbing, the Customer Service Call Center (or the FIC Supervisor if the FIC is already on-site) advises the customer to call a

plumber. As a customer service, the FIC may also provide the customer with a Private Building Backup fact sheet that includes guidance on cleaning up the sewage and preventing future incidents (see **Appendix C-4**).

The City FIC responds to investigate and confirm whether City infrastructure caused the Building Backup. If the backup is on-going, the FIC will initiate measures to stop the backup. In the event that a Building Backup reaches the 1,000-gallon threshold or is a danger to public health or the environment, oral and written agency notification reports are required as described in Section 4.3. At the same time, Risk Management staff is informed to initiate any claim process and to arrange for cleanup contractors to respond. For Building Backups that customers do not report during, or immediately after, a backup, no FIC response is required, but the City's Risk Management investigator will still need to verify the backup. The Risk Management investigator will also research sewer conditions as well as any operation and maintenance activities being performed in the neighborhood during the reported date of the backup event, to assess possible City responsibility. Cleanup reimbursement may be offered for Public Building Backups with proper documentation. **Figure 4-2** summarizes the Building Backup Response Procedure.

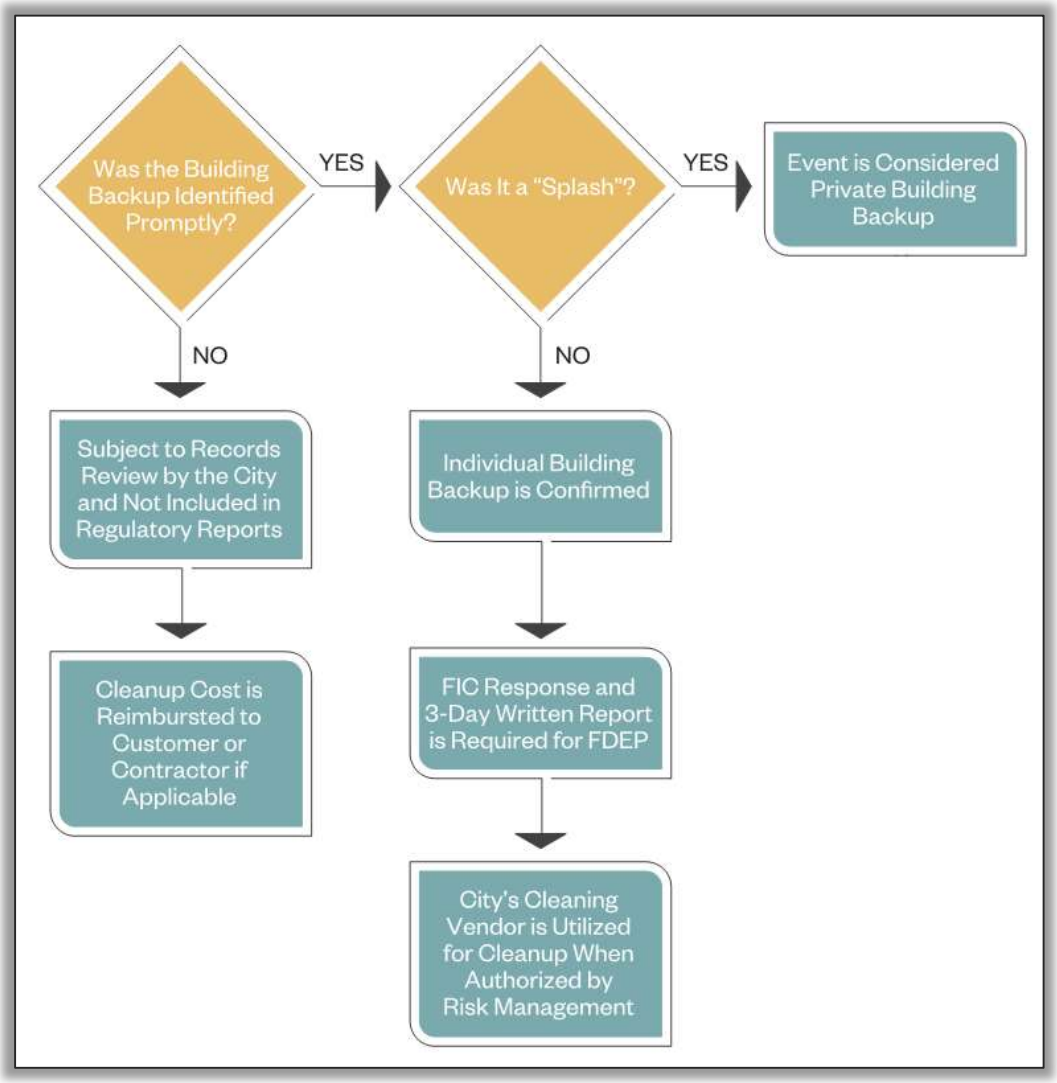


Figure 4-2: Building Backup Response Procedure Workflow

4.2 Contain, Correct, and Clean-up

Immediate actions consist of stopping the spill in a safe manner, internal notifications, repair, and cleanup. Emergency permitting, if necessary, will follow the repair action. The purpose of these actions is to protect the public from harm and any long-term effects resulting from a spill.

City work crews and equipment are stationed at various locations depending on the division. Typically, the first responder division has crews at:

- Public Works Administration Compound, 949 NW 38th Street
- Central Maintenance Shop (CMS), 4250 NW 10th Avenue
- Plant A, 1901 NW 6th Street

For the most common types of SSO events, the City has developed flow charts illustrating SSO field crew response activities. **Figure 4-3** presents flow charts for SSOs related to gravity mains, force mains, air relief valves, and pump stations. These response activities should be completed in parallel or immediately following verification of the SSO event to the Call Center, so the appropriate incident reporting and notification protocols are implemented.

4.2.1 Contain Overflow

Upon arriving at the site, a three-fold plan is implemented by the responding team members:

- Implement shutdown plans to divert flow from the affected area if a force main or gravity transmission main is involved or if upstream pump stations are expected to pump flow to the area.
- Establish safe working conditions and work to stop the overflow as rapidly as possible. As needed, utilize the assistance of Fort Lauderdale police to ensure people are kept away from emergency work sites.
- Contain the spill area and minimize the release of sewage to populated areas and surface waters (including storm drains that lead to water bodies).

When sewage is overflowing from manholes, cleanouts, wet wells, or failed pipes, the FIC and field crews are directed to immediately divert sewage away from any nearby water body or from any storm drain or catch basin inlet that leads to receiving waters in accordance with the following procedures:

1. Maintain a safe working environment that minimizes the potential for sewage contact by the public or customers.
2. Restore normal flow conditions as soon as possible.
3. Place sandbags or flow barriers such as earthen berms around storm drain inlets, catch basins, or drainage ditches to prevent sewage from discharging into adjacent water bodies.
4. On occasions when normal flow conditions cannot be restored promptly:
    a. Install temporary bypass pumping (see Subsection 4.2.2.4 for bypass pumping details).
    b. Assess the need to communicate with the public and upstream industrial customers to conserve water and limit waste generation during emergency periods.
    c. Minimize the volume of sewage transmitted to impacted portions of the system by such measures as:
        i. Temporarily shut down upstream pump station(s) to store wastewater flow in the upstream collection system and wet wells while repair is affected.
        ii. Manipulate pump stations and/or valves to divert wastewater to other portions of the system.
5. Vacuum or otherwise recover as much sewage as possible, including any impacted drainage systems.

Appendix D-1 and **Appendix D-2** contain the City's procedure for exercising force main valves, and the Operations and Maintenance (O&M) manual for DeZURIK valves found in the City, respectively.

4.2.2 Correct Cause of Overflow

Subsequent to these immediate containment efforts, City and/or contractor crews should correct the failure.

Response personnel are advised of precautions to minimize adverse environmental impacts during repair efforts, as follows:

1. Repair crews should take all necessary precautions to prevent construction debris from falling into surface waters. Any debris that falls into the water shall be removed immediately.
2. Effective turbidity control including, but not limited to, turbidity curtains, shall be employed during all operations that may create turbidity. If necessary, turbidity curtains may be extended to enclose the entire work area. Where water depths and currents allow, turbidity curtains shall be weighted so as to extend to the entire depth, provided that sea grasses will not be damaged. All curtains shall remain in place until turbidity levels have subsided.
3. All excess spoil generated from excavations shall be removed from the work area and disposed of in accordance with applicable federal, state, and local regulations.
4. If historical or archaeological artifacts are discovered at any time within the project site, the City should immediately notify FDEP and the Bureau of Historic Preservation, Division of Archives, History and Records Management, R.A. Gray Building, Tallahassee, FL 32301.

Response activities for each of these different causes of overflows are detailed in **Figure 4-3.**

4.2.2.1 Surcharged Wastewater Pipes

Wastewater pipes that suffer clogs and blockages are identified by observing manhole surcharge conditions. When the blockage location is identified, the City's sewer cleaning crews respond to clear the blockage and restore normal sewage flow conditions as soon as possible. Cleaning crews utilize vacuum trucks to vacuum and remove the sewage and the obstructing materials at the downstream manhole, in order to prevent the materials from moving downstream and contributing to a future blockage. For larger force mains and sewers, repair through an emergency contractor crew might be preferred. Contracts with emergency contracting services are updated annually. The D&C Division may be contacted for the latest information on emergency contracting.

4.2.2.2 Broken Wastewater Pipes

Gravity sewer and force main pipes that suffer failures and produce an SSO are repaired using new piping materials. Such repairs may include measures to prevent flow to the affected section while the repair work is being conducted. Flow through larger force mains and interceptors is diverted within the system to the maximum extent possible. Smaller gravity pipe failures can generally be

managed by shutting down upstream pump stations and plugging pipes. Repairs to smaller force main breaks can often be accomplished by shutting down the upstream pump station(s), and temporarily using upstream storage capacity, for the relatively short time required to affect the force main repair.

Temporary bypass lines carry flow from the nearest manhole upstream of the failure to the next downstream manhole. If necessary, influent wastewater at the upstream manhole will be lifted to the surface using portable pumps and generators. Work crews block the ends of the section under repair to prevent flow from entering. Pipe repair operations then proceed using standard construction methods. Mobile bypass pumps are used to bypass flow when necessary.

4.2.2.3 Broken or Clogged ARV

When a broken or clogged air release valve causes an overflow, the ARV crew is mobilized. The ARV crew first closes the corporation stop to prevent further wastewater release and is then responsible for making the necessary repair or correcting the blockage. The City's maintenance procedure protocol for ARVs and the O&M manual for the ARVs found in the City are provided in **Appendix D-3** and **Appendix D-4**, respectively.

4.2.2.4 Pump Stations

As with pipe-related problems, the top priority for crews responding to pump station (PS) emergencies is to return the station to normal flow conditions. This applies to all types of pump station emergencies whether electrical, mechanical, or structural, and the type of SSO control applied during a specific event will vary depending on the nature of the pump station failure. Activities required to return the station to operational condition will include a root cause analysis to determine the type of repair required.

When a pump station suffers a failure, temporary bypass pumping using portable pumps, piping, and/or generators is installed. When in bypass, the influent to the wet well is pumped to land surface and delivered through a valve connection in the pump station discharge line. In some cases, depending on site-specific conditions, City crews and/or contracted services may pump down the stations by tanker truck. **Figure 4-4** shows a typical bypass pumping installation.

Several pipe loops exist within The City's service area, but the collection/transmission network does not provide completely redundancy. When possible, the quantity of wastewater discharged will be minimized by manipulating flow control devices to reroute flow through other pipelines. In instances where the notification plan is activated and flow reductions are necessary, the City may encourage temporary water use reductions on the part of customers.

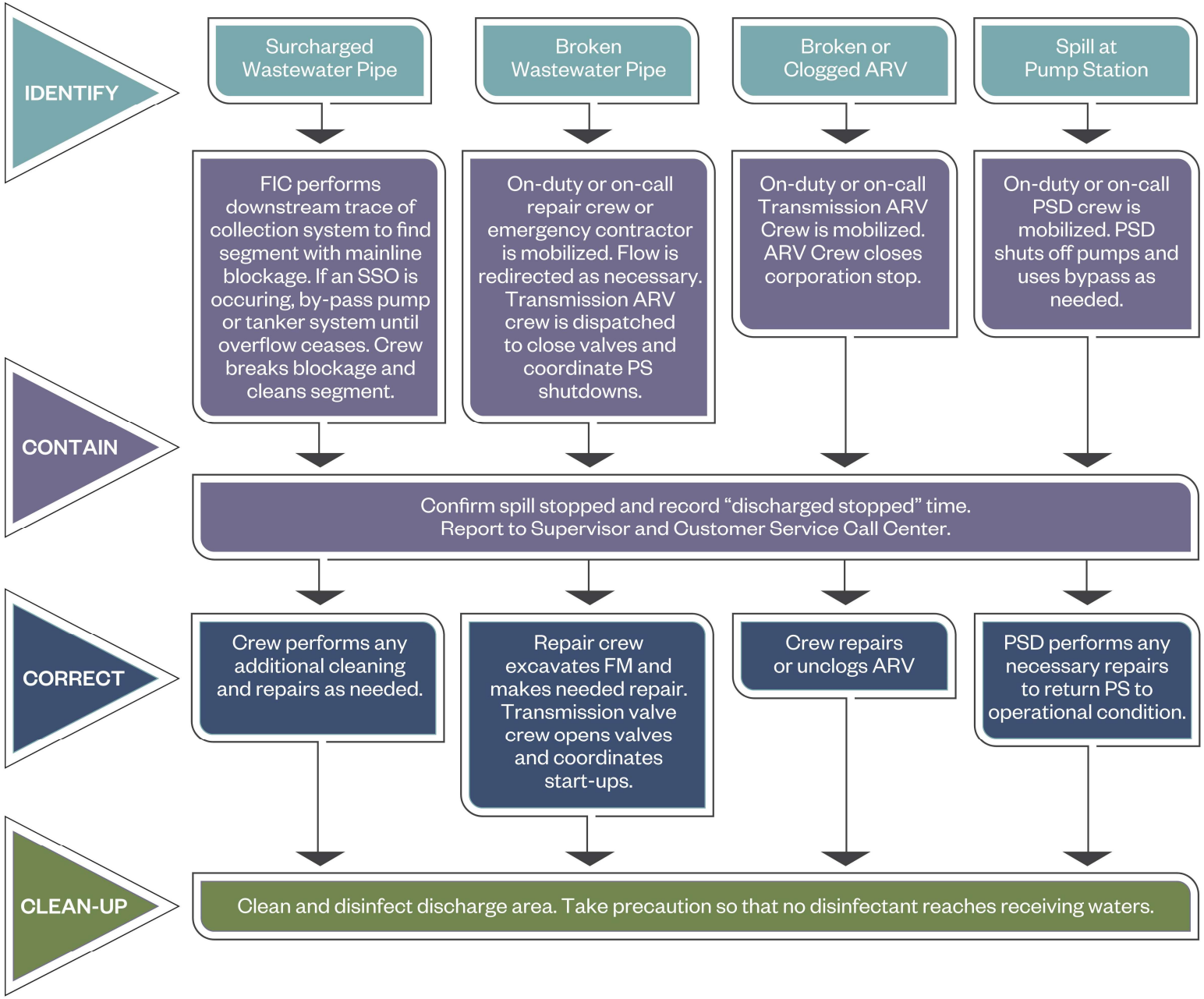


Figure 4-3: Field Response Workflow for Different Causes of Overflow

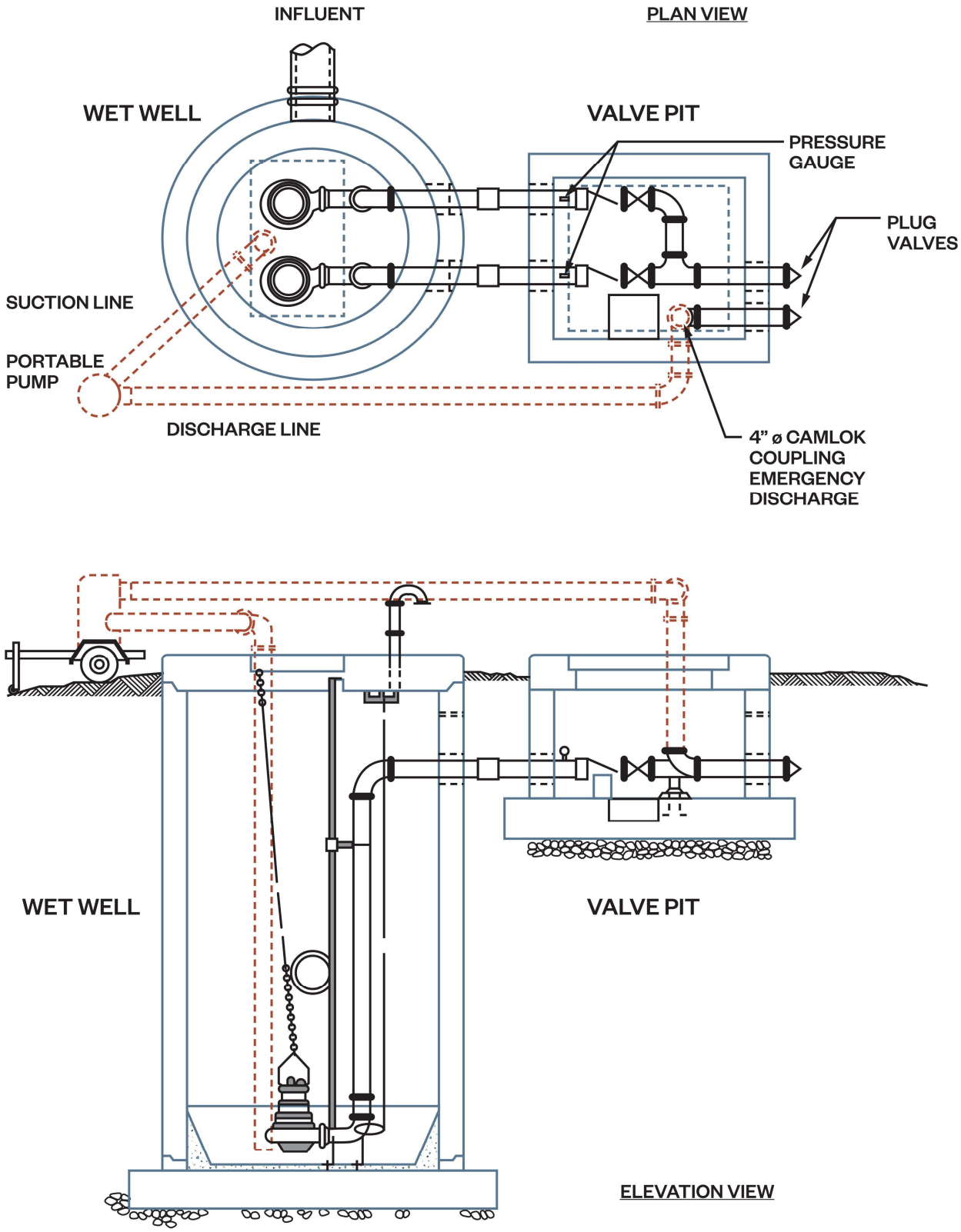


Figure 4-4: Wastewater Pump Station Bypass Schematic

4.2.3 Cleanup Procedures

Once the discharge is contained, corrective actions have been taken, and a repair plan has been developed, cleanup and disinfection procedures begin.

4.2.3.1 SSO Cleanup

Discharges to surface waters are contained by Public Works Utilities personnel to the greatest possible extent. As the problem is being corrected, or immediately thereafter, the City will begin to clean and disinfect areas impacted by the spill. The cleanup and disinfection procedures are:

1. Maintain a safe working environment that minimizes potential for customer and public contact with sewage throughout cleanup activities.
2. Recover and remove spilled sewage to the greatest extent possible using the City's vacuum trucks or larger tank trucks. A fleet of four 3,500-gallon vacuum trucks, two 4,500-gallon tank trucks, and one 8,000-gallon supertanker are available to collect spilled wastewater and return it to a functioning part of the collection system. Where capacity exists, trucks may dispose of spilled wastewater into a downstream manhole. This option is best used for larger spills where the practice can greatly increase the capability of a limited number of hauling vehicles. For large spills, the City may engage the use of contracted vacuum truck services.
3. Wash down spill site with water and collect the wash water by vacuum truck.
4. Rake and remove sewage debris that cannot be removed by vacuum or tank trucks.
5. Apply disinfectant to impervious surface areas where the spill has been removed. (Do not use disinfectant where it might be washed into surface waters or on pervious surfaces.)
6. Post warning signs in accordance with ERA instructions if receiving water has been impacted.
7. Promptly return to remove warning signs upon subsequent ERA and/or FDEP authorization.

4.2.3.2 Building Backup Cleanup

For Public Building Backups, once the field crews have returned the system to normal operations, the Unit Supervisor contacts Risk Management. Risk Management personnel are responsible for authorizing the City's contract vendor to perform cleanup and disinfection procedures as defined in Subsection 4.2.3.2, Building Backup Cleanup.

The City contracts with cleanup contractors to clean and disinfect private property should a City-caused Building Backup occur, or as a customer service should a "splash" event occur during a public sewer cleaning operation. A splash is a spill caused by customer plumbing conditions such as air pockets in the plumbing or clogged air vents during cleaning of a public sewer.

Contractor cleaning and disinfection procedures are as follow:

1. After the service call is received to provide cleaning and disinfection following a sewage backup, the contractor contacts the affected party and gives instructions not to touch anything that has been in contact with sewage and to stay away from the impacted areas.

2. Upon arrival at the scene of the incident, the contractor assesses the damage and takes photographs to document conditions.
3. All personal belongings that have been in contact with the sewage are placed in plastic bags for proper disposal.
4. The affected areas are sprayed with a pressure steam gun and a solution of Simple Green D Pro 3®, a one-step hospital-grade germicidal cleaner registered with the Environmental Protection Agency (EPA). At the same time, the water and sewage are extracted. This mixture of high temperature with antibacterial agents and deodorizer has proven to be effective in killing pathogens that may be found in sewage, exceeding the effectiveness of chlorine as a disinfectant.
5. After all the affected areas are sprayed and liquids are extracted, a complete rinse is done with hot water at pressures between 700 and 1,000 pounds per square inch (psi). Materials to which such water pressures cannot be applied are cleaned and disinfected by applying Simple Green D Pro 3® with a hand sprayer followed by rinsing with clean hot water.
6. After all the affected areas are cleaned and disinfected, and floors dried or disposed of (e.g., carpet or laminate flooring), the last step is treatment with a fogging (wet) machine and Microban®, which is an antimicrobial product protection suitable for a range of materials including polymers, textiles, coating, paper, and adhesives. The Microban® fogging treatment is crucial due to different viruses that can be found in sewage, such as Rotavirus, Adenoviruses, and Norovirus. The fogging treatment with Microban® is effective in killing viruses when applied in accordance with manufacturer's instructions.

The City is typically able to respond to a customer complaint of a possible Building Backup within 60 to 90 minutes. Once the FIC confirms a Public Building Backup, the cleanup contractor generally responds within another 60 to 90 minutes and, if site access is authorized by the customer, initiates cleanup immediately upon arrival at the site. Cleanup is normally completed the same day. However, there are times when the customer prefers to schedule cleanup for a later time and those requests are accommodated by the cleanup contractor. Upon completion of the cleanup, the customer is asked to sign a form indicating the cleanup was performed to the customer's satisfaction to ensure the adequacy of the cleanup.

5.0 Documentation and Reporting

5.1 SSO Reporting Requirements

The responding Incident Commander is responsible for dispatching additional response crews, if needed, and providing initial SSO data to the Call Center for initial SSO reporting, preferably within two hours. In some cases, all required information may not be available within two hours. However, it will be provided as soon as it can be determined without interfering with the primary mission of the responding crew to stop the overflow. The Call Center notifies the on-call ERA staff via Q-Alert and initiates a Sanitary Sewer Overflow Report Form (**Appendix B-1**). This form is used as a supplement to Q-Alert and completion is not mandatory.

The goal of the immediate 8-hour notification is to minimize the potential adverse impacts on public health and the environment (including impacts to users of area waters that might become contaminated by unpermitted wastewater discharge), to comply with Broward County requirements, and to alert other agencies that may provide support in the response. The City's protocols and procedures to support these goals are described in the following subsections on Public Notifications and Agency Notifications. During normal business hours, the City's Customer Service Office provides ongoing updates of events to the City Manager, SCO, Public Works, and ERA Staff.

5.2 Public Notification Plan

All spills shall be visible by the public via the FDEP Pollution Notice. Additional public notification protocols are initiated immediately upon the Customer Service Call Center becoming aware that a major spill is occurring. For smaller spills, the ERA Program determines if public notifications are required. Major spills are defined as spills that are:

- Large (50,000 gallons or more)
- On-going
- A danger to public health or the environment

Public/Private Building Backups are not subject to public notice except in the unusual situation where the threat of localized flooding and widespread backups exists or where the backups have the potential to adversely impact public health. A summary of the public notification protocol can be found in **Figure 5-1**.

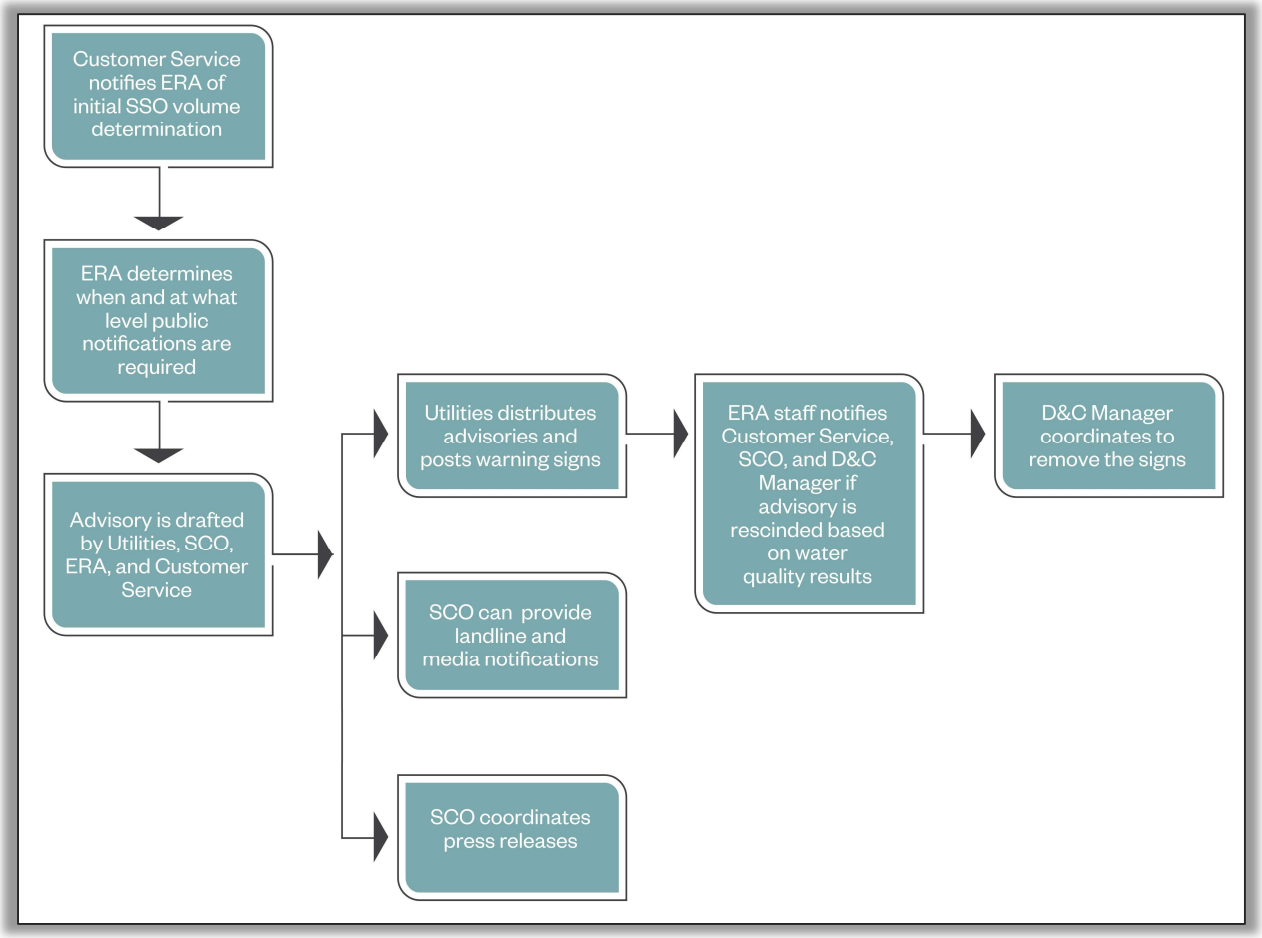


Figure 5-1: Public Notification Workflow

5.2.1 Public Notification

The ERA Program determines if a public advisory is required based on the location of the spill, volume of the spill, and proximity to the public. When a "No Recreation" or "No Swim" advisory is required, the advisory is drafted by Utilities, SCO, ERA, and Customer Service and then distributed by Utilities.

Depending on the severity of the incident, SCO has the option of providing for land-line telephone notification of residents in the affected areas by using "CodeRed", a "Reverse 911" process. Additional public notifications using social media websites may also be used by the SCO.

The Customer Service Call Center generates the Preliminary Spill Report based on information and data provided by the FIC and Division Manager responsible for SSO response activities. The information on cause is based on conditions readily observable in the field and may be subject to change based on more detailed, follow-up investigations. The estimated SSO volume should also

be considered preliminary, as it may be based on field observations or calculations performed under strenuous time constraints.

5.2.2 Public Access Advisory

Customer Service and Utilities or Emergency Management coordinate the posting of warning signs to minimize or prevent public access to sites where a potential health threat may exist. ERA's water quality sampling plan forms the basis for sign posting locations as it is based on receiving water connectivity and flow patterns. For significant discharges to receiving water, the signs are posted the day the SSO occurs and remain in place until sampling results indicate water quality has returned to published guidelines for the water body's use. Once repairs have been completed and the results of water quality monitoring in the affected water bodies and shoreline areas are available, the Environmental Laboratory Supervisor e-mails the water quality results to the ERA. The determination of when the public access postings can be removed is based upon the bacteria testing results in the affected areas. ERA staff notifies the Customer Service Call Center and SCO when the public access advisory is rescinded and instructs the D&C Manager to remove the public access advisory signs.

5.2.3 Media Communications

Upon determination of a major spill requiring public notification, the ERA section coordinates public notification with the City's SCO. The SCO then coordinates press releases through a multitude of media. Contact information for local media is provided in **Appendix C-5**.

Outside of normal business hours, the City's SCO provides news releases by e-mail to a pre-established media distribution group. Pre-scripted news releases are available for editing and prompt release to provide updates during the incident.

The news release will characterize the situation and advise of possible health risks, describe any special conditions such as traffic disruption required to complete necessary repairs, and make appropriate requests of the public to limit water use. The news release will also include any affected bodies of water and associated public advisories regarding impacts to swimming and recreational activities.

5.3 Agency Notification

The ERA Program is responsible for generating required reports and submissions to regulatory agencies in compliance with permitting conditions and specified deadlines.

Under FAC Chapter 62-604.550, the SWO within Florida's DEM must be notified of any unauthorized release or spill of wastewater to surface or ground water or any other abnormal event that:

- Results in a discharge in excess of 1,000 gallons
- Or endangers public health or the environment

Additionally, under FAC Chapter 62-604.550, the FDEP must be notified of any unauthorized release or spill that:

- Results in a discharge of 1,000 gallons per incident or less

FAC Chapter 62-04.550(2)(b) requires verbal reporting to FDEP or SWO within 24 hours. The verbal notification must be followed by a written report describing the incident no more than five days following the event. The FDEP may waive the 5-day written report if the verbal report was received within 24 hours, the discharge did not endanger public health or the environment, and the release, spill, or abnormal event has been corrected. FAC 62-62.610 covers all aspects of reporting requirements for abnormal events at the WWTP. The City has adopted a conservative interpretation of the regulations by reporting all spills, regardless of volume.

Under Section 403.077 of the Florida Statutes (FS), a spill must be reported via a Public Notice of Pollution through the FDEP if the unauthorized discharge:

- Reaches waters of the State
- And is reportable to the SWO

The Public Notice of Pollution form is submitted via webpage (preferred) or via email. If after providing the notice the ERA Program determines that a reportable pollution release did not occur, that an amendment is warranted, or that the release migrated outside of the property boundary, the ERA Program shall notify FDEP. The FDEP is responsible for publishing the notice on a website accessible to the public and shall electronically notify interested parties including local government, health departments, or news media. The City's policy is to submit a Public Notice of Pollution form for all spills.

Under Section 27-58(b)(3), Chapter 27 of the Broward County Code of Ordinances, BCEPGMD must be notified of all abnormal events, including sanitary sewer spills, that:

- Could cause unsafe or inadequate treatment plant operation
- Are not in accordance with the Broward County Code of Ordinances

The City must, per conditions of its permit, provide a verbal SSO report to BCEPGMD within eight hours of an event. The verbal notification must be followed by a written report describing the incident no more than three working days following the event. The Broward County spill policy from May of 2019 can be referenced in **Appendix B-3**. The spill policy and forms are updated annually and provided to the ERA via email. Similar notification is required for spills at the WWTP. The City's policy is to report all spills to BCEPGMD.

A summary of the agency notification protocol can be found in **Figure 5-2**.

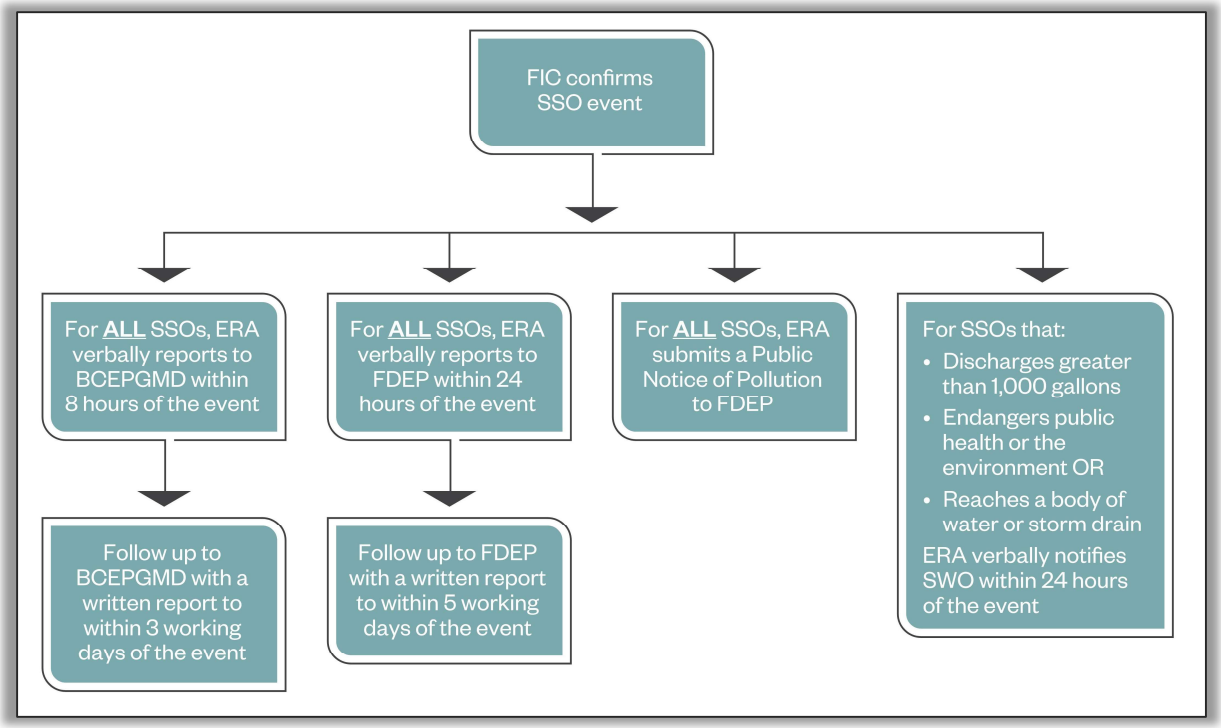


Figure 5-2: Agency Notification Workflow

5.3.1 Immediate Notifications

The Call Center notifies ERA immediately upon confirmation of an SSO event, regardless of size, because ERA is responsible for agency notifications. The City's internal goal, for reporting SSOs discharging to waters of the United States or the State, is within eight hours from the time the SSO event is confirmed.

5.3.1.1 Broward County Environmental Protection and Growth Management Department

Within eight hours of the sewer overflow event, the on-call ERA staff verbally notifies BCEPGMD by calling the **Broward County Hotline at (954) 519-1499**. The on-call ERA staff provides the following information to the extent known:

- Name and callback number for the person reporting the event
- Address of the event
- Estimated volume of discharge
- Estimated time event started
- Estimated time of correction
- Information on whether the sewer overflow is affecting a body of water directly or through a storm drain discharging to a surface water outfall
- Information on whether a public area is affected that cannot be isolated

5.3.1.2 Florida Department of Environmental Protection

The on-call ERA staff verbally notifies FDEP within twenty-four hours of all sewer overflow events. Per City policy, all sewer overflow events are verbally reported to the **FDEP designated representative at (561) 681-6694**. The on-call ERA staff will provide the following information, to the extent known, to the FDEP designated representatives:

- FDEP Facility-Site ID for the GTL WWTP: DEP FLA041378
- Name, address, and telephone number of person reporting
- Name, address, and telephone number of permittee or responsible person for the discharge
- Date and time of the discharge and status of discharge (ongoing or ceased)
- Characteristics of the wastewater spilled or released (untreated or treated, industrial or domestic wastewater)
- Estimated amount of the discharge
- Location or address of the discharge
- Source and cause of the discharge
- Whether the discharge was contained on-site, and cleanup actions taken to date
- Description of area affected by the discharge, including name of water body affected if any
- Other persons or agencies contacted

The ERA is also responsible for submitting a Public Notice of Pollution to the FDEP. The City's policy is to submit a Public Notice of Pollution for all SSOs. The preferred method for submitting the Public Notice of Pollution is through the following webpage but reporting entities may also report via email. The pollution notice form is provided in **Appendix B-5**.

- Webpage: http://prodenv.dep.state.fl.us/DepPNP/user/pnpRequest
- Email: pollution.notice@dep.state.fl.us

5.3.1.3 State Watch Office

The on-call ERA staff verbally notifies the SWO within twenty-four hours of all sewer overflow events that:

- Results in a discharge in excess of 1,000 gallons
- Or endangers public health or the environment

The City policy is to report spills that meet either of the above criteria and any spill that reaches a body of water or a storm drain. Reportable sewer overflow events are verbally reported to the **State Watch Office by calling (800) 320-0519**.

Per the SWO Reporting Guidelines (2011), the on-call ERA staff will provide the following information, to the extent known, to the SWO:

- FDEP Facility-Site ID for the GTL WWTP: DEP FLA041378
- Treated or untreated wastewater
- Cause and source of the release (manhole, force main, lift station etc.)

- Responsible Party's name, address and phone number if available
- Domestic or industrial wastewater
- If the release been stopped or is still occurring
- Any waterways affected and the name of the waterway
- Amount released in gallons
- What clean-up efforts have been performed if any
- Any state assistance requested
- Whether the release was on-site or off-site

5.3.2 Written Reports

The City's ERA Section is responsible for submitting reports and supporting data to FDEP and Broward County. The data used to populate the form are compiled primarily from work order information which has been verified, and potentially corrected, by supervisors as needed.

5.3.2.1 Broward County Environmental Protection and Growth Management Department

Within three (3) working days of the sewer overflow event the ERA submits a written report that:

- Describes the incident and the cause of the incident
- The measures taken to correct the problem and prevent its reoccurrence
- The intention toward repair, replacement, or reconstruction of damaged facilities
- A schedule of necessary actions aimed at restoring operation within the license conditions and compliance with all provisions of the current version of Chapter 27 of the BC Code of Ordinances

This report may be faxed to BCEPGMD, or preferably e-mailed, to WWCompliance@broward.org. The "FAX or E-MAIL NOTIFICATION FORM" from May of 2019 presented in **Appendix B-2** should be attached to the written report. The spill policy and forms are updated annually and provided to the ERA via email.

Appendix B-4 contains a "SAMPLE WRITTEN REPORT" form, for use in reporting abnormal events at wastewater treatment plants or major problems/spills that are not corrected within 24 hours and require replacement or reconstruction of a portion of a collection/transmission system.

It is noted that during a tropical storm, or emergency event of a magnitude that results in destruction of infrastructure and/or major power outages, BCEPGMD may suspend the normal spill/abnormal event reporting requirements. The City will continue to report all spills as soon as feasibly possible.

Appendix C-6 contains additional BCEPGMD contact information.

5.3.2.2 Florida Department of Environmental Protection

Within five (5) working days of the sewer overflow event the ERA submits a written report. The same written report that is submitted to BCEPGMD is also typically submitted to the FDEP, ensuring that the following elements are included:

- A description of the spill, release or abnormal event
- The location of the SSO by street address or any other appropriate measure (such as latitude/longitude or global positioning system coordinates)
- The estimated date and time when the SSO began and stopped, or if it is still an active SSO, the anticipated time the SSO will stop
- The steps taken to respond to the SSO
- The name of the receiving water, if applicable
- An estimate of the volume (in gallons) of sewage spilled
- A description of the wastewater collection/transmission system component (e.g., manhole, gravity main, air release valve, force main, pump station wet well, public lateral, private lateral, public cleanout, private cleanout, etc.) from which the SSO was released
- An estimate of the SSOs impact on public health and to water quality in the receiving water body, subject to available information
- The cause, or suspected cause, of the SSO
- The date of the last SSO at the same location, if applicable
- The steps taken or planned to reduce, prevent, or eliminate recurrence of the SSO
- A list of all notifications to the public and other agencies or departments
- The steps taken, or to be taken, to cleanup any surfaces that have been in contact and/or contaminated by the SSO

The written report requirement may be waived for spills less than 1,000 gallons if the verbal report has been received within 24 hours from the time the City becomes aware of the circumstances, and the release, spill or abnormal event has been corrected and did not endanger health or the environment.

This report may be submitted via email to Konstantin Dubov at Konstantin.Dubov@FloridaDEP.gov with copy to SED.Wastewater@FloridaDEP.gov.

Appendix C-6 contains additional FDEP contact information.

5.3.3 Secondary Notification

After those on the Primary Notification list have been contacted, the ERA may contact other agencies, as well as interested and possibly impacted parties, if there has been a verified discharge into surface waters. The following agencies may require notification of an unauthorized discharge:

- South Florida Water Management District (SFWMD)
- US Army Corps of Engineers (USACE)
- US Coast Guard (USCG)
- US Fish and Wildlife Service (USFWS)
- Broward County Emergency Management Division (BCEMD)
- Florida Department of Health in Broward (FDOH)

Under typical operations, agencies on the secondary notification list are not contacted. Contact information and concerns of each agency may be found in **Appendix C-6**.

5.3.4 Emergency Permitting

In addition to regulatory agency SSO notifications, emergency permitting may be required before, during, and after an emergency response.

If work affects streets and roads, the D&C Division is responsible for obtaining emergency MOT permits through the City's MOT department and the Florida Department of Transportation (FDOT). D&C is also responsible for obtaining any emergency construction permits. After-the-fact permits may be required by FDEP for permanent repair work as evaluated on a case-by-case basis.

Many of the federal, state, and local agency requirements may be fulfilled by contacting the agencies and describing the location and extent of the incident. In declared state emergencies, state agencies will issue an Emergency Final Order (EFO), which will outline any requirements such as a waiver of certain permitting or relaxing notification requirements. In times of emergency the EFO is used to determine the state agency requirements.

Appendix C-6 includes the contact information for agencies that may be involved in emergency permitting procedures.

5.3.5 Building Backups

As previously noted, Building Backups caused by conditions affecting the public sewer or public lateral are defined as SSO events. As an SSO event, Building Backups are subject to SSO reporting and notification requirements detailed in the preceding subsections and summarized below for reference.

- Individual Building Backups that are promptly identified to the City are subject to immediate response by the FIC as directed by the Customer Service Call Center are subject to 3-day written report requirements to FDEP Southeast District.
- Individual Building Backups are subject to subsequent cleanup by the City's contract cleaning vendor, when confirmed by the FIC to be caused by conditions within the public sewer or public lateral infrastructure and cleanup is authorized by Risk Management.
- Individual Building Backups that are not identified promptly (i.e., within 90 days of the event or which City field crews cannot verify) and which have been cleaned up by the customer or their contractor, are only subject to records review by the City and possible cleanup cost reimbursement if the records review determines conditions within the public sewer or public lateral infrastructure caused the event. Since these events were not promptly identified, the events are not included in any of the required regulatory reports due to the difficulty of verifying the event or whether the cause was public or private.
- Individual Building Backups that are "splashes" are defined as Private Building Backups and thus are not SSOs. These events are cleaned up by the City's contract cleaning vendor,

or are subject to clean-up cost reimbursement depending on the timeliness of the customer complaint, as a customer service since the sewer cleaning contributed to the event.

The City has adopted regulations regarding the customer's responsibility regarding maintenance of laterals. **Figure 5-3** illustrates a typical lateral installation serving a single property, and defines maintenance responsibilities both for the private lateral (from the connection at the service lateral into and including the house plumbing) and for the public lateral (from the public sewer main to the cleanout at the right-of-way or easement line). As shown in the figure, two cleanouts are required: Cleanout #1 at the building and Cleanout #2 at the right-of-way or easement line.

The customer is responsible for repair and maintenance of the house connection (private lateral) to Cleanout #2. The customer is also responsible for keeping the service lateral (public lateral) free from obstructions to the connection at the public sewer. The City is responsible for repairs to the service (or public) lateral.

During a Building Backup event, the customer may occasionally remove the cleanout cap on Cleanout #1 to alleviate flow entering the building. This causes an SSO discharge to the environment. If the overflow cause is determined to be on the public side and the City is made aware of the discharge, the SSO is reported by the City as a public SSO. If the overflow cause is determined to be on the private side, and the City is made aware of the discharge, the SSO is reported by the City as a private SSO. In some cases, the City will not be aware of the discharge and in those cases the private SSO may not be properly reported.

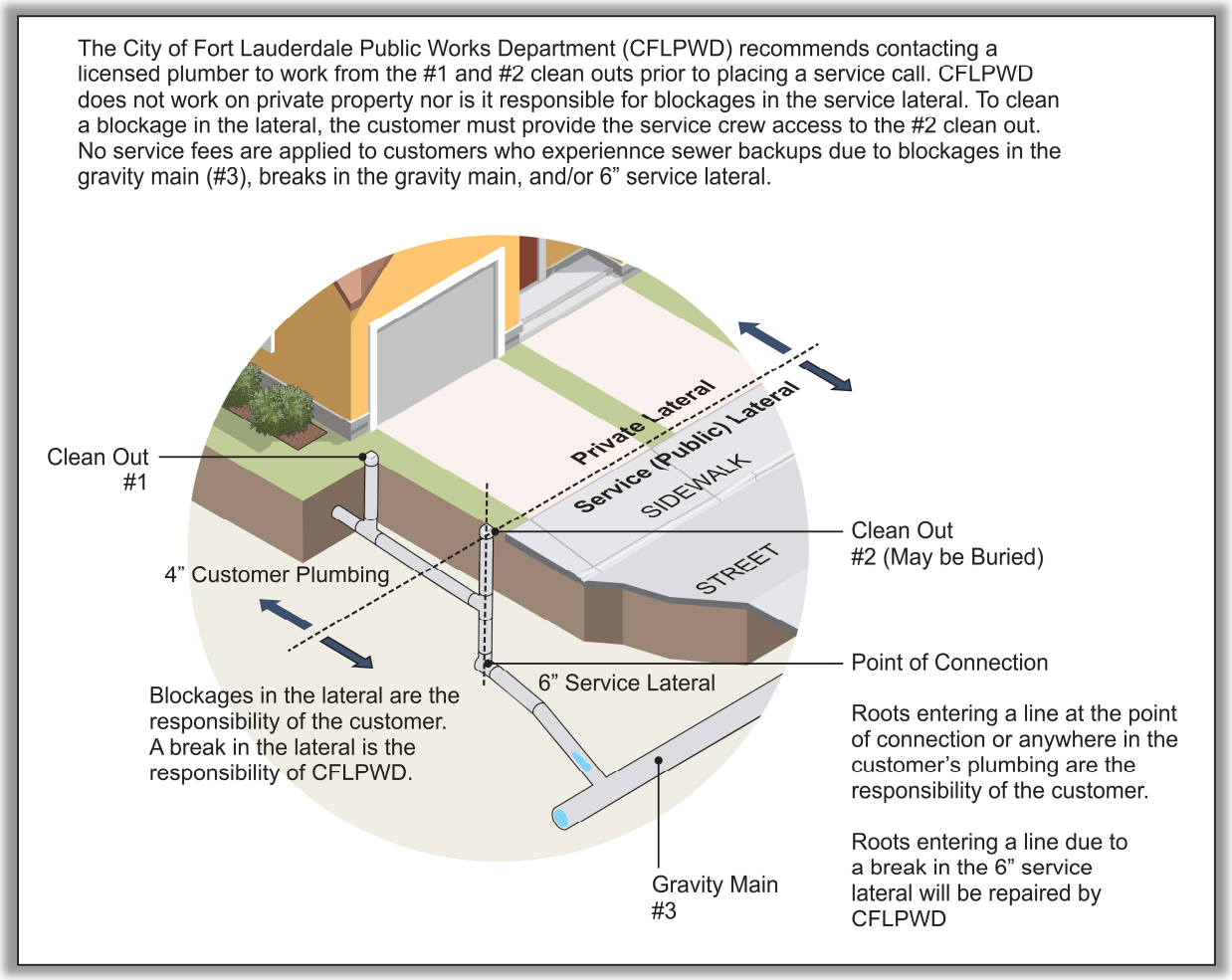


Figure 5-3: Typical Lateral Installation

5.4 Document Retention

The City maintains all records documenting response actions taken and measures to prevent the SSO from recurring. These records are to be maintained for a period of at least five years. Specifically, the required records include:

- Q-Alert work order records
- BCEPGMD and FDEP reports and forms
- Water quality sampling results
- Building Backup and claims documentation

These materials are retained and stored under the City records management archival and retention protocols for electronic and paper documents and records.

6.0 Evaluation of Impacts

6.1 Water Quality Monitoring

The ERA is responsible for coordinating water quality sampling with the Environmental Laboratory if the SSO impacts surface waters. The ERA conducts sampling to assess potential impacts to receiving waters from the SSO discharge. Data from the water quality sampling are used to make recommendations concerning:

- When and where to post, and to subsequently remove, warning signs.
- If, when, where, and for how long public advisories may be needed relative to potential health and environmental impacts from SSO discharges to receiving waters.

Water quality monitoring is initiated by the ERA and analysis of samples is completed by the City's Environmental Lab Staff when:

- The SSO volume is greater than or equal to 1,000 gallons and the discharge impacts tidal surface waters directly (direct discharge to receiving water) or indirectly (indirect discharge to receiving water through a storm drain, catch basin, or drainage ditch) and is east of US 1.
- The SSO volume is greater than or equal to 500 gallons and the discharge impacts tidal waters west of US1 and east of I-95.
- The SSO volume is greater than or equal to 100 gallons and the flow impacts any non-tidal or tidal surface waters west of I-95.

Surface water sampling and analytical parameters may include: total coliform, fecal coliform, e-coli, and enterococcus. Samples are collected at the point of discharge, 200-400 feet upstream, and 200-400 feet downstream. Additional sampling locations may be required for large spills. Sampling is repeated on 24-hour intervals until the bacterium counts are below the appropriate class III standards as defined in F.A.C. 62-302.530 Table for Water Quality.

Initial sampling focuses on the immediate vicinity of the discharge(s). The sampling area may be modified on subsequent days to account for site conditions including currents, water flow, tides, and wind-driven circulation patterns, with an emphasis on sites where public contact is likely. Sampling continues at the frequencies noted below until water quality reflects typical conditions or meets water quality standards.

If the volume of discharge is estimated in excess of one million gallons, additional samples are collected downstream at public access areas within a mile of the discharge. Beach areas will be sampled if potentially impacted. Locations are determined in the field, but may include public areas as well as sites that are routinely monitored or for which background information is available. Additional samples are collected at the discretion of the field supervisor taking into account tides,

canal discharges, wind-driven circulation, or other factors that could influence movement of contaminated water.

6.1.1 Initial Day One Sampling

One the first day that the discharge is confirmed and is reported to the ERA Program, a sampling protocol is implemented. Surface water samples are collected at suspected point(s) of discharge to surface waters. If the receiving water is a tidal water body or a canal tributary ultimately discharging to tidal waters, samples will be collected upstream and downstream of the suspected sources of discharge.

Exact locations of sampling may be modified in the field due to access or other pertinent site conditions found by the sampling staff, including location and volume of the source, currents, water flow, tides and wind-driven circulation patterns, or sites where public contact is likely. Sampling will be conducted by the ERA using the following guidelines:

1. Collect one upstream sample at any location providing access within 200 to 400 yards of the discharge site.
2. Collect downstream sample(s) at any locations providing access within 200 to 400 yards of the discharge site.
3. If the discharge occurs at the end of a canal, two downstream samples may be collected. A modified plan may be used to meet variable situations.

6.1.2 Day Two Sampling

Day Two surface water samples are collected at all Day One stations approximately 24 hours after the initial Day One samples were collected. The Day Two sampling protocol will continue until water quality meets standards or reflects typical conditions.

6.2 Water Quality Analysis

Sampling methods follow the National Environmental Laboratory Accreditation Conference (NELAC) certified Environmental Laboratory's established quality assurance and quality control (QA/QC) procedures. Bacteriological samples are collected by the ERA according to procedures from the FDEP FAC 62-4.246.

All laboratories analyzing samples collected during the monitoring are required to have NELAC certification to perform analysis of the specific parameter(s) and all analyses are carried out according to NELAC certifications and procedures.

The ERA Program receives verbal bacteria analyses results within 30 hours of delivering the samples to the laboratory. This includes a six-hour sample holding time and 24 hours to read results. The results are communicated to FDEP and the BCEPGMD per the County permit.

Upon completion of the emergency response and clean-up activities, the D&C Manager is also responsible for ensuring the activities were properly documented, and for ensuring accurate field information was provided as part of reporting and notification activities.

6.3 Estimate Volume of Spilled Sewage

The Collection System Supervisor is charged with developing a field estimate of the volume of sewage discharged during the event. It is noted that these calculations are performed at a time when actions are focused on controlling the spill, returning the system to normal operation, and mitigating the spill impacts, and accordingly the initial SSO volume estimate should be considered just that – an initial estimate.

Upon completion of the emergency response activities, the D&C Manager is charged with developing the final volume estimate as well as an estimate of the volume recovered during the emergency response activities. The volume calculation methodology used depends on the type of spill event. Methods for estimating the spill volume are found in **Appendix E-2**.

The SSO recovery volumes are typically calculated by counting the number of vacuum or tanker trucks used to collect the spill for transport to a downstream point within the wastewater collection/transmission system or WWTP. The volume is estimated by multiplying the number of trucks by the capacity of each truck. If partial truck loads are involved, the supervisor estimates a "percent full" for the partial load and applies that percentage to the truck volume.

At times the FIC arrives at a site after an overflow has stopped, but when evidence of a spill event is visible. These instances are confirmed SSO events and are subject to the reporting requirements detailed previously in this SSORP. However, it is generally not possible to calculate a volume when the crew has not observed the overflow. These SSO incidents are noted as having a "de minimis" volume in the field reports and in the subsequent reports to regulatory agencies.

6.4 Analyze Cause of SSO

In addition to the QA/QC check of the SSO volume estimate, the Collection System Supervisor is responsible for validating the field assignment of SSO cause. Field reports are reviewed, and the crews are questioned in greater detail as to the field conditions. In most cases, the cause initially determined by the FIC is determined to be the actual cause, but in some cases additional contributing causes or an underlying "root" cause is identified. Refinements to cause determination are important when defining additional corrective actions to prevent future SSO events.

6.5 Follow-Up Review of SSOs

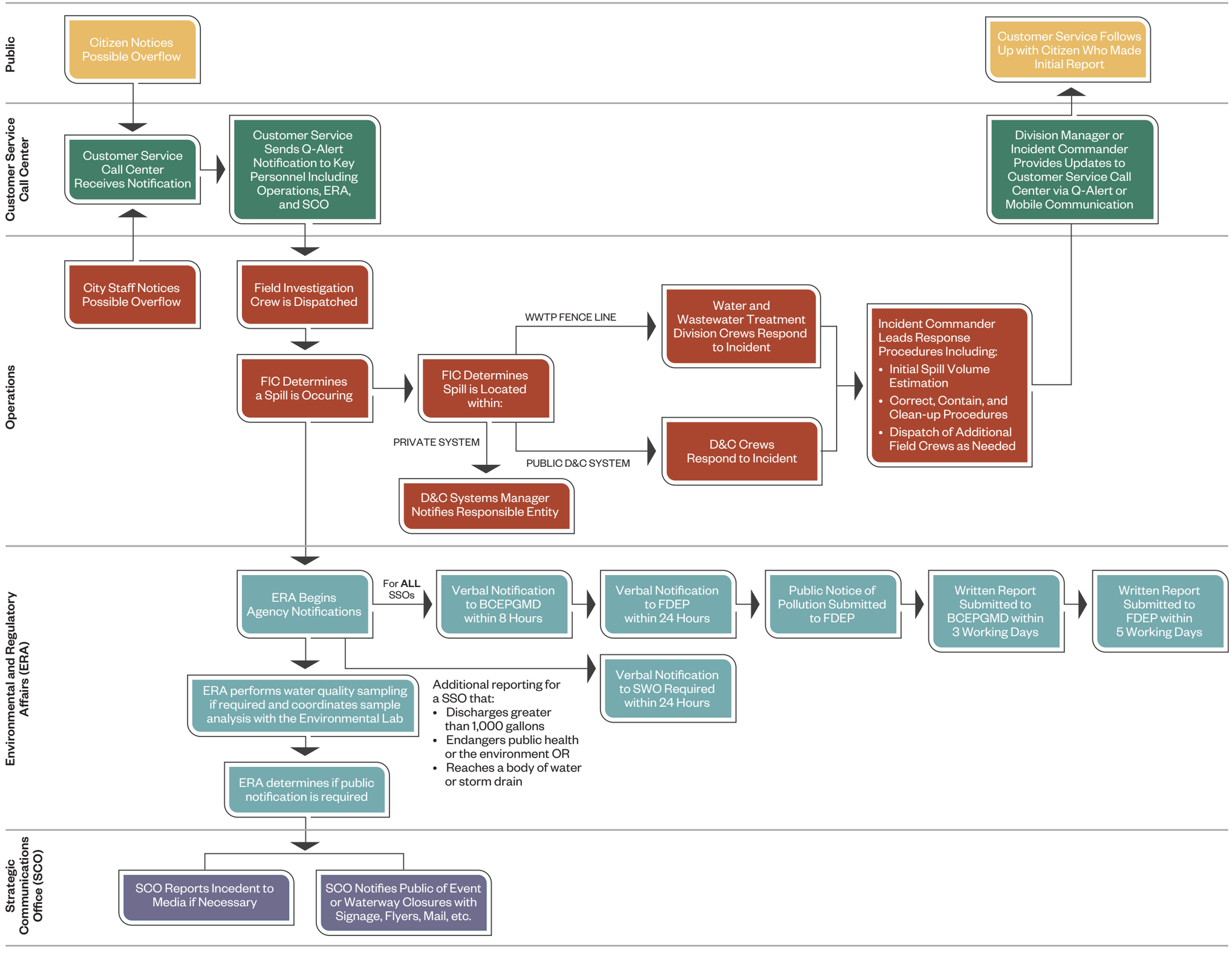
The ERA and Utilities staff conduct reviews of prior SSO events to identify lessons learned and define potential additional corrective actions. The analyses are completed on an as needed basis when deemed productive. The goal of these reviews is to:

- Define root cause of failures
- Check historical data for patterns that may indicate potential failure conditions
- Define potential improvements in the procedures and protocols to improve response or better control SSO discharges or Building Backups
- Define additional preventive actions to reduce the potential for recurrence

In preparation for the SSO root cause analysis meetings, each Supervisor reviews prior SSOs associated with gravity sewers or force mains. Additionally, each Supervisor reviews key SSO reports, work orders, and asset data associated with SSO events. Repeat SSOs are identified, as well as the date of the last cleaning of the associated sewer infrastructure. Repeat SSO data are considered when deciding whether or not the sewer should be placed on a "hot spot" list for more frequent sewer cleaning. For SSOs involving force mains, all historical records are considered.

The post-event analyses further ensure that if a "temporary fix" has been applied, steps to make a proper, permanent fix are identified and implementation is initiated. The analyses include a review of response efforts to identify and record "lessons learned" during the response.

Appendix A-1: Response Procedure Workflow


Public
Customer Service Call Center
Operations
Environmental and Regulatory Affairs (ERA)
Strategic Communications Office (SCO)
Citizen Notices Possible Overflow
Customer Service Call Center Receives Notification
Customer Service Sends Q-Alert Notification to Key Personnel Including Operations, ERA, and SCO
City Staff Notices Possible Overflow
Field Investigation Crew is Dispatched
FIC Determines a Spill is Occuring
FIC Determines Spill is Located within:
WWTP FENCE LINE
PRIVATE SYSTEM
PUBLIC D&C SYSTEM
Water and Wastewater Treatment Division Crews Respond to Incident
D&C Crews Respond to Incident
D&C Systems Manager Notifies Responsible Entity
Incident Commander Leads Response Procedures Including:
• Initial Spill Volume Estimation
• Correct, Contain, and Clean-up Procedures
• Dispatch of Additional Field Crews as Needed
Division Manager or Incident Commander Provides Updates to Customer Service Call Center via Q-Alert or Mobile Communication
Customer Service Follows Up with Citizen Who Made Initial Report
ERA Begins Agency Notifications
For ALL SSOs
Verbal Notification to BCEPGMD within 8 Hours
Verbal Notification to FDEP within 24 Hours
Public Notice of Pollution Submitted to FDEP
Written Report Submitted to BCEPGMD within 3 Working Days
Written Report Submitted to FDEP within 5 Working Days
ERA performs water quality sampling if required and coordinates sample analysis with the Environmental Lab
Additional reporting for a SSO that:
• Discharges greater than 1,000 gallons
• Endangers public health or the environment OR
• Reaches a body of water or storm drain
Verbal Notification to SWO Required within 24 Hours
ERA determines if public notification is required
SCO Reports Incedent to Media if Necessary
SCO Notifies Public of Event or Waterway Closures with Signage, Flyers, Mail, etc.

Appendix A-2: ERP Checklist 27

CHECKLIST 27

SANITARY SEWER OVERFLOW

This checklist describes procedures for responding to a sanitary sewer overflow caused by pump station failure, a break in the force main, or a break in the gravity main. Routine overflows will be handled in accordance with standard operating procedures. The procedures in this checklist provide additional guidance for non-routine overflows that may require response from multiple PWD staff and/or external agencies.

☐	LINE#	TASK
		GENERAL STAFF RESPONSE TASKS
	1	Notify Incident Commander.
	2	Staff becomes aware that the wastewater system components are in need of repair.
		INCIDENT COMMANDER (or Designee) RESPONSE TASKS
	3	If local emergency response assistance is required, call 911.
	4	Direct Notification Coordinator to contact the appropriate City officials and federal, state, and local agencies.
	5	Call the Communications/Media Coordinator and decide whether, when, and how to notify customers and the news media.
	6	Assemble team of Operations & Maintenance and Engineering Coordinators to assess damage and identify possible solutions.
	7	If the damage appears to be the result of an intentional act implement checklist 11; 6 a, b, c.
	8	Notify local emergency responders about potentially hazardous materials that may be present at the site.
	9	Determine the impact of the destruction/failure on the ability of the wastewater system to collect and pump wastewater.
	10	Determine effect of sewer backups on customers and sanitary sewer overflows on the local environment.
		a. Follow Utilities Policy, Procedure & Standards Manual Sanitary Sewer Overflow Policy 0.01.001.01
	11	Based on the extent of the damage, consider alternative (interim) treatment, and/or distribution schemes.
	12	Implement recovery plan.
	13	Notify customers when system is returned to service.
	14	Maintain log of actions and forward to the Safety Officer at the conclusion of the emergency event.

Check box when an item was completed or, if an item was not applicable, place "N/A" in the column.

The tasks listed above are general guidelines for responding to each type of emergency; specific response actions may vary depending upon the nature and extent of the emergency event.

Appendix B-1: Sanitary Sewer Overflow Policy and Internal Reporting Form

Purpose:

To unify individual departmental SSO Polices into one standard interdepartmental SSO Policy and to provide detailed instructions on how to complete the attached SSO worksheet.

Section 1:
To be completed by the First Responder and Manager

1. If you are the first responder, please complete Section 1, items I through 25. Note, the first responder should be a representative from the affected area (Distribution & Collection (D&C), Water Treatment, Wastewater Treatment, etc.), but it does not have to be. Once a Manager from the affected area is on site, the partially completed SSO Worksheet can be given to the Manager or a designee to complete. If the event takes place over multiple shifts then the Manager or the designee will assign the record keeping responsibilities as he or she sees fit.
2. Write the Q-ALERT number assigned to the event in this box.
3. Write the time you're filling out the form in this box.
4. Write your name in this box. You are the first responder.
5. Write the address of the event in this box.
6. Write your crew number or radio call number in this box.
7. Write the time you received the call from the dispatcher in this box.
8. Write your Department and Division in this box, for example D&C would write 70/66.
9. Write the time you arrived on scene in this box.
10. Write the name of the Dispatcher you have been communicating with in this box.
11. Ask the Dispatcher for the time the first call came in and write that in this box.

12. Write the Manager's name that is on site. This person should represent the owner, for example, an event at a water treatment plant would require a member of the water treatment plant management team to be on site. Managers are expected to be on site if the estimated spill is over 500 gallons.
13. Write the time when the flow or discharge was stopped in this box.
14. Write the name of the Environmental Representative on site in this box.
15. If you believe the spill is between 0 and 999 gallons check the box in front of that selection. If you believe the spill is between 1,000 and I 0,000 gallons check the box in front of that selection. If you believe the spill is more than I0,000 gallons, check the box in front of that selection.
16. Write the name of the Public Information representative contacted.
17. Before writing a number in this box the volume must be calculated using a repeatable method and the results approved by a Division Manager. This calculation can be done after the repairs are made but must be completed before closing out the event.
18. Describe the possible cause in a couple of words, such as "Pipe Break", "Clogged Gravity", etc.
19. Check the boxes that most appropriately describe the SSO. For example, if there is a clogged lateral on the owner's side and the clog is due to palm tree roots you would check the boxes that read Private, Lateral, and Gravity; write 4" next to Size; write Cast Iron next to Material; check the box in front of Roots; and describe the SSO in more detail in the open space.
20. Check all boxes that apply. For example, if the SSO was in the parking lot of a mall and entered a private catch basin, you check the Catch Basin, Ground, Public Access Area boxes. If you know the Catch Basin is part of an Exfiltration System, you would check that box as well.

At this point you now have now gathered enough information to be able to apply the specific policy designed to address the specific situation.

A. Procedures for gravity pipe breaks and/or overflows

- All staff should follow the appropriate safety procedures at all times. The police should be called to maintain traffic patterns if needed.
- Determine the location of the stoppage or damaged pipe.
- If an SSO is occurring, by-pass pump or tanker the system until the overflow condition ceases or the main is repaired.
- If the main is clogged, use the equipment available (roding machine, snake, vacuum truck, etc.) to break the stoppage.
- If the main is broken determine the depth:
  (1) If it is able to be repaired by in-house crews then make the repair.
  (2) If it is not able to be repaired by in-house crews then refer it to the annual emergency repair contractor after consultation with the D&C Division Manager, or the corresponding Plant Manager as applicable.
- Sanitize and deodorize the area.

B. For pressure pipe breaks / force mains /pump stations

- All staff should follow the appropriate safety procedures at all times. The police should be called to maintain traffic patterns if needed.
- Redirect flow to an alternate force main if available.
- In the event there is no alternate force main available tankering or bypass pumping will be implemented.
- Isolate the damaged force main or station.
- Turn off pumping stations impacting the damaged area.
- Determine the depth:
  (1) If it is able to be repaired by in-house crews then make the repair.

(2) If it is not able to be repaired by in-house crews then refer it to the annual emergency repair contractor after consultation with the D&C Division Manager.

- Place the force main or station back in service.
- Sanitize and deodorize the area.

21. Write the name of the Dispatcher or Customer Service representative you spoke with when you provided an update in this box.
22. Write the time and date the update was given to Customer Service in this box.
23. Describe the cleanup effort in this box. Include a count of the number of vacuum truck loads taken from the event site, the capacity of the vacuum trucks used, and any other cleanup methods used such as truckloads of wet soil removed.
24. Describe the repair method used in this box.
25. This box will be filled out by a Manager after considering the alternatives.

Section 2:
To be completed by a Customer Service Representative

26. Write the date and time the informational email was sent in this box. Customer Service will send an email to "key" personnel and the following people must be included on this type of email:
    - Armondo Kale; Chaz Adams; Christian Carbonera; Christopher Woolweaver ; Donna McMahon; Donnell Cunningham; Erin Saey; Fred Ross ; Gary Durrant ; Jeanne Brown ; Jina Moore ; Joe Heyward ; Joseph Precanico ; Jud Hopping; Keith Hutchison ; Kenya Baker ; Larry Teich ; Marie Pierce ; Marla Donald; Mary Crance; Matt Little; Melissa Doyle ; Randy Rufrano ; Reina Gonzalez ; Rick Johnson ; Rosemary Collette ; Shannon Vezina; Steve Roberts Jr ; Talal Abi-Karam ; Todd Hiteshew ; Troy Balint ; Nancy Gassman; Glen Hadwen.

There is a prepared email script to use for the first notification, as well as for any follow up emails necessary.

Please utilize the following script when notifying chain of command.

As the issue occurs:

Please be advised that an event may have occurred at (address) that the Environmental Department may need to respond to. This event is being investigated by the field crews. The Environmental Department, (staff member name), has been notified . (staff member name) will communicate with the field crews and determine the response.

Use this script after the issue has occurred and for follow up:

The event did not require any further action by Staff.
Or
(Staff member name) has informed us that the following has occurred:_____--'
(Fill in the blanks)

A. Customer Service Policy

- When Customer Service receives a report from anyone that indicates that sewage has overflowed into any public area (SSO), Customer Service has an obligation to contact the appropriate people in a timely manner.
- This issue must be repo1ted to the Environmental Services Division by the person who takes the initial call.
- First, get all of the pertinent information from the person reporting the SSO, including name, address of the issue, and a contact phone number.

- Next, create a Q-Alert Service Request and dispatch a crew. Call takers must verbally alert dispatch whenever the call is received from the public.
- Then call the Environmental Services Division, either via phone or radio, making note of you are referring this issue to. Provide Environmental staff the Q-Alert SR# and who is responding in the field. The Environmental Services Division has an obligation to report this type of issue to Broward County Environmental Protection and Growth Management Depa1tment (EPGMD) within 8 hours of receiving notification that sewage has overflowed onto a public area.

27. Enter the names of the key personnel emailed in this box, including those listed above.

Section 3:
To be completed by an Environmental Services Representative

28. Write the name of the Environmental Services representative coordinating the efforts name and contact information in this box.

A. Environmental Services Policy

- If Sanitary Sewer (SS) hits the street, dispatch is to notify the on-call Environmental Services duty officer.

- Environmental Services duty officer needs to get the following information for notification purposes:
  - Date:
  - Address/ Location of Discharge: oSource of Discharge:
  - Time Sanitary Sewer Overflow (SSO) started:
  - Estimated Discharge/ Flow: *Discharge to:
  - Stormdrain/Waterway impacts:
  - Name of Waterway:
  - Plan of action:
  - Time SSO ended or is estimated to end:
  - Q-Alert #
  - Name and contact # of crew member onsite:

- Notify Broward County Hotline at 954-519-1 499. Leave the details above, as well as your name and contact phone number for BCH duty officer to call you back with questions or clarification. Document Call Date/Time for reporting form. (Notification timeframe is 8 hours).
- Notify the local West Palm Beach office of the Florida Department of Environmental Protection at 561-681-6694. Leave the details above, as well as your name and contact phone number for BCH duty officer to call you back with questions or clarification. Document Call Date/ Time for reporting form. (Notification timeframe is 8 hours).
- If the SS discharge is greater than 1,000 gallons and there is a stormdrain/waterway impact, the State Warning Point (SWP) must be notified at 1-800-320-0519. In this case, a duty officer with the United States Coast Guard (USCG) will answer and prompt you with questions, most of which can be answered by the information outlined above
- Additional information for the waterway name will be requested by the SWP duty officer.
- Environmental Services duty officer must document the CASE # for reporting form.

- A SS discharge greater than 1,000 gallons and discharged to a water body is the threshold for mandatory sampling. The duty officer will notify and coordinate sampling with the City's Environmental Laboratory staff to ensure sample holding times are met. The laboratory's phone number is 954-828-7883.
    - Based on the Point of Entry (POE), (SS discharge) the sampling locations in the water body will need to be determined , but at minimum they should include the following:
        - One sample at POE
        - One sample 200 feet upstream from the POE
        - One sample 200 feet downstream from the POE
    - A map should be pulled from GIS to indicate documentation and reporting purposes.
        - Waterway access may dictate that sampling locations need to increased or decreased depending on the site topography.
- All of the information above should be documented by the Environmental Services duty officer and the Distribution and Collection (D&C) responding staff. Staff is responsible for generating and submitting the field SSO report to the Environmental Services Division the next business day so that the SS discharge can be documented and the wastewater utility/ abnormal event reporting form can be filled out and submitted to Broward County within the regulatory compliance period. Reporting period is 3 working days.
- For SS discharges greater than 1,000 gallons the following information will need to be documented by staff in addition to a creating a detailed timeline that can be utilized for developing and submitting a written report to the regulatory agencies, (e.g., Broward County and DEP).

29. Attach a copy of the map identifying the location.
30. Describe the sampling locations and attach a map.
31. Write the names, phone numbers, and any report numbers received from BCEPGMD, DEP WPB, and/or DOH in this box.

32. Write any questions or requests received from BCEPGMD, DEP WPB, or DOH in this box.
33. Write the responses give to BCEPGMD, DEP WPB, or DOH in this box.
34. Write the name of the City's Environmental Laboratory staff person contacted in this box.
35. Write the Date and time Environmental Services reported the laboratory test results in this box and attach the results.

Section 4:
To be completed by a Public Information Specialist:

36. Write the name of the Public Information Specialist coordinating communications for the event and contact information in this box.
37. Insert a copy of the Code Red message(s) in this box.
38. Insert a copy of the Press Release(s) in this box..
39. List other PIO tools used in this box.

Section 5:
The appropriate representatives should complete their respective boxes in this section.

40. The First Responder will sign in this box.
41. The First Responder will write the time and date he/she signed the form in th is box.
42. The Manager from the affected area reviewing the document will sign in this box.
43. The Manager from the affected area reviewing will write the time and date he/she signed the form in this box.
44. The Environmental Representative will print his/her name in this box.
45. The Environmental Representative will write the time and date he/she signed the form in this box.
46. The Environmental Representative will sign his/her name in this box.
47. The Public Information Specialist will print his/her name in this box.
48. The Public Information Specialist will write the time and date he/she signed the form in this box.
49. The Public Information Specialist will sign his/her name in this box.
50. The Environmental Laboratory Supervisor will print his/her name in this box.
51. The Environmental Laboratory Supervisor will write the time and date he/she signed the form in this box.
52. The Environmental Lab Supervisor will sign his/her name in this box.

53. The individual who gave the last update will print his/her name in this box.
54. The individual who gave the last update will write the time and date he/she signed the form in this box.
55. The individual who gave the last update will sign his/her name in this box.
56. The Manager from the affected area on-site will print his/her name in this box.
57. The Manager from the affected area on-site will write the time and date he/she signed the form in this box.
58. The Manager from the affected area on-site will sign his/her name in this box.

The template for the SSO Form is stored in the shared drive S:\Departmental\Environmental Resources\SSO. The policy /instructions are housed in the same location.

All completed sections will also be stored in the shared drive S:\Departmental\Environmental Resources\SSO \year

A representative from the Environmental Services Division will keep track of and assign the event number. The event number is a combination of the year, a hyphen, and a numerical value representing the next integer chronologically. For example, if the year the event occurred is 2013 and it is the fifth event of the year, the event number would be 2013-5. This number will be placed in the upper left hand corner of every page of the worksheet. The form will be titled by year, event number, address, section, and revision number. For example 2013-5 123 Main Street PIO (2). This tells the reader the year the event occurred was 2013, it was the fifth event of the year, the address was 123 Main Street, and that this was PIO's second revision.

Attachments:
SSO Form

SECTION 1: This section should be completed by the first responder, reviewed by Management, and submitted to Environmental Services within 24 hours (or within the next business day) of the event being reported.			
1. Current Date:		**2. QAlert Number:**	
3. Current Time:		**4. Name:**	
5. Address:		**6. Crew Number:**	
7. Time SSO Reported:		**8. Department / Division of the Event**	
9. Time the initial responder arrived:		**10. Dispatcher:**	
11. Date and Time SSO started:		**12. Management representative:**	
13. Date and Time SSO ended:		**14. Environmental Representative:**	
15. Estimated volume of the spill in gallons:	☐ 0-999 ☐ 1,000 – 10,000 ☐ 10,001 +	**16. Public Information Officer contacted:**	
17. Calculated volume of the spill in gallons:	If you do not know, do not guess	**18. Possible Cause:**	
19. Describe the SSO:	***Source:*** ☐ Private ☐ Lateral ☐ Manhole ☐ Gravity ☐ Main ☐ Valve ☐ Force Main ☐ Pump Station ☐ Plant If Pipe: Size_____ Material_____ Age_____ ***Cause***: ☐ Roots ☐ Grease ☐ Debris ☐ Broken Pipe ☐ Pump Station Issue ☐ Other *Include the failed component. For example, A7 wet well overflowed or 18" force main break. Include a description of the area. For example, spill is contained in a 10' x 10' area. Attach any pictures taken.*		
20. Where did the overflow discharge to? Place a check mark next to all that apply. If other is used, write in a description.	☐ Catch Basin ☐ Exfiltration System ☐ Positive Drainage System ☐ Ground ☐ Water Body ☐ Park ☐ Public Access Area ☐ Other: Attach pictures taken.		
21. Follow up information provided to		**22. Time and date the follow up was provided.**	

Customer Service. Name of dispatcher:			
23. Describe the cleanup effort:	*Include the type of equipment used, chemicals, and the number of people on site. For example, two vacuum trucks and two crew trucks were on site from 9 p.m. to 11 p.m. Six employees used the two vacuum trucks, brooms, and shovels to clean the area while two employees spread disinfectant and deodorizer. In addition, include the number of vacuum truckloads removed from the site. Attach any pictures taken.*		
24. Describe the Repair:	*For example, used a vacuum truck and jet to clean the line and break the stoppage or excavated and sleeved in a new piece of pipe. Attach any pictures taken.*		
25. Steps taken to prevent reoccurrence:			
SECTION 2: This section to be completed by Customer Service.			
26. Date and time the informational email sent:	**Add Date, Time, Location** Please be advised that an event may have occurred at **(Location of event).** Environmental has been notified. **(Larry/Troy)** will communicate with the field crews and determine the response **(QAlert number)**		
27. Key personnel contacted. Include date and time:	Send email to: PWCustomerService@fortlauderdale.gov As of August 2015 this distribution list includes: **Armondo Kale; Chaz Adams; Christian Carbonera; Christopher Woolweaver ; Donna McMahon; Donnell Cunningham; Erin Saey; Fred Ross ; Gary Durrant ; Jeanne Brown ; Jina Moore ; Joe Heyward ; Joseph Precanico ; Jud Hopping; Keith Hutchison ; Kenya Baker ; Larry Teich ; Marie Pierce ; Marla Donald; Mary Crance; Matt Little; Melissa Doyle ; Randy Rufrano ; Reina Gonzalez ; Rick Johnson ; Rosemary Collette ; Shannon Vezina; Steve Roberts Jr ; Talal Abi-Karam ; Todd Hiteshew ; Troy Balint ; Nancy Gassman; Glen Hadwen**		
SECTION 3: This section to be completed by Environmental Services.			

28. Environmental representative coordinating the effort:	
29. Make a map showing the location of the event.	Attach a copy
30. Mark up a map showing the sampling location.	Attach a copy
31. Contact BCEPGMD/DEP WPB/ State Warning Point/ DOH as needed. List names, phone numbers, and report numbers if any.	
32. List questions / requests from BCEPGMD/DEP WPB/ State Warning Point/ DOH	
33. List the responses to the questions / requests from BCEPGMD/DEP WPB/ State Warning Point/ DOH.	
34. Lab person contacted	
35. Lab test results reported.	Attach a copy
SECTION 4: This section to be completed by the Public Information Officer.	
36. Public Information Officer coordinating the effort	

37. CodeRED message used			
38. Press Release Messages used	Attach a copy		
39. List other PIO tools used	Attach a copy		
SECTION 5: The following boxes in this section should be completed and signed by the			
40. First Responder Signature:		**41. Date/Time:**	
42. Reviewed By:		**43. Date/Time:**	
44. Env. Representative:		**45. Date/Time:**	
46. Signature :			
47. Public Info Officer:		**48. Date/Time:**	
49. Signature:			
50. Env. Lab Supervisor:		**51. Date/Time:**	
52. Signature:			
53. Last Updated By:		**54. Date/Time:**	
55. Signature:			
56. Manager On-site:		**57. Date/Time:**	
58. Signature:			

Appendix B-2: Broward County Wastewater Utility Abnormal Event Notification Form

Broward County Board of County Commissioners
Environmental Engineering and Permitting Division
One N. University Drive • Mailbox 201 • Plantation, Florida 33324-2020 • (954) 519-1483 • FAX (954) 519-1412

Email Written Notification
Wastewater Utility Spill/Abnormal Event Report

Notification to Broward County Environmental Protection and Growth Management Department:
(954) 519-1499 Date: ____ /____/____ Time: AM ☐ PM ☐
FDEP Notified at (561) 681-6694: Yes ☐ No ☐ Date: ____/____/____ Time: AM ☐ PM ☐
State Watch Office Notified * (800) 320-0519: Yes ☐ No ☐ Incident # _____

Date/Time utility aware of event: ____/____/____ _____ AM ☐ PM ☐
Estimated Date/Time event started: ____/____/____ _____ AM ☐ PM ☐
Date/Time flow stopped: ____/____/____ _____ AM ☐ PM ☐

Utility Contact: _____ Title: _____
Name of Utility: _____ Phone: _____
Email Address: _____ Cell: _____

Event Location/Address: City: Lat/Long:

Description of Discharge/Abnormal Event (include cause and affected waterbody):

☐ **Gravity** Sewer Main Size: _____ Material: _____; or ☐ **Manhole**; or ☐ Lateral ☐ Public or ☐ Private

☐ **Force Main** Pipe Size: _____ Material: _____ Age: _____; or ☐ **Valve** Type _____

☐ **Lift Station** Name/Designation: _____; ☐ Other: _____

Total Volume Discharged: _____ **Volume Recovered**: _____ **Raw or Treated Discharge**: _____

Discharge to: GROUND ☐ GROUNDWATER ☐ SURFACE WATER ☐ STORM DRAIN ☐ PUBLIC ACCESS AREA ☐
Storm Drain Discharge To: Surface Water Outfall ☐ French Drain (infiltration system) ☐

Samples Taken: YES ☐ NO ☐ Initial Sample Date: ____/____/____
Second Sample Date: ____/____/____
Email Lab Test Results with a *Location Map* to the email addresses below.

Sampling Required:
Marine Surface Waters East of US 1 (Test for *Enterococci* and Fecal Coliform): Discharges ≥ 1000 Gallons.
Marine Surface Waters West of US 1 and East of I-95 (Test for *Enterococci* and Fecal Coliform): Discharges ≥ 500 Gallons.
Marine Surface Waters West of I-95 (Test for *Enterococci* and Fecal Coliform), and All Fresh Surface Waters Regardless of Locations (Test for *E. coli* and Fecal Coliform): Discharges ≥ 100 Gallons.
Minimum samples for Fecal Coliform, *E. coli*, and *Enterococci* should be taken at the point of discharge, 200-400 feet upstream and 200-400 feet downstream of discharge. Take samples at 24-hour intervals until the indicator bacteria count is below 800 MPN (Most Probable Number)/100 ml for Fecal Coliform, 410 MPN/100 ml for *E. coli*, and 130 MPN/100 ml for *Enterococci*.

Steps Taken to Contain and Correct:

Method of Cleanup and Cleanup Status:

Steps Taken to Prevent Recurrence:

Email form and documents to: Broward County Domestic Wastewater Program, WWCompliance@broward.org **and** Konstantin Dubov, Konstantin.Dubov@FloridaDEP.gov along with the State's inbox SED.Wastewater@FloridaDEP.gov.
*All spills *1000 gallons* or more or *abnormal events that endanger the public health and/or environment* must be reported within twenty-four (24) hours of the event to the ***State Watch Office*** by calling (800) 320-0519.

Appendix B-3: Broward County Spill Policy (2019)

Environmental Protection and Growth Management Department
ENVIRONMENTAL ENGINEERING AND PERMITTING DIVISION
1 North University Drive, Mailbox 201, Plantation, Florida 33324 • 954-519-1483 • FAX 954-519-1412

Spill Policy 2019

DATE: May 29, 2019

TO: Owners and Operators of Domestic Wastewater Treatment Plants and/or Collection/Transmission Systems

FROM: Broward County Domestic Wastewater Program
Environmental Engineering and Permitting Division (EEPD)
Environmental Protection and Growth Management Department

RE: **Notification Procedures for Wastewater Spills and Abnormal Events**

This notice is being provided to inform and assist you in the notification to the County and State Regulatory agencies following a wastewater spill or abnormal event. This would include an occurrence of any serious plant breakdown or other collection or transmission facility condition causing, or likely to cause:

- Unsafe or inadequate treatment plant operation
- Any discharge of water or wastewater not in accordance with 62-600.100, F.A.C., and Section 27-193(b)(2), Chapter 27 of the Code of Ordinances, Broward County.

If at any time, an owner or operator determines or has evidence to suspect that there is or has been a discharge to the ground, groundwater, or surface waters, the responsible party shall take immediate action to stop the discharge and contain and recover the discharged materials. A verbal notification and written report are required. *Failure to comply with this notification requirement will initiate a Warning Notice. Further failures could initiate a Notice of Violation that may result in fines.* The minimum requirements for such reporting are as follows:

Broward County (BC) Notification Requirements (ref. Section 27-58(b)(3), Chapter 27, BC Code of Ordinances):
All sanitary sewer spills and effluent spills and abnormal events that could interfere with the operation of the WWTP or the collection transmission system shall be reported to BC Hotline by calling (954) 519-1499 within eight (8) hours of the event. Voice mail service is provided and an appropriate response team will be notified. The utility shall provide the name and callback number of the person reporting the event. Further information shall include the address of the event, estimated volume of discharge, if and when the flow was stopped and if the spill reached a storm drain or affected a body of water either directly or through a storm drain discharge or through a surface water outfall. Notification is also required if a public area was affected that could not be isolated.
Additionally: Within three (3) working days of the event, submit a written report that describes the incident, the cause of the incident, the measures taken to correct the problem and prevent its reoccurrence, the owner's intention toward repair, replacement or reconstruction of destroyed facilities and a schedule of events leading toward operation within the license conditions and compliance with all provisions of the current version of Chapter 27 of the BC Code of Ordinances. The completed report must be emailed to WWCompliance@broward.org.
We request that you simultaneously email to Mr. Konstantin Dubov of the Florida Department of Environmental Protection (FDEP) Southeast District (Konstantin.Dubov@FloridaDEP.gov) and SED.Wastewater@FloridaDEP.gov.
See **Attachment A** for key enterable form and **Attachment B** for example of a narrative report.

See Page 2 for FDEP Notification Requirements.

State Notification Requirements (ref. Rule 62-620.610(20) & Rule 62-604.550 Florida Administrative Code):
All sanitary sewer spills and effluent spills and/or an abnormal event that could interfere with the operation of the WWTP or the collection transmission system, shall be called into the FDEP Southeast District within twenty-four (24) hours of becoming aware of the event. Call Konstantin Dubov at (561) 681-6694.

Additionally: All sanitary sewer spills and effluent spills that reach a body of water or a storm drain, or are over 1000 gallons, or abnormal events that endanger the public health and/or environment shall be reported within twenty-four (24) hours of the event to the State Watch Office by calling (800) 320-0519.

Submit a written report within five (5) days to:
Mr. Konstantin Dubov
Florida Department of Environmental Protection
Compliance Assurance Program - Southeast District
3301 Gun Club Road, MSC 7210-1
West Palm Beach, FL 33406
konstantin.dubov@FloridaDEP.gov

For Florida Public Notification Requirements, please follow the link https://floridadep.gov/pollutionnotice

Should you have questions on this notice, please do not hesitate to contact:
Yvel Rocher, P.E., Licensed Engineer, at yrocher@broward.org (954-519-1234) or WWCompliance@broward.org.
You may also reach out to the EEPD main line at 954-519-1483.

Appendix B-4: Broward County Sample Narrative Report (2019)

Utility Heading

Date

Mr. Konstantin Dubov,
Florida Department of Environmental Protection
Compliance Assurance Program - Southeast District
3301 Gun Club Road, MSC 7210-1
West Palm Beach, FL 33406
Konstantin.Dubov@FloridaDEP.gov Phone: (561) 681-6694

RE: Be advised that on <*date*>, at <*time*>, there was a discharge at: <*location address, city*>.

Please be advised that on <*date and time*>, there was a sanitary sewer discharge at <*location*>.
The discharge occurred due to <*a broken 18 inch 1981 steel force main*>
Approximately <*amount in gallons*> discharged to the ground and approximately <*amount in gallons*> discharged to water bodies or storm drains.
The discharge location <*was/was not in an area with public access*>.
The initial call was placed to the Broward County Environmental Protection and Growth Management Department Hotline on <*date and time*> and then to the Florida Department of Environmental Protection - West Palm Beach Office, and the State Watch Office.

The cause of the discharge was attributable to <*pipe age/fatigue. The pipe was corroded on the bottom where it broke and it was repaired on (date), by removing a two-foot section and installing new ductile iron pipe. The force main was put back into service on (date and time) following the repairs and no further problems have been detected*>

The discharge was <*fully or partially recovered*> and disinfectant was utilized in the ground areas.
<*The discharge to surface water was sampled at the outfall, upstream and downstream of the outfall*>.
The facility was fully operational <*date, time, or will be operational*>. The sample results and sample location map are attached for your review.

The following is a written sample of the calculations used to estimate the discharge: <*The estimated discharge quantity is based on a 2-inch diameter hole in the pipe with a flow rate of 138 gallons per minute (gpm) for 180 minutes, equaling approximately 25,000 gallons being discharged. It is estimated the vacuum trucks picked up 30,000 gallons of which half was most likely tidal water, meaning 15,000 gallons out of the 25,000 was recovered. In an effort to validate this amount, City staff calculated the overland flow into the waterway at a quarter-inch deep discharging over a 10 foot section of seawall/deck at 90 gpm for approximately 110 minutes, equaling approximately 10,000 gallons*>

Our utility will, in the future <*further assess, repair, replace and/or reconstruct the facilities*>. A schedule of events leading towards improved operation, maintenance and future emergency response to this facility are as follows: <*List all steps known or anticipated for determining or arranging improved future operation and maintenance of the facility; reference these to benchmarks in time, operation, maintenance and/or already planned improvements*>.

Sincerely,

Name
Title
Attachments: Sampling Map, Sample Results Report
CC: WWComplinace@broward.org, BC Environmental Engineering and Permitting Division

ATTACHMENT B

Appendix B-5: Pollution Notice Submittal Form

Florida Department of Environmental Protection

Bob Martinez Center
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Noah Valenstein
Secretary

Pollution Notice

You are submitting a Public Notice of Pollution in accordance with Section 403.077, F.S. which is intended to prevent harm to human health, welfare, or property by assisting the control of pollution. This rule specifies that "reportable releases" are required to be reported to the Department.

Please be aware that while submission of a Notice through this form complies with the requirements of Section 403.077, F.S., it does not relieve you of any obligation to report to the State Watch Office or other authority required by your permit or state law.

Fields marked with * are required. After completion, please e-mail the form to **pollution.notice@dep.state.fl.us**.

If you are reporting a new release, please select "Initial Notice" below.

If you have previously reported this incident, have obtained a DEP Incident ID, and wish to update your Notice, please select "Updated Notice of Pollution" and enter the DEP Incident ID.

NOTICE TYPE *

☐ Initial Notice of Pollution

☐ Updated Notice of Pollution

If this is an updated Notice, DEP Incident ID: _____

INCIDENT INFORMATION

Please enter a name for the Incident: _____

State Watch Office Incident Number or Case ID: _____

Incident Report (Please enter a complete description of the incident. If you have a summary e-mail from the State Watch Office, you may copy that and paste it here): *

Incident Location (in Decimal Degrees): *

Latitude: _____ **Longitude:** _____

Please select all counties directly affected by the Incident: *

☐ Alachua	☐ Duval	☐ Holmes	☐ Miami-Dade	☐ Seminole
☐ Baker	☐ Escambia	☐ Indian River	☐ Monroe	☐ St. Johns
☐ Bay	☐ Flagler	☐ Jackson	☐ Nassau	☐ St. Lucie
☐ Bradford	☐ Franklin	☐ Jefferson	☐ Okaloosa	☐ Sumter
☐ Brevard	☐ Gadsden	☐ Lafayette	☐ Okeechobee	☐ Suwannee
☐ Broward	☐ Gilchrist	☐ Lake	☐ Orange	☐ Taylor
☐ Calhoun	☐ Glades	☐ Lee	☐ Osceola	☐ Union
☐ Charlotte	☐ Gulf	☐ Leon	☐ Palm Beach	☐ Volusia
☐ Citrus	☐ Hamilton	☐ Levy	☐ Pasco	☐ Wakulla
☐ Clay	☐ Hardee	☐ Liberty	☐ Pinellas	☐ Walton
☐ Collier	☐ Hendry	☐ Madison	☐ Polk	☐ Washington
☐ Columbia	☐ Hernando	☐ Manatee	☐ Putnam	
☐ DeSoto	☐ Highlands	☐ Marion	☐ Santa Rosa	
☐ Dixie	☐ Hillsborough	☐ Martin	☐ Sarasota	

Start Date and Time of Incident: *_____

Is the Incident on-going?: * ☐ Yes ☐ No

If No, End Date and Time of Incident: _____

Has the pollution migrated off-site from the Incident?: ☐ Yes ☐ No

If Yes, please select any county(ies) to which the Incident has migrated: *

☐ Alachua	☐ Duval	☐ Holmes	☐ Miami-Dade	☐ Seminole
☐ Baker	☐ Escambia	☐ Indian River	☐ Monroe	☐ St. Johns
☐ Bay	☐ Flagler	☐ Jackson	☐ Nassau	☐ St. Lucie
☐ Bradford	☐ Franklin	☐ Jefferson	☐ Okaloosa	☐ Sumter
☐ Brevard	☐ Gadsden	☐ Lafayette	☐ Okeechobee	☐ Suwannee
☐ Broward	☐ Gilchrist	☐ Lake	☐ Orange	☐ Taylor
☐ Calhoun	☐ Glades	☐ Lee	☐ Osceola	☐ Union
☐ Charlotte	☐ Gulf	☐ Leon	☐ Palm Beach	☐ Volusia
☐ Citrus	☐ Hamilton	☐ Levy	☐ Pasco	☐ Wakulla
☐ Clay	☐ Hardee	☐ Liberty	☐ Pinellas	☐ Walton
☐ Collier	☐ Hendry	☐ Madison	☐ Polk	☐ Washington
☐ Columbia	☐ Hernando	☐ Manatee	☐ Putnam	
☐ DeSoto	☐ Highlands	☐ Marion	☐ Santa Rosa	
☐ Dixie	☐ Hillsborough	☐ Martin	☐ Sarasota	

FACILITY INFORMATION

Facility/Installation Name: * _____

Address Line 1: _____

Address Line 2: _____

Directions: _____

City: _____

State: * FL

Zip Code: _____

REPORTER DETAILS

Name: * _____

Title: * _____

Phone: * _____ **Ext:** _____

E-mail Address: * _____

Relationship: * ☐ Operator of the Facility/Installation ☐ Owner of the Facility/Installation

☐ Other (Please specify relationship): _____

CONTACT DETAILS

Name: * _____

Phone: * _____ **Ext:** _____

E-mail Address: * _____

Appendix C-1: 2019 SSORP Training Presentation

Sanitary Sewer Overflow Training

2019

1

Agenda

Bathrooms
Cell Phones
Reason for Training

Topics

- Introduction
- Notifications - internal & external
- Ongoing event updates
- Requirements
- Review of forms and critical information

2

National Pollutant Discharge Elimination System (NPDES)

- HHHW
  - Know where it goes
  - Industrial Pretreatment Program
- Fertilizer, Pesticide, Herbicide
  - Reduce or eliminate
- Illicit Discharge
  - Only Rain down the Storm Drain

3

Introduction

What is a Sanitary Sewer Overflow (SSO)?

- Any unauthorized releases or spills of wastewater or other abnormal event where information indicates that public health or the environment will be endangered.
- Regulatory oversight of wastewater is provided by Florida Department of Environmental Protection (FDEP) and Broward County within Florida Administrative Code (FAC) and Broward County Code.

4

What Are The Environmental Impacts?

- Bacteriological pollution
- Ecosystem effects such as turbidity, sedimentation, and contaminated shell fish
- Nutrient enrichment
- Public advisories for no fishing, swimming, or recreation
- Offensive odors

5

What's New in the City

- Consent Order with FDEP
  - City needs to modify it's activities
    - Increase Maintenance
    - Increase Pipe Replacement
    - Increase Documentation
    - Increase Oversight
- Public Notices and Public Review

6

What We Are Doing

- The City is refining the current Sewer Overflow Response Plan (SORP) to be more responsive to these events.
- The current operating budget for sewer maintenance is over $15 million.
- Sewer lining accounted for 11 million this past year.
- The 5 year Capital Improvement Project (CIP) budget includes over $25 million in new replacement infrastructure.

7

Notifications

First Call

- Customer Service – by radio or phone
  - What to report?
    - The exact location address
    - Impacted area
  - How much?
    - Estimate the flow or volume – best guess

8

Notifications

First Call

- Call outs?
  - Does the Duty Forman need to be notified?
    Small spill, vac-truck, additional staff
  - Does the Manager need to be notified?
    High visibility area, large spills
  - Private?
    Monitor and advise
- Water Body Impacted
  - Storm drains
  - Surface waters

9

Notifications

External Communications

- Public
  - Keep it simple, direct, and to the point
  - "I don't know" is an acceptable answer
- Media
  - Refer to the PAO and Manager
  - "I can't provide and official comment " is an acceptable answer

Always be Polite, Courteous and Accommodating

10

Ongoing Event Updates

- Establish a point of contact - Rick, Steve, Chief, Supervisor, Etc…
  - Provide the details of the event and work being performed and the work planned
  - This is being rolled up to the CM, PAO, maybe Commission
    Impact area
    Outreach
    Reg. Affairs
    Traffic Impacts
    Repair efforts and Logistics

11

Requirements

- Florida Administrative Code
  62-604.550 Abnormal Events
  - (a) Unauthorized releases or spills in excess of 1,000 gallons per incident, or other abnormal events where information indicates that public health or the environment will be endangered, shall be reported orally to the STATE WARNING POINT TOLL FREE NUMBER (800) 320-0519 as soon as practical, but no later than 24 hours from the time that the owner/operator becomes aware of the circumstances. The owner/operator, to the extent known, shall provide the following information to the State Warning Point:

12

Requirements

- 1. Name, address, and telephone number of person reporting;
- 2. Name, address, and telephone number of owner/operator of the collection/transmission system or responsible person for the discharge;
- 3. Date and time of the discharge and status of discharge (ongoing or ceased);
- 4. Characteristics of the wastewater spilled or released (untreated or treated, industrial or domestic wastewater);
- 5. Estimated amount of the discharge;
- 6. Location or address of the discharge;
- 7. Source and cause of the discharge;
- 8. Whether the discharge was contained on-site, and cleanup actions taken to date;
- 9. Description of area affected by the discharge, including name of water body affected, if any; and
- 10.Other persons or agencies contacted.

13

Requirements

(b) Unauthorized releases or spills of 1000 gallons per incident or less shall be reported orally to the Department within 24 hours from the time that the owner/operator of the collection/transmission system becomes aware of the circumstances.

14

Requirements

(c) The oral notification shall be followed by a written submission, which shall be provided within five days of the time that the owner/operator becomes aware of the circumstances. The written submission shall contain: a description of the spill, release or abnormal event and its cause; the duration including exact dates and time, and if it has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence. The Department shall waive the written report if the oral report has been received within 24 hours from the time that the owner/operator of the collection/transmission system becomes aware of the circumstances, and the release, spill or abnormal event has been corrected and did not endanger health or the environment.

15

Requirements

- State Permit for GTL - FLA041378-
  - FAC 62-620.610 **General Conditions for All Permits**
    - Sections 1-23

      Covers all aspects of operations and reporting requirements including fines and accessibility for regulatory agencies.

16

Requirements

- Broward County Code – Sec. 27-58(b)(3)

In the event the licensee is temporarily unable to comply with any of the conditions of the license or with this chapter, the licensee shall notify EPGMD within eight (8) hours or as stated in the specific section of this chapter. Within three (3) working days of the event, the licensee shall submit a written report to EPGMD that describes the incident, its cause, the measures being taken to correct the problem and prevent its reoccurrence, the owner's intention regarding the repair, replacement and reconstruction of destroyed facilities and a schedule of events leading toward operation with the license condition.

17

Requirements

- Broward County GTL License – WWTP-0700 New
  - Specific Conditions item 7 – Licensee/Co-Licensee must notify EPGMD by phone if any private collection/transmission system malfunction results in or has the potential to result in a sanitary sewer overflow.

18

Requirements

- Broward County GTL License – WWTP-0700 New
  - Specific Conditions item 8 – Lab documents to be provided by email only and the lab results from spill sampling must be informally reported within 24 hours. When formal spill result reports are received, they must be sent by the close of business the following day.
  - Specific Condition item 23 – Comply with Broward County Code of Ordinances.

19

Requirements

- Broward County Guidance Documents
  - You must call the county hotline, 954-519-1499, within 8 hours. The State Local office and when required, the State Watch Office, within 24 hours. We recommend you call all three numbers <u>within 8 hours</u>.

20

Requirements

- Broward County Guidance Documents

Sample requirement update:

- **Tidal Surface Water East of US 1:** Discharges ≥ 1000 Gallons.
- **Tidal Surface Water West of US 1 and East of I-95:** Discharges ≥ 500 Gallons.
- **All Non-Tidal Surface Water and Tidal Surface Water West of I-95:** Discharges ≥ 100 Gallons.
  - Minimum Fecal Coliform sampling should be at the point of discharge, 200-400 feet upstream and 200-400 feet downstream of discharge. Sample at 24 hour intervals until the Fecal Coliform count is below 800 colonies/100 ml.
  - When in doubt it is best to prove by sampling that your discharge had little to no impact on the water body.
  - We are encouraging photographs of the discharge site, the damaged equipment, the repair, and the water condition at the outfall.

21

Requirements

- Broward County Guidance Document
  - Email form
  - Written Report form

  Either can be used but a written report is requested for anything called into the State Watch Office
- Must be sent to the State FDEP and Broward County within 3 days

22

SOPs and Forms

- Read and follow the policies that were handed out today
- SOPs
  - SSO Policy and Form
  - SOP Force Main Break
  - SOP Gravity Stoppage
  - SOP Pump Station Maintenance

23

SOPs and Forms

Event _____ SSO WORKSHEET

SECTION 1: This section should be completed by the first responder, reviewed by Management, and submitted to Environmental Services within 24 hours (or within the next business day) of the event being reported.			
1. Current Date:		2. Hansen Number:	
3. Current Time:		4. Name:	
5. Address:		6. Crew Number:	
7. Time SSO Reported:		8. Department / Division of the Event	
9. Time the initial responder arrived:		10. Dispatcher:	
11. Date and Time SSO started:		12. Management representative:	
13. Date and Time SSO ended:		14. Environmental Representative:	
15. Estimated volume of the spill in gallons:	☐ 0-999 ☐ 1,000 – 10,000 ☐ 10,001 +	16. Public Information Officer contacted:	
17. Calculated volume of the spill in gallons:	If you do not know, do not guess	18. Possible Cause:	
19. Describe the SSO:	*Source:* ☐ Private ☐ Lateral ☐ Manhole ☐ Gravity ☐ Main ☐ Valve ☐ Force Main ☐ Pump Station ☐ Plant If Pipe: Size_____ Material_____ Age_____ *Cause:* ☐ Roots ☐ Grease ☐ Debris ☐ Broken Pipe ☐ Pump Station Issue ☐ Other		

24

SOPs and Forms

17. Calculated volume of the spill in gallons:	If you do not know, do not guess	18. Possible Cause:	
19. Describe the SSO:	**Source:** ☐ Private ☐ Lateral ☐ Manhole ☐ Gravity ☐ Main ☐ Valve ☐ Force Main ☐ Pump Station ☐ Plant If Pipe: Size_____ Material_____ Age_____ **Cause:** ☐ Roots ☐ Grease ☐ Debris ☐ Broken Pipe ☐ Pump Station Issue ☐ Other *Include the failed component. For example, A 4" wet well overflowed or 18" force main break. Include a description of the area. For example, spill is contained in a 10' x 10' area. Attach any pictures taken.*		
20. Where did the overflow discharge to? Place a check mark next to all that apply. If other is used, write in a description.	☐ Catch Basin ☐ Exfiltration System ☐ Positive Drainage System ☐ Ground ☐ Water Body ☐ Park ☐ Public Access Area ☐ Other: Attach pictures taken.		
21. Follow up information provided to Customer Service. Name of dispatcher:		22. Time and date the follow up was provided.	
23. Describe the cleanup effort:	*Include the type of equipment used, chemicals, and the number of people on site. For example, two vacuum trucks and two crew trucks were on site from 9 p.m. to 11 p.m. Six employees used the two vacuum trucks, brooms, and shovels to clean the area while two employees spread disinfectant and deodorizer. In addition, include the number of vacuum truckloads removed from the site. Attach any pictures taken.*		

25

SOPs and Forms

23. Describe the cleanup effort:	*Include the type of equipment used, chemicals, and the number of people on site. For example, two vacuum trucks and two crew trucks were on site from 9 p.m. to 11 p.m. Six employees used the two vacuum trucks, brooms, and shovels to clean the area while two employees spread disinfectant and deodorizer. In addition, include the number of vacuum truckloads removed from the site. Attach any pictures taken.*

Page 1 of 3

MD 8/1/13

Event _____ SSO WORKSHEET

24. Describe the Repair:	*For example, used a vacuum truck and jet to clean the line and break the stoppage or excavated and sleeved in a new piece of pipe. Attach any pictures taken.*
25. Steps taken to prevent reoccurrence:	
SECTION 2: This section to be completed by Customer Service.	
26. Date and time the informational email	Attach a copy of the email

26

Potential Impacts

- Fines
- Increased Regulatory Oversight
- Legal issues - public and private
- Permit revision, revocation, or termination

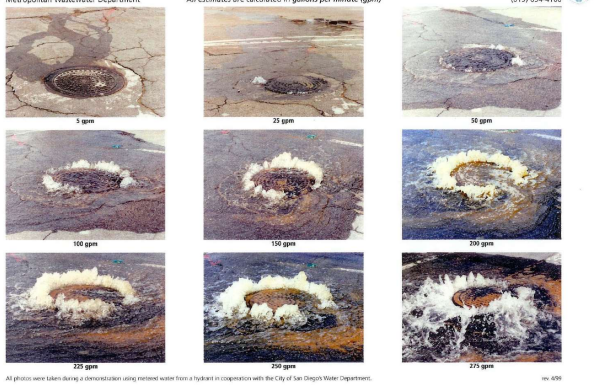
27

City of San Diego
Metropolitan Wastewater Department

Reference Sheet for Estimating Sewer Spills from Overflowing Sewer Manholes

All estimates are calculated in gallons per minute (gpm)

Wastewater Collection Division
(619) 654-4160



All photos were taken during a demonstration using metered water from a hydrant in cooperation with the City of San Diego's Water Department.

rev 4/99

28

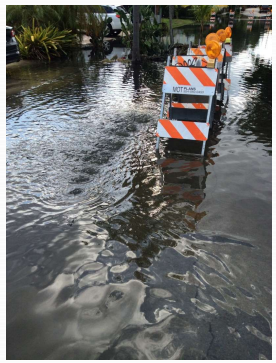
Estimating SSO Volumes

29

Estimating SSO Volumes

30

Estimating SSO Volumes



31

Estimating SSO Volumes

32

Estimating SSO Volumes

33

Estimating SSO Volumes

34

Estimating SSO Volumes

35

Estimating SSO Volumes

36

Estimating SSO Volumes

- June 23, 2016 - 1101 Bayview Dr.
(George English Park)

37

Estimating SSO Volumes

- June 23, 2016 - SE 2nd St and SE 10th Ave
(Himmarshee Canal)

38

Estimating SSO Volumes

39

QUESTIONS?

40

Appendix C-2: City Radio Channel Information

FL LG TEMPLATE - STANDARD T301D

ZONE 1			ZONE 2			ZONE 3		
Z/P		DISPLAY	Z/P		DISPLAY	Z/P		DISPLAY
1	A	UT DISP	2	A	AIRPORT	3	A	BLANK
1	B	PUB SVC	2	B	RANGER	3	B	BLANK
1	C	CUST SVC	2	C	PARKS	3	C	BLANK
1	D	MNT I/R	2	D	SE PARKS	3	D	BLANK
1	E	FAC MNT	2	E	SNYDER	3	E	BLANK
1	F	SPC PROJ	2	F	DOCKS	3	F	BLANK
1	G	UT CONS	2	G	CODE	3	G	BLANK
1	H	WAST WTR	2	H	BLDG	3	H	BLANK
1	I	TREATMNT	2	I	MERS-A1	3	I	BLANK
1	J	SANITATN	2	J	MERS-A2	3	J	BLANK
1	K	ENG ENV	2	K	MERS-A3	3	K	BLANK
1	L	PW TAC1	2	L	PARKING	3	L	BLANK
1	M	PW TAC2	2	M	FLEET	3	M	NW AP
1	N	PW TAC3	2	N	EOC 3	3	N	NE BEACH
1	O	LG COMN	2	O	LG COMN	3	O	BARNETT
1	P	GLOBAL	2	P	FLGLOBAL	3	P	T301 D

FL LG TEMPLATE - STANDARD T301D

ZONE 1			ZONE 2			ZONE 3		
Z/P		DISPLAY	Z/P		DISPLAY	Z/P		DISPLAY
1	A	UT DISP	2	A	AIRPORT	3	A	BLANK
1	B	PUB SVC	2	B	RANGER	3	B	BLANK
1	C	CUST SVC	2	C	PARKS	3	C	BLANK
1	D	MNT I/R	2	D	SE PARKS	3	D	BLANK
1	E	FAC MNT	2	E	SNYDER	3	E	BLANK
1	F	SPC PROJ	2	F	DOCKS	3	F	BLANK
1	G	UT CONS	2	G	CODE	3	G	BLANK
1	H	WAST WTR	2	H	BLDG	3	H	BLANK
1	I	TREATMNT	2	I	MERS-A1	3	I	BLANK
1	J	SANITATN	2	J	MERS-A2	3	J	BLANK
1	K	ENG ENV	2	K	MERS-A3	3	K	BLANK
1	L	PW TAC1	2	L	PARKING	3	L	BLANK
1	M	PW TAC2	2	M	FLEET	3	M	NW AP
1	N	PW TAC3	2	N	EOC 3	3	N	NE BEACH
1	O	LG COMN	2	O	LG COMN	3	O	BARNETT
1	P	GLOBAL	2	P	FLGLOBAL	3	P	T301 D

FL LG TEMPLATE - STANDARD T301D

ZONE 1			ZONE 2			ZONE 3		
Z/P		DISPLAY	Z/P		DISPLAY	Z/P		DISPLAY
1	A	UT DISP	2	A	AIRPORT	3	A	BLANK
1	B	PUB SVC	2	B	RANGER	3	B	BLANK
1	C	CUST SVC	2	C	PARKS	3	C	BLANK
1	D	MNT I/R	2	D	SE PARKS	3	D	BLANK
1	E	FAC MNT	2	E	SNYDER	3	E	BLANK
1	F	SPC PROJ	2	F	DOCKS	3	F	BLANK
1	G	UT CONS	2	G	CODE	3	G	BLANK
1	H	WAST WTR	2	H	BLDG	3	H	BLANK
1	I	TREATMNT	2	I	MERS-A1	3	I	BLANK
1	J	SANITATN	2	J	MERS-A2	3	J	BLANK
1	K	ENG ENV	2	K	MERS-A3	3	K	BLANK
1	L	PW TAC1	2	L	PARKING	3	L	BLANK
1	M	PW TAC2	2	M	FLEET	3	M	NW AP
1	N	PW TAC3	2	N	EOC 3	3	N	NE BEACH
1	O	LG COMN	2	O	LG COMN	3	O	BARNETT
1	P	GLOBAL	2	P	FLGLOBAL	3	P	T301 D

FL LG TEMPLATE - STANDARD T301D

ZONE 1			ZONE 2			ZONE 3		
Z/P		DISPLAY	Z/P		DISPLAY	Z/P		DISPLAY
1	A	UT DISP	2	A	AIRPORT	3	A	BLANK
1	B	PUB SVC	2	B	RANGER	3	B	BLANK
1	C	CUST SVC	2	C	PARKS	3	C	BLANK
1	D	MNT I/R	2	D	SE PARKS	3	D	BLANK
1	E	FAC MNT	2	E	SNYDER	3	E	BLANK
1	F	SPC PROJ	2	F	DOCKS	3	F	BLANK
1	G	UT CONS	2	G	CODE	3	G	BLANK
1	H	WAST WTR	2	H	BLDG	3	H	BLANK
1	I	TREATMNT	2	I	MERS-A1	3	I	BLANK
1	J	SANITATN	2	J	MERS-A2	3	J	BLANK
1	K	ENG ENV	2	K	MERS-A3	3	K	BLANK
1	L	PW TAC1	2	L	PARKING	3	L	BLANK
1	M	PW TAC2	2	M	FLEET	3	M	NW AP
1	N	PW TAC3	2	N	EOC 3	3	N	NE BEACH
1	O	LG COMN	2	O	LG COMN	3	O	BARNETT
1	P	GLOBAL	2	P	FLGLOBAL	3	P	T301 D

Appendix C-3: Key City Personnel Contact Information for Notifications

Name	Department / Office	Title	Phone	Email
Christopher Woolweaver	Public Works / Distribution and Collection	Distribution and Collection Chief	954-828-7773	CWoolweaver@fortlauderdale.gov
Donna McMahon	Public Works / Customer Service	Administrative Supervisor	954-828-4786	DMcMahon@fortlauderdale.gov
Eric Rucker	Public Works / Distribution and Collection	Stormwater operation chief	954-828-7899	ERucker@fortlauderdale.gov
Erin Saey	Public Works / Distribution and Collection	Senior Administrative Assistant	954-828-5629	ESaey@fortlauderdale.gov
Jamar Wilkerson	Public Works / Distribution and Collection	Distribution and Collection Chief	954-828-7764	JWilkerson@fortlauderdale.gov
Jason Walker	Public Works / Distribution and Collection	Distribution and Collection Chief	954-828-7684	JWalker@fortlauderdale.gov
Jeron Coney	Public Works / Distribution and Collection	Stormwater Operations Chief	954-828-7872	JConey@fortlauderdale.gov
Jill Prizlee	Public Works / Engineering Services	Chief Engineer	954-828-5962	JPrizlee@fortlauderdale.gov
Jordan Wingate	Public Works /Customer Service	Senior Administrative Assistant	954-828-7595	JWingate@fortlauderdale.gov
Jud Hopping	Public Works / Distribution and Collection	Distribution and Collection Supervisor	954-828-7776	JHopping@fortlauderdale.gov
Judy Johnson	Public Works / Customer Service	Senior Administrative Assistant	954-828-6879	JJohnson@fortlauderdale.gov
Keith Hutchison	Public Works / Distribution and Collection	Distribution and Collection Supervisor	954-828-7682	KHutchison@fortlauderdale.gov
Larry Teich	Public Woks / Environmental Resources	Environmental Compliance Supervisor	954-828-7844	LTeich@fortlauderdale.gov
Marie Pierce	Public Works / Distribution and Collection	Stormwater Operations Manager	954-828-7847	MarieP@fortlauderdale.gov
Miguel Arroyo	Public Works / Treatment	Water and Wastewater Treatment Manager	954-828-7806	MArroyo@fortlauderdale.gov
Nadine Blue	Public Works / Customer Service	Senior Administrative Assistant	954-828-7812	NBlue@fortlauderdale.gov
Nancy Gassman	Public Works / Sustainability	Assistant Public Works - Sustainability	954-828-5769	NGassman@fortlauderdale.gov

Name	Department / Office	Title	Phone	Email
Omar Castellon	Public Works / Engineering Services	Chief Engineer	954-828-5064	OCastellon@fortlauderdale.gov
Patricia Jolly	Public Works / Customer Service	Senior Administrative Assistant	954-828-7707	PaJolly@fortlauderdale.gov
PWD 24/7 Call Center Team				PWD247CallCenterTeam@fortlauderdale.gov
Rafeela Persaud	Public Works / Administration	Administrative Assistant I	954-828-7810	RPersaud@fortlauderdale.gov
Reina Gonzalez	Public Works / Customer Service	Administrative Supervisor	954-828-7843	RGonzalez@fortlauderdale.gov
Rick Johnson	c / Distribution and Collection	Utility Distribution and Collection Systems Manager	954-828-7809	RJohnson@fortlauderdale.gov
Steve Roberts Jr	Public Works / Distribution and Collection	Utility Distribution and Collection Systems Manager	954-828-7855	SRobertsJr@fortlauderdale.gov
Talal Abi-Karam	Public Works / Administration	Assistant Public Works Director-Utilities	954-828-5299	TAbi-Karam@fortlauderdale.gov
Todd Hiteshew	Public Works / Sustainability	Environmental Compliance Manager	954-828-7807	THiteshew@fortlauderdale.gov
Troy Balint	Public Woks / Environmental Resources	Environmental Program Coordinator	954-828-7845	TBalint@fortlauderdale.gov
Chris Lagerbloom	City Manager / Administration	City Manager	954-828-5959	CLagerbloom@fortlauderdale.gov
Rob Hernandez	City Manager / Administration	Deputy City Manager	954-828-5758	RobHernandez@fortlauderdale.gov
Raj Verma	Public Works / Engineering Services	Director Public Works	954-828-5806	Rverma@fortlauderdale.gov
Aneisha Daniel	Public Works / Administration	Deputy Director Public Works	954-828-5609	ADaniel@fortlauderdale.gov

Appendix C-4: Sewage Backup Prevention Resident Communication Postcards

NO FROG, NO CLOG.

Help prevent sewer clogs in your neighborhood.

CITY OF FORT LAUDERDALE

Proper FROG Disposal is Every Citizen's Job

When Fats, Rags, Oils, and Grease (FROG) are sent down drains, they can build up in pipes and cause backups in homes, streets, and the sewer system. In addition to the costly repairs, sewer backups pose a serious public health threat.

By putting Fats, Rags, Oils, and Grease down the drain . . .

FROG builds up inside pipes and can cause a complete blockage.

Clogged pipes overflow in your home and in the environment . . .

Resulting in increased cost to residents due to repair and maintenance costs.

Tips for proper disposal in your home:

- ✓ Throw bulky waste materials in trash.
- ✓ Freeze small amounts of fats, oils, and grease in a container with a tight-sealing lid and dispose of them in trash.
- ✓ Mix cooking oil with an absorbent material, such as cat litter or coffee grounds, and place in a tightly-sealed container before disposing.
- ✓ Scrape and wipe excess grease from pans and dishes with a paper towel before washing.
- ✓ Use a strainer in your sink to catch scraps.
- ✓ Use environmentally safe cleaning products instead of harsh detergents or cleaners that can damage sewer lines.

Large-quantity FROG disposal

Large amounts of FROG (such as those used to deep fry a turkey), can be disposed of at Household Hazardous Waste (HHW) Drop-off Events.

For a listing of HHW events, visit www.fortlauderdale.gov/HHW.

Did you know?

Pouring grease down the garbage disposal and then running hot water and grease-fighting detergent to wash it down does not remove grease from the plumbing system. The hot water cools down in pipes causing fats and grease to thicken, creating blockages further down the pipeline.

City of Fort Lauderdale
Public Works Department
949 NW 38th Street
Fort Lauderdale, FL 33309

Tips for Local Businesses:

Certain establishments, such as restaurants or car washes, may be required to install grease, oil, and sand interceptors to prevent these harmful items from entering the sewage system. Interceptors – also called grease traps – should be routinely checked and maintained to ensure they are properly working. The City recommends cleaning grease traps at least every 30 days, or more often as necessary.

The "Do Not Flush" List

- Fats, cooking oil, rags, or grease
- Motor oil
- Disposable diapers and baby wipes
- Disinfectant wipes
- Cleaning cloths
- Large chunks of garbage
- Cat litter including so-called "flushable" cat litter
- Feminine hygiene products
- Dye (hair /clothing) or tanning solutions
- Flammable products (lighter fluid, acetone)
- Acidic and toxic substances

If you experience a sewer blockage, please contact the City of Fort Lauderdale's 24-hour Customer Service Center at 954-828-8000 or visit the Lauderserv page on the City website to submit a service request.

CITY OF FORT LAUDERDALE

GREEN YOUR ROUTINE
CITY OF FORT LAUDERDALE

If you would like this publication in an alternate format please call (954) 828-4755 or email publicaffairs@fortlauderdale.gov. ♻ Printed on recycled paper.

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Appendix C-5: Local Media Contact Information

Local Media Contact Information

Receiver Name	Phone	Email
TV Stations		
WTVJ NBC 6	(954) 622-6111	webteam@nbcmiami.com
WPLG ABC 10	(954) 364-2500	
WSVN FOX 7	(305) 795-2777	newsdesk@wsvn.com
WSCV TB1 51	(954) 622-7710	reportea@telemundo51.com noticias@telemundo51.com
CBS 4 Miami	(954) 463-6397	wfornews@wfor.cbs.com
Newspapers		
Hollywood Gazette – Brett Daley		brett@hollywoodgazette.com
The Miami Herald – Heidi Carr	(954) 538-1461	HCarr@MiamiHerald.com
Sun-Sentinel – News Desk	(954) 356-4000	newsalerts@sun-sentinel.com
Broward Informer	(954) 370-6009	Informar@comcast.net
El Nuevo Herald – Andres Reynaldo	(305) 376-2825	areynaldo@elnuevoherald.com
S. Fl. Sun Times – Larry Blustein		sfsuntimes@aol.com
Radio Stations		
WLRN 91.3 FM	(305) 995-1717	info@wlrn.org
WSBR 74 AM	(561) 997-0074	
WXDJ 95.7 FM	(305) 444-9292	info@elzol.com
WZTA 94.9 FM	(305) 654-9494	
WPYM Party 93.1 FM	(954) 584-7117	

Appendix C-6: Agency Contact Information

Agency Contact Information for Notifications (September 2019)

Primary Agency Contact Information					
Agency	**Address**	**Point of Contact**	**Phone**	**Email**	**Concerns**
Florida Department of Environmental Protection (FDEP)	2201 Gun Club Road, MSC 7210-1 West Palm Beach, FL	Konstantin Dubov; Environmental Specialist II	Office: (561) 681-6694 Fax: (561) 681-6760	Konstantin.Dubov@dep.state.fl.us	Primary contact for verbal report and recipient of written report
		Southeast District Office	(561) 681-6600	SED.wastewater@dep.state.fl.us	Copy on written report
Broward County Environmental Protection and Growth Management Department (BCEPGMD)	BCEPGMD, Environmental Engineering and Permitting Division 1 N University Dr., Mailbox 201, Plantation, Florida 33324	---	---	WWCompliance@broward.org	Receiving email address for written report
		Yvel Rocher, PE	954-519-1483	yrocher@broward.org	Primary contact
		Emergency Hotline	(954) 519-1499	---	Contact for initial verbal report
State Watch Office (SWO)	---	---	(800) 320-0519	swp@em.myflorida.com	Reporting of spills >1,000 gallons and/or spills that endanger public health or the environment

Secondary Agency Contact Information					
Agency	**Address**	**Point of Contact**	**Phone**	**Email**	**Concerns**
South Florida Water Management District (SFWMD)	2535 Davie Road Davie, FL 33317	Fort Lauderdale Field Station	(954) 452-4814	---	Impacts to management of surface waters
		24/7 Operations Control Center	(561) 682-6116	---	Impacts to management of surface waters
US Army Corps of Engineers (USACE)	4400 PGA Blvd, Ste 500 Palm Beach Gardens, FL 33410	Palm Beach Gardens Permitting Section	Phone: (561) 472-3504 Fax: (561) 626-6791	---	Public Defense (Permit by Rule applicable in Emergency Situations)
US Coast Guard (USCG)	Brickell Plaza Federal Building 909 SE 1st Avenue Miami, FL 33131	Section Fort Lauderdale	(954) 927-1611	---	Compliance with marine vessel safety regulations
		Section Miami Command Center (24 hour)	(305) 535-4472	---	Compliance with marine vessel safety regulations
		National Response Center (24 hour)	(800) 424-8802	---	Emergency call center that documents and routes reports of pollution
US Fish and Wildlife Service (USFWS)	1339 20th Street Vero Beach, Florida 32960	South Florida Ecological Services Office	Phone: (772) 562-3909 Fax: (772) 562-4288	verobeach@fws.gov	Management of fish, wildlife, and natural habitats
Broward County Emergency Management Division (BEMD)	201 NW 84th Ave Plantation, FL 33324	Main Office	Phone: (954) 831-3900 Fax: (954) 382-5805	---	Emergency management assistance
Florida Department of Health in Broward (FDOH)	780 SW 24th Street Fort Lauderdale, FL 33315	Main Office	(954) 467-4700	Post.CHD06@flhealth.gov	Public health (Possible permit requirement for permanent repairs)

Appendix D-1: Exercising Force Main Valve

Standard Operating Procedure for
Waste Water Force Main Valve Exercising

This plan summarizes the maintenance program maintained by the City to ensure performance and reliability of the wastewater collection system. The City encompasses an area over 33 square miles and maintains 752 Isolation Valves located throughout 119 miles of pressured force main. Force main size ranges from 2" up to 54".

Procedures/Work Steps:

1. **Locate valve**
   A. Locate the Valve– The crew will have access to the most current force main system maps for the project area. The crew will locate all isolation valves using the following guidelines:
      1. The Crew will search for all valves visually and electronically using the City of Fort Lauderdale water maps as reference material.
      2. The Crew will search for water valves shown, but not identified by visual inspection, using a magnetic locator, probing rods and other industry standard tools.
      3. If the valve cannot be located after searching for sixty minutes, the valve will be labeled "cannot locate" and documented as a work order creating a mapping grade GPS position where searched and otherwise treated as a standard valve assessment.
      4. A valve that is deemed critical by The City and cannot be located by the process detailed above may require further investigation by means of ground penetrating radar.

2. **Identify the Valve– The Crew will use the City's unique identifier (UNITID) to reference valves.**
3. **Notify proper manager of activity**
4. **Photograph the location, identifying the condition of the site.**
5. **Check the area for potential hazards and implement needed controls.**

6. **Establish traffic control as necessary.**
7. **Pull valve cover.**
8. **Clean and inspect riser as necessary.**
9. **Inspect valve nut if possible.**
10. **Exercise valve:**
    a) **Verify the direction for turning the valve to the *CLOSED* and *OPEN* positions.**
    b) **Assume all valves are in the fully *OPEN* position unless otherwise indicated.**
    c) **Begin *CLOSING VALVE SLOWLY*, increasing torque as necessary to achieve movement (without exceeding the pre-determined maximum torque value).**
    d) **Count the number of turns to achieve *NO GREATER THAN A 50% CLOSURE* of the valve.**
    e) **Begin *OPENING VALVE SLOWLY*, increasing torque as necessary to achieve movement (without exceeding the pre-determined maximum torque value).**
    f) **Count the number of turns necessary to achieve the fully open position. The number of turns to open should equal the same number as was closed. (*DO NOT JAM THE OPERATING NUT IN THE OPEN POSITION*).**
    g) **Repeat the Close/Open cycle a minimum of (3) three times.**
11. **Record the valve condition, number of turns, date, time and any other pertinent information.**
12. **Replace valve cover**
13. **Confirm it is the correct valve cover labeled (SEWER).**
14. **Paint valve cover (sewer green)**
15. **Prior to departing, evaluate the location for hazards to people, property or environment, record findings.**
16. **Photograph site.**
17. **Notify proper management that you have completed work at this location.**

Special Notes and Considerations:

- Valves are not to be operated by anyone other than designated and qualified City of Fort Lauderdale Public Services crews.
- No force main valves will be exercised without ***PRIOR APPROVAL OF THE WASTE WATER SUPERVISOR AND NOTIFICATION OF THE PUMPING STATION CHIEF.***
- Force main valves 20" or larger on primary transmission lines should only be exercised during ***OFF PEAK HOURS***.
- When operating a valve the crew will follow all guidelines to ensure their safety.
- The employee should verify the exercising of the valve would not inconvenience or endanger any customer.
- The valve will be verified by address, GPS, and location on the atlas.
- The valve will be closed no more than 50%, then reopened counting turns in each direction to verify the correct operation of the valve.
- In case of emergency where the valve needs to be fully closed a record of the number of turns will be kept in both directions.
- If the valve is not operating as it should a Q-Alert number will be created and issued to a crew to make the repair.
- All records will be gathered and kept at a central location.
- Pumping Station isolation valves which are not buried and are located in a valve box or inside a drywell are operated and serviced by the station mechanics.
- Critical isolation valves are exercised annually and non-critical are exercised on an as needed basis or a minimum of every five years.

Documentation

The Crew will provide applicable valve data in a spatially accurate format compliant with the City of Fort Lauderdale's existing data structure. The database shall contain the information agreed with by the City and at a minimum the following attribute data:

- A Unique Identification Number
- Torque chart for fully exercised large valves
- Data Dictionary
- Valve Condition (operable, inoperable)

- Source Document Reference
- Valve discrepancies (categories and details)
- Date of Operation
- Structure discrepancies (categories and details)
- Valve Size
- Valve Type
- HDOP value
- PDOP value
- Use of valve
- Correction Status
- Valve Structure
- Attribute indicating whether vacuumed/pumped
- Date\Time Recorded

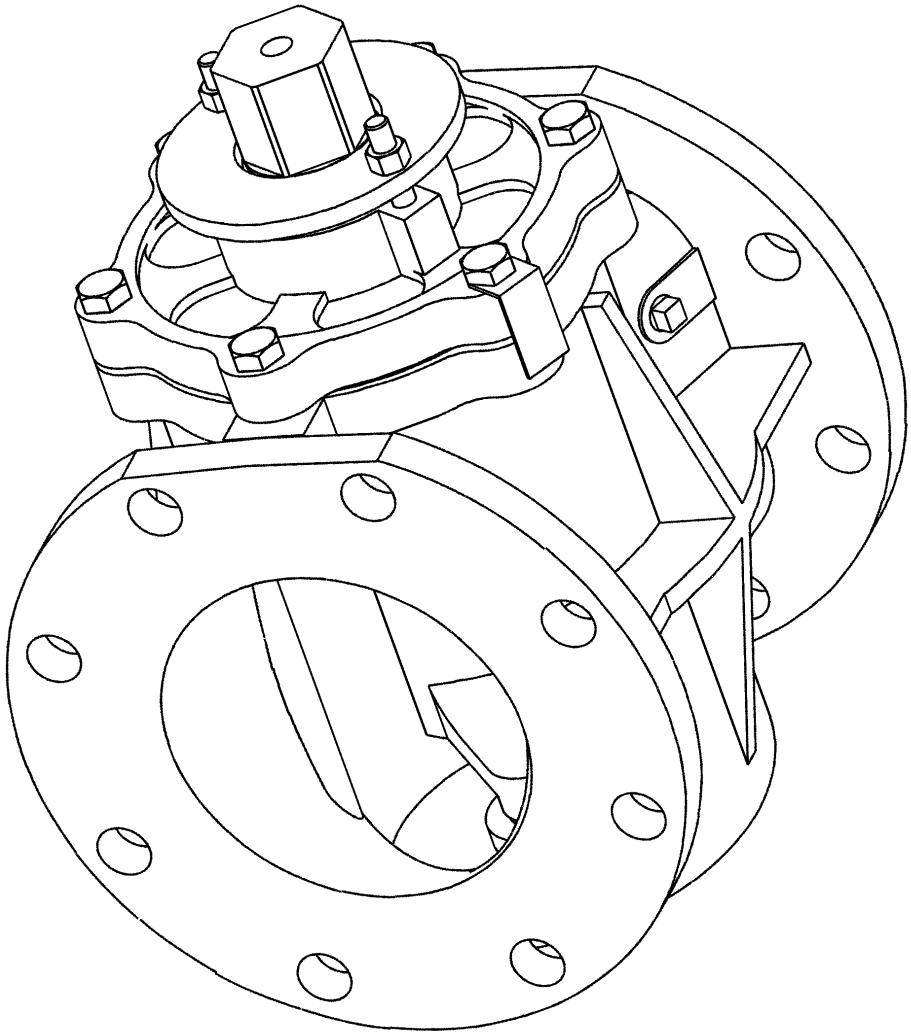
SAFETY

The Crew will abide by all applicable safety regulations in the fulfillment of this scope of services. The Crew shall provide all traffic control services necessary to ensure a safe working environment.

Appendix D-2: DeZURIK Valve Operations and Maintenance Manuals

DeZURIK

4-20" PEC ECCENTRIC VALVES



Instruction **D10021**

March 2009

Instructions

These instructions provide information about PEC Eccentric Valves. They are for use by personnel who are responsible for installation, operation and maintenance of PEC Eccentric Valves.

Safety Messages

All safety messages in the instructions are flagged with an exclamation symbol and the word Caution, Warning or Danger. These messages indicate procedures that must be followed exactly to avoid equipment damage, personal injury or death. Safety label(s) on the product indicate hazards that can cause equipment damage, personal injury or death. If a safety label becomes difficult to see or read, or if a label has been removed, please contact DeZURIK for replacement label(s).

WARNING!

Personnel involved in the installation or maintenance of valves should be constantly alert to potential emission of pipeline material and take appropriate safety precautions. Always wear suitable protection when dealing with hazardous pipeline materials. Handle valves, which have been removed from service with suitable protection for any potential pipeline material in the valve.

Inspection

Your PEC Eccentric Valve has been packaged to provide protection during shipment, however, it can be damaged in transport. Carefully inspect the unit for damage upon arrival and file a claim with the carrier if damage is apparent.

Parts

Recommended spare parts are listed on the assembly drawing. These parts should be stocked to minimize downtime.

Order parts from your local DeZURIK sales representative, or directly from DeZURIK. When ordering parts, please include the 7-digit part number and 4-digit revision number (example: **9999999R000**) located on the data plate attached to the valve assembly. Also include the part name, the assembly drawing number, the balloon number and the quantity stated on the assembly drawing.

DeZURIK Service

DeZURIK service personnel are available to install, maintain and repair all DeZURIK products. DeZURIK also offers customized training programs and consultation services.

For more information, contact your local DeZURIK sales representative or visit our website at www.dezurik.com.

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Description

The 4 – 20” PEC Eccentric Valves have welded nickel seats that provide excellent resistance to corrosion and damage, and prolong the life of the resilient plug facing. The valve rotates 90 degrees from full open to full closed. Clockwise rotation of the valve stem closes the valve. If an actuator other than a DeZURIK is to be mounted, the actuator must be capable of maintaining the valve plug position with flow in the pipeline.

WARNING!

Personnel involved in the installation or maintenance of valves should be constantly alert to potential emission of pipeline material and take appropriate safety precautions. Always wear suitable protection when dealing with hazardous pipeline materials. Handle valves, which have been removed from service with suitable protection for any potential pipeline material in the valve.

Required Tools

This valve is assembled using only SAE fasteners. To service this valve, you should have a full set of combination wrenches, Allen wrenches, a large flat tipped screwdriver, a flat pry bar, a pin punch and a dead blow hammer.

Note: You may want to machine a shaft to aid you in removing the lower bearing from the body. See *"Disassembly"* section.

Installation

The type of materials carried in the pipeline and the location of the valve determine the correct installation procedure.

Note (4” & 6” Valves): Full height hex nuts are recommended for flange bolting, however, if flange nut installation by the bonnet area of the valve is difficult because of the use of insulating washers, etc., a jam nut and grade 5 bolt, can be used instead of the full nut.

Liquids and Gases

1. Before installation, remove foreign material such as weld spatter, oil, grease, and dirt from the valve and pipeline.
2. Install the valve as shown in Figure 1.

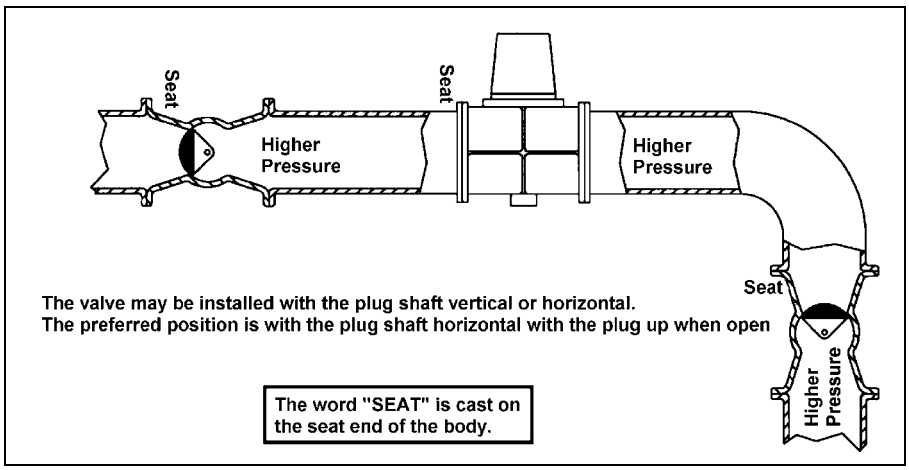

Figure 1—Liquids and Gases

Installation *(continued)*

3. Ensure the valve and flanges are concentric to ensure proper flange sealing.
4. Tighten the flange bolts or studs in a crisscross pattern.

Suspended Solids

If the pipeline carries suspended solids such as paper stock of 2 percent or higher consistency, mining slurry, or raw sewage:

1. Before installation, remove foreign material such as weld spatter, oil, grease, and dirt from the valve and pipeline.
2. Install the valve as shown in Figure 2.
    a. In HORIZONTAL pipelines, install the valve so that the plug is horizontal and rotates upward as the valve opens.
    b. For VERTICAL pipelines, install the valve with the end marked "SEAT" at top of valve.

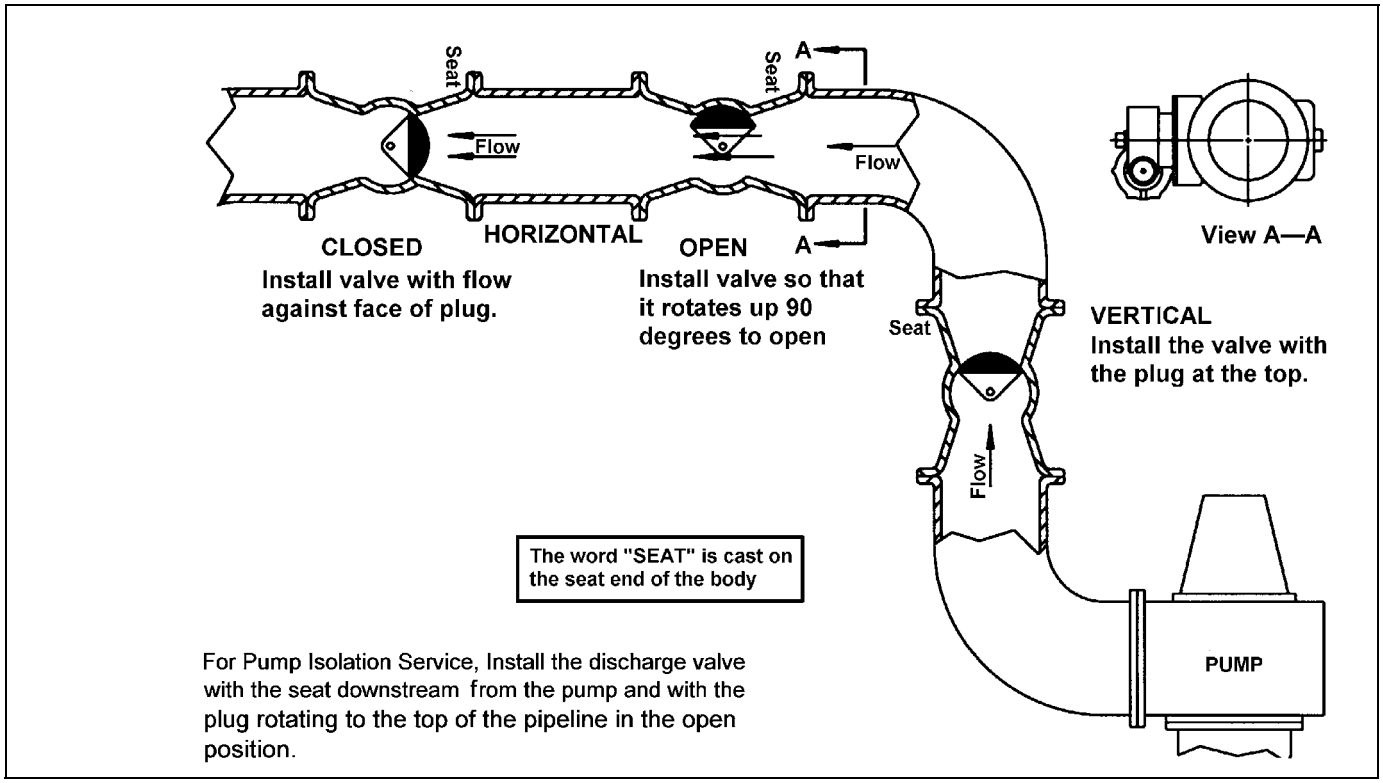

Figure 2 — Liquids with Suspended Solids

3. Tighten the flange bolts or studs in a crisscross pattern.
4. Ensure the valve and flanges are concentric to ensure proper flange sealing.

Closed Position

Because of the eccentric action of this valve, the closed position of the valve is dependent upon the pressure drop expected when the valve is closed.

To adjust the valve closed position, follow these steps:

WARNING!

This valve is a pressure vessel. The bonnet will blow off the actuator if the bonnet bolts are removed with pressure in the valve. Completely release pressure before disassembling the valve.

1. Relieve pipeline pressure.

WARNING!

Moving parts from accidental operation of power actuator can cause personal injury or equipment damage. Disconnect and lock out power to actuator before servicing.

2. If the actuator is powered, disconnect and lock out the pneumatic, hydraulic, or electrical power to prevent accidental operation of the actuator.
3. Back off the actuator closed position stop as described in the Actuator Instructions.
4. Close the valve with the torque specified in the Actuator Instructions.

   Note: This torque is the amount required to seat the plug for a given pressure drop across the valve. To avoid excessive plug and seat wear caused by over torquing, use the actual pressure drop across the valve when determining correct closing torque.
5. After the valve has been closed using the correct amount of torque, set the actuator closed position stop to limit actuator travel at this position.

Lubrication

This valve does not require routine maintenance lubrication. If the valve is disassembled, lubricate the packing and the plug journals as follows:

Packing

Packing lubrication requirements are dependent upon the packing material.

- **PTFE PACKING:**

  Requires no lubrication.

- **ALL PACKING OTHER THAN PTFE:**

  Apply a light coat to the inside and outside diameters of the packing rings using one of these lubricants.

  - Keystone Nevastane HT1 (**recommended**)
  - Phillips Philube PF (alternate)
  - Mobilgrease FM 101 (alternate)
  - Amoco FG (alternate)

  Note: Ensure lubricant is compatible with flow media.

Lubrication *(continued)*

Plug Journals and Lubrication

Plug journal lubrication is dependent upon the materials used in construction of the valve.

- CAST IRON, NI-RESIST, BRONZE AND ACID BRONZE VALVES: Lubricate the journals on the plug using one of these lubricants.
  - Keystone Nevastane HT1 (**recommended**)
  - Phillips Philube PF (alternate)
  - Mobilgrease FM 101 (alternate)
  - Amoco FG (alternate)
- ALL VALVES EXCEPT CAST IRON, NI-RESIST, BRONZE, & ACID BRONZE: Coat the journals on the plug with a light coat using one of these lubricants.
  - Dow Corning Molykote G Rapid paste (**recommended**)
  - Shell Retinax AM (alternate)
  - Shell Lithall MDS (alternate)

  Then lubricate with a mixture of powdered graphite and one of these lubricants.
  - Standard Oil #140 Gear Lube (**recommended**)
  - Mobil Mobilgear 634 (alternate)
  - Shell Omala 460 (alternate)
  - Texaco Meropa 460 (alternate)
  - Amoco MP (alternate)
- HARD RUBBER LINED VALVES: Lubricate the journals on the plug using one of these lubricants.
  - Dow Corning Molykote #44 (**recommended**)
  - Magnalube G (alternate)
  - Texaco Molytex E.P. Grade 2 (alternate)

Packing Adjustment

The stem seal tightening procedure is dependent upon the type of actuator on the valve. If a packing leak should occur, tighten the packing as follows:

4 – 8" Lever and Nut Operated Valves

1. Loosen the nuts under the packing gland
2. While actuating the valve with a torque wrench, tighten the nuts on top of the packing gland until the torque required to actuate the valve matches the torque shown in Table A.

Table A: Actuating Torque

Valve Size		Actuating Torque			
		Standard Packing		Low Friction Packing	
in	mm	ft lbs	Nm	ft lbs	Nm
4	100	28	37	14	18
5-6	125-150	60	81	30	40
8	200	104	141	52	70

3. Once the torque is matched, tighten the nuts under the packing gland.

   Note: If the packing leaks following this adjustment, replace the packing.

10" and 12" Lever Operated Valves

Tighten the nut on top of the housing until the spring is approximately 3/4 compressed.

Note: If packing leaks when the spring is fully compressed, replace the packing.

All Other Actuators

Tighten the gland nuts evenly only until the leak stops.

Note: Do not continue tightening after leak stops. If packing leak cannot be stopped by tightening the gland nuts, the packing must be replaced.

Packing Replacement

Replacing Packing with Actuator Removed

To replace the packing without removing actuator, see *"Replacing Packing Without Removing Actuator"* section.

1. Discontinue pipeline flow and relieve pipeline pressure.
2. Scribe the actuator and valve bonnet for alignment when reassembling.

WARNING!

Moving parts from accidental operation of power actuator can cause personal injury or equipment damage. Disconnect and lock out power to actuator before servicing.

3. If the actuator is powered, disconnect and lock out the pneumatic, hydraulic, or electrical power to prevent accidental operation of the actuator.

WARNING!

When an eccentric valve is mounted in a vertical pipeline— or mounted in a horizontal pipeline with the plug stem horizontal—gravity can cause the plug to swing to a lower position in the valve body when the actuator is removed. Place the plug in the lowest position before removing the actuator.

4. Remove the actuator from the valve. See Actuator Instructions.
5. Remove the actuator adaptor (when used) from the valve.
6. Remove the packing gland nuts, then slide the packing gland off the valve shaft.
7. Pull the packing out of the bonnet.

Packing Replacement *(continued)*

8. For valves with low friction packing, lubricate the new packing, then install it one ring at a time in the sequence shown in Figure 3.

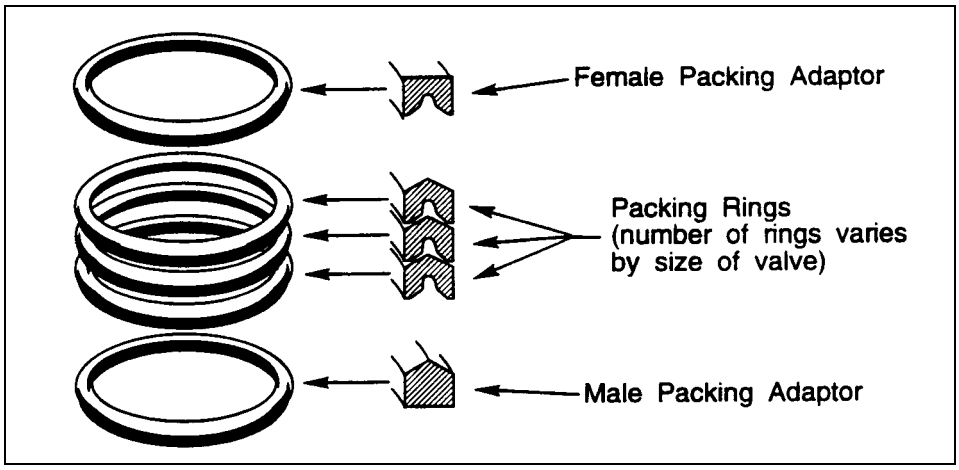

Figure 3 — Correct Packing Installation Sequence

Note: 4 - 8" lever and nut operated valves without low-friction packing have a friction cone and standard packing. Before installing the gland, set the cone on top of the packing. Do not lubricate the outside of the cone or the inside of the gland. See Figure 4.

9. Slide the packing gland down the valve shaft and over the studs. If the valve has a friction cone, bring the gland nuts under the gland up finger tight.

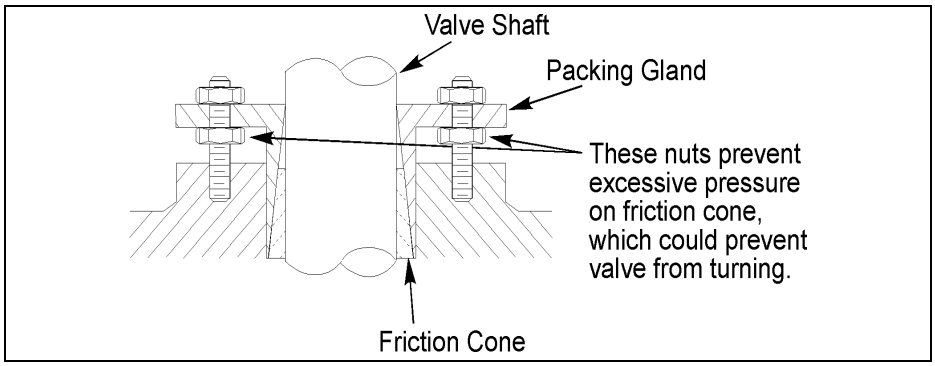

Figure 4 — Friction Cone Adjustment

10. Adjust gland nuts.
    a. 4 - 8" LEVER AND NUT OPERATED VALVES ONLY:
    Turn packing gland nuts onto the studs until they touch the gland.
    b. ALL REMAINING VALVES EXCEPT 10" AND 12" LEVER OPERATED:
    Turn the packing gland nuts onto the studs until they touch the packing gland, then one more turn.

    Note: This is a preliminary adjustment, it will be necessary to adjust the packing gland nuts after the valve is pressurized. See "Packing Adjustment" section.
11. Fasten the adaptor (when used) to the valve, lining up the scribe marks made during disassembly.
12. Install the actuator as described in the Actuator Instructions.
13. If the actuator is a powered actuator, reconnect power to the actuator.

Packing Replacement *(continued)*

Replacing Packing Without Removing Actuator

Note: Lever and nut operated valves require that the actuator be removed before packing can be replaced. See *"Replacing Packing with Actuator Removed"* section to replace the packing in these valves.

WARNING!

Excessive pipeline pressure can propel the loose packing, and can cause personal injury or equipment damage. If possible, relieve the pressure in the pipeline to 0 psi before removing the packing gland.

1. Ensure that the pipeline pressure does not exceed 25 psi—if possible, relieve the pressure to 0 psi.

WARNING!

Caustic, toxic, or hot material in the pipeline can cause personal injury or death if leakage occurs. Confirm that the material is not harmful.

2. Ensure that the material in the pipeline will not cause injury if leakage occurs.
3. Remove the packing gland nuts from the studs, and slide the packing gland up the stem of the plug.
4. Remove the studs from the bonnet.
5. Cut and completely remove all of the old packing from the packing chamber in the bonnet.
6. Cut each new packing ring radially in one place with a razor-sharp knife.
7. Place each new packing ring—one at a time with the joints staggered—around the plug and into position in the packing chamber.
8. Replace the studs in the bonnet.
9. Push the rings down into position with the packing gland, and replace the packing gland nuts on the studs.
10. Turn the packing gland nuts onto the studs until they touch the packing gland, then one more turn.
11. Restore the pipeline pressure, and check for packing leakage. If leakage occurs, tighten each packing nut just enough to stop the leakage. Excessive tightening will cause reduced packing life and higher valve operating torque.

Disassembly

WARNING!

This valve is a pressure vessel. The bonnet will blow off the actuator if the bonnet bolts are removed with pressure in the valve. Pressure must be completely released before disassembly.

Follow these steps to disassemble valve:

1. Relieve pipeline pressure and close the valve.

WARNING!

Moving parts from accidental operation of power actuator can cause personal injury or equipment damage. Disconnect and lock out power to actuator before servicing.

2. If the actuator is powered, disconnect and lock out the pneumatic, hydraulic, or electrical power to prevent accidental operation of the actuator.
3. Close the valve.
4. Remove the valve from the pipeline (if desired).

   Note: The valve can be disassembled while still in the pipeline.

WARNING!

When an eccentric valve is mounted in a vertical pipeline—or mounted in a horizontal pipeline with the plug stem horizontal—gravity can cause the plug to swing to a lower position in the valve body when the actuator is removed. Place the plug in the lowest position before removing the actuator.

5. Remove actuator from valve—see Actuator Instructions.
6. Scribe a line on the body, bonnet and plug stem to help align these parts during re-assembly.
7. Remove the bolts that hold the bonnet in place, then pry the bonnet loose from the valve body.
8. Remove the plug from the valve body.
9. Remove the gland nuts and gland from the bonnet.
10. Remove the packing from the bonnet.
11. Reaching through the packing chamber in the bonnet, drive the upper bearing out of the bonnet using a hammer and pin punch.
12. Remove the lower bearing from the valve body.

    Note: The bearing can be chiseled out; or, it can be hydraulically forced out. See Figure 5.

Disassembly *(continued)*

To hydraulically force the bearing out:

1. Fill the interior diameter of the bearing with water.
2. Pound a shaft with the same outside diameter as the lower journal of the valve plug into the bearing

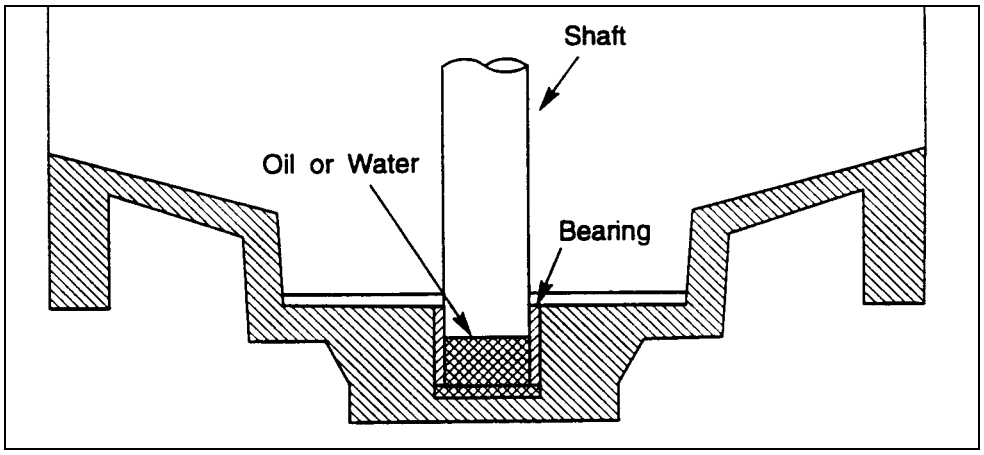

Figure 5 — Hydraulically Removing the Lower Bearing

Reassembly

1. Push a new lower bearing into the valve body, then lubricate the bearing as described in the *"Lubrication"* section.
2. Place the plug into the valve body so the lower journal slides into the bearing. Turn the plug so it is almost closed.
3. Set a new gasket in the body.
4. Push a new bearing into the bonnet, then lubricate the bearing. See "Lubrication" section.
5. Place bonnet on valve, align scribe marks, then fasten bonnet in place.
6. Turn the plug to the closed position. See "Closed Position" section.
7. For valves with low friction packing, lubricate the new packing, then install it one ring at a time. See Figure 3.

   Note: 4 - 8" valves use a friction cone with a wrenching nut or hand lever actuator, and standard packing. Before installing the gland, set the cone on top of the packing. Do not lubricate the outside of the cone or the inside of the gland.
8. Slide the packing gland down the valve shaft and over the studs. If the valve has a friction cone, bring the gland nuts under the gland up finger tight.

Reassembly *(continued)*

9. Adjust gland nuts.
    a. 4 – 8" LEVER AND NUT OPERATED VALVES ONLY: Turn packing gland nuts onto the studs until they contact the gland. It will be necessary to adjust the packing gland nuts after the valve is pressurized; see the *"Packing Adjustment"* section.
    b. ALL VALVES EXCEPT 10" AND 12" LEVER OPERATED: Turn the packing gland nuts onto the studs until they contact the packing gland, then one additional turn.

    Note: This is a preliminary adjustment, it will be necessary to adjust the packing gland nuts after the valve is pressurized. See *"Packing Adjustment"* section.
10. Install the actuator—see Actuator Instructions.
11. After pipeline flow is restored, check the packing for leakage.

    Note: If packing leaks, tighten the packing gland nuts only enough to stop the leak. Over tightening the packing will cause premature packing failure and higher valve operating torque.
12. If the actuator is a powered actuator, reconnect power to the actuator.

Removing Valve from Pipeline

To remove the entire valve assembly from the pipeline, follow these steps.

WARNING!

This valve is a pressure vessel. The bonnet will blow off the actuator if the bonnet bolts are removed with pressure in the valve. Pressure must be completely released before disassembly.

1. Relieve pipeline pressure and drain portion of system where valve is located.
2. Close the valve.

WARNING!

Moving parts from accidental operation of power actuator can cause personal injury or equipment damage. Disconnect and lock out power to actuator before servicing.

3. If the actuator is powered, disconnect and lock out the pneumatic, hydraulic, or electrical power to prevent accidental operation of the actuator.
4. Support the valve assembly, then remove the flange bolts.
5. Remove the valve from the pipeline.

Field Test

Stroke the valve between the fully open and fully closed positions to verify that the valve and actuator are functioning properly.

Emergency Operation

Operate the valve as under normal conditions, taking care to bring the plug to the position required by the particular emergency condition.

Predicted Wear of Parts

Length of service for parts subject to wear is dependent on service conditions.

Troubleshooting

Symptom	Possible Cause	Corrective Action
Packing Leaks.	Packing is loose.	Adjust Packing. (See *"Packing Adjustment"* section)
	Packing is worn.	Replace Packing. (See *"Packing Replacement"* section)
Valve does not close.	Object is wedged between plug and seat.	Open the valve completely to flush object. If this doesn't work, remove valve from the pipeline. (See *"Removing Valve from Pipeline"* section)
	Actuator closed position is out of adjustment.	Adjust the closed position stop as described in the Actuator instructions.
Valve leaks when closed.	Plug is worn or damaged.	Replace plug. (See *"Disassembly"* section)
	Rubber on plug is torn.	

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Products, auxiliaries and parts thereof of DeZURIK manufacture are warranted to the original purchaser for a period of twenty-four (24) months from date of shipment from factory, against defective workmanship and material, but only if properly installed, operated and serviced in accordance with DeZURIK recommendations. Repair or replacement, at our option, for items of DeZURIK manufacture will be made free of charge, (FOB) our facility with removal, transportation and installation at your cost, if proved to be defective within such time, and this is your sole remedy with respect to such products. Equipment or parts manufactured by others but furnished by DeZURIK will be repaired or replaced, but only to the extent provided in and honored by the original manufacturers warranty to DeZURIK, in each case subject to the limitations contained therein. No claim for transportation, labor or special or consequential damages or any other loss, cost or damage shall be allowed. You shall be solely responsible for determining suitability for use and in no event shall DeZURIK be liable in this respect. DeZURIK does not guarantee resistance to corrosion, erosion, abrasion or other sources of failure, nor does DeZURIK guarantee a minimum length of service. Your failure to give written notice to us of any alleged defect under this warranty within twenty (20) days of its discovery, or attempts by someone other than DeZURIK or its authorized representatives to remedy the alleged defects therein, or failure to return product or parts for repair or replacement as herein provided, or failure to install and operate said products and parts according to instructions furnished by DeZURIK, or misuse, modification, abuse or alteration of such product, accident, fire, flood or other Act of God, or failure to pay entire contract price when due shall be a waiver by you of all rights under this warranty.

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Appendix D-3: Sewer Release Valve Maintenance Procedures

Sewer Air Release Valve Maintenance Procedures

Summary
This plan summarizes the maintenance program maintained by the City to ensure performance and reliability of the wastewater collection system. The City encompasses an area over 33 square miles and maintains 292 Air Relief Valves (ARV) located throughout 119 miles of pressured force main. Force main size ranges from 2" up to 54".

Description of Operation
The Waste water air release valve is designed to automatically remove air pockets at the high points in a piping system. As fluid enters the valve, the float will rise, closing the orifice. As air accumulates in the piping system and enters the valve, the float drops allowing the venting orifice to open.

Installation
Air release valves must be installed at the system high points in the vertical position with the inlet down for proper operation.

Inspection
The valve should not leak fluid at any connection or through the outlet. If there is leakage through the outlet, perform a back wash procedure on the valve. Check to see that air is being released by cracking the lower drain valve. If a large amount of air is released from the drain valve, then the main valve may be clogged and cleaning or a backwash procedure should be performed.

Documentation
Valve documentation data will be collected for each ARV valve. Data documentation will include, at a minimum:

i. Physical data - ID number, map number, valve size, if clean out was necessary, valve discrepancies (by category and details), box/vault discrepancies (by category and details), additional physical information as necessary.
ii. Location data – Mapping grade GPS coordinate data parameters noted in the GPS mapping section.
iii. Discrepancies _ Details on discrepancies so that work order (as described below) can be concisely created.

Procedures/Work Steps:
1 Locate air release valve
   a. The crew will locate all ARVs using the following guidelines:
      i. The Crew will search for all valves visually and electronically using the City of Fort Lauderdale sewer maps as reference material.
      ii. The Crew will search for ARVs shown, but not confirmed by visual inspection, using a magnetic locator, probing rods and other industry standard tools.
      iii. If the ARV cannot be located after searching for sixty minutes, the valve will be labeled "cannot locate" and documented as a work order creating a mapping grade GPS position where searched and otherwise treated as a standard valve assessment.

2 Verify GPS and sewer atlas location.
3 Photograph the location, identifying the condition of the site.
3 Check the area for potential hazards and implement needed controls.
4 Establish traffic control as necessary.
5 Pull air release valve cover.
6 Make a visual inspection of the manhole looking for potential hazards and conditions.
7 If there is water present evacuate with a Vacuum truck.
8 Utilizing a calibrated gas monitor check atmospheric conditions of the manhole at all levels and continue monitoring throughout the inspection.
9 Utilizing a portable blower ventilate the space for a minimum of (30) minutes before entering.
10 When the space has been properly ventilated and the atmosphere has tested good install an approved ladder for access.
11 Enter space and perform the necessary inspection and valve testing as outlined.
12 Close manhole when completed.
13 Document all maintenance activity and conditions.
14 If the air release valve is inoperable when completed open a Q-Alert work order number and report the condition to the immediate supervisor as soon as possible.

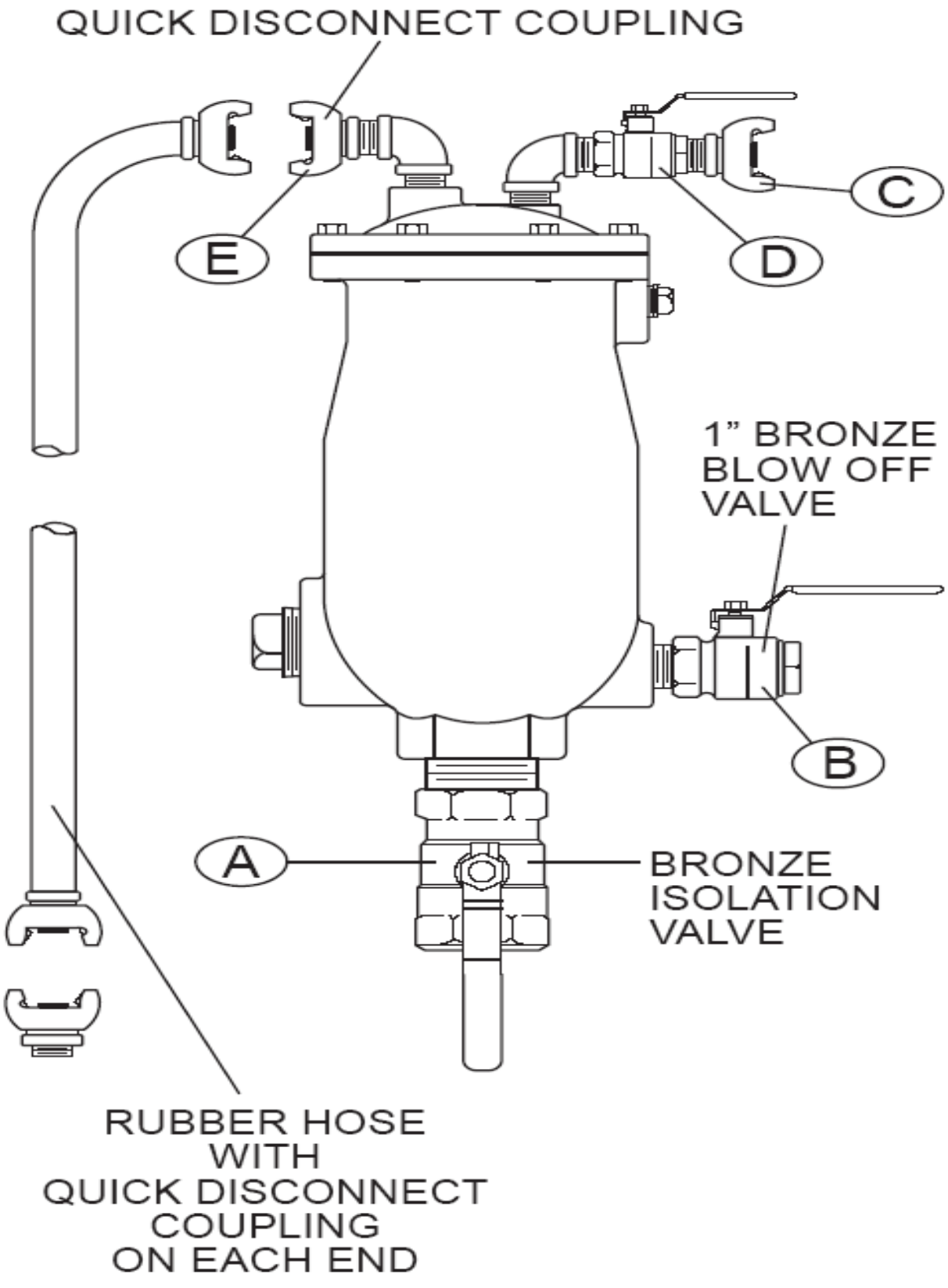
Safety

The Crew will abide by all applicable safety regulations in the fulfillment of this scope of services. The Crew shall provide all traffic control services necessary to ensure a safe working environment for the fulfillment of this contract. As a requirement to perform this scope of work safely, all work vehicles will be equipped with amber warning lights, strobe lights, directional arrow board lights, communications equipment and signage which will clearly identify the Crew.

Backwash Procedure (refer to diagram on following page)

In order to properly backwash the valve, a ½" clean water supply of at least 30 psi is needed. This supply should be connected the rubber hose with quick disconnect couplings.*DO NOT USE A POTABLE WATER SUPPLY FOR BACKFLUSHING AND CAPTURE ALL FLUSH WATER*. See attached diagram and follow procedure to back flush valve:

1. Pipe valve B to a drain prior to backwashing.
2. Close inlet valve from force main.
3. Open Valve B.
4. Connect water supply to E and supply water for a minimum of (3) minutes to flush seat and mechanism area.
5. Re-connect water supply to C and open valve D to wash the valve body for a minimum of (1) minute.
6. Close valve D and B.
7. Slowly open valve A to place unit back in service.


QUICK DISCONNECT COUPLING
E
C
D
1" BRONZE
BLOW OFF
VALVE
B
A
BRONZE
ISOLATION
VALVE
RUBBER HOSE
WITH
QUICK DISCONNECT
COUPLING
ON EACH END

Appendix D-4: ARV Operations and Maintenance Manuals

Manual No.
WWAR-OM1-2

Wastewater Air Release Valve
Models 48A, 49A

Operation, Maintenance and Installation Manual

INTRODUCTION 1
RECEIVING AND STORAGE..... 1
DESCRIPTION OF OPERATION 1
INSTALLATION..... 2
VALVE CONSTRUCTION 2
MAINTENANCE 3
TROUBLESHOOTING 4
DISASSEMBLY 4
REASSEMBLY 4
PARTS & SERVICE 5
WARRANTY 6

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VAL-MATIC'S WASTEWATER AIR RELEASE VALVE OPERATION, MAINTENANCE AND INSTALLATION

INTRODUCTION

This manual will provide you with the information to properly install and maintain the valve to ensure a long service life. The Wastewater Air Release Valve has been designed with stainless steel trim to give years of trouble-free operation but regular maintenance is recommended for valves subject to fluids containing suspended solids or greases/oils. The Wastewater Air Release Valve is typically mounted at the high points in a piping system to automatically remove pockets of air as they accumulate. The valve can also be used to slowly release air in tanks and pump casings.

CAUTION: **This valve is not intended for fuel liquids service.**

The valve is a float-operated, resilient-seated valve designed to handle waste fluids. The valve may be equipped with backwash accessories. The Size, Maximum Working Pressure and Model No. are stamped on the nameplate for reference.

RECEIVING AND STORAGE

Inspect valves upon receipt for damage in shipment. Handle all valves carefully without dropping. Valves should remain boxed, clean and dry until installed to prevent weather related damage. For long term storage greater than six months, the valve must remain in the box and stored indoors. Do not expose valve to sunlight or ozone for any extended period.

DESCRIPTION OF OPERATION

The Wastewater Air Release Valve is designed to automatically remove air pockets at the high points in a piping system. The valve, as shipped, is a normally open valve and will slowly vent air through the top orifice. As fluid enters the valve, the float will rise, closing the orifice. As air accumulates in the piping system and enters the valve, the float drops allowing the venting orifice to open.

The valve can be equipped with optional external valves and hose connections for backwashing. These items are packaged separately.

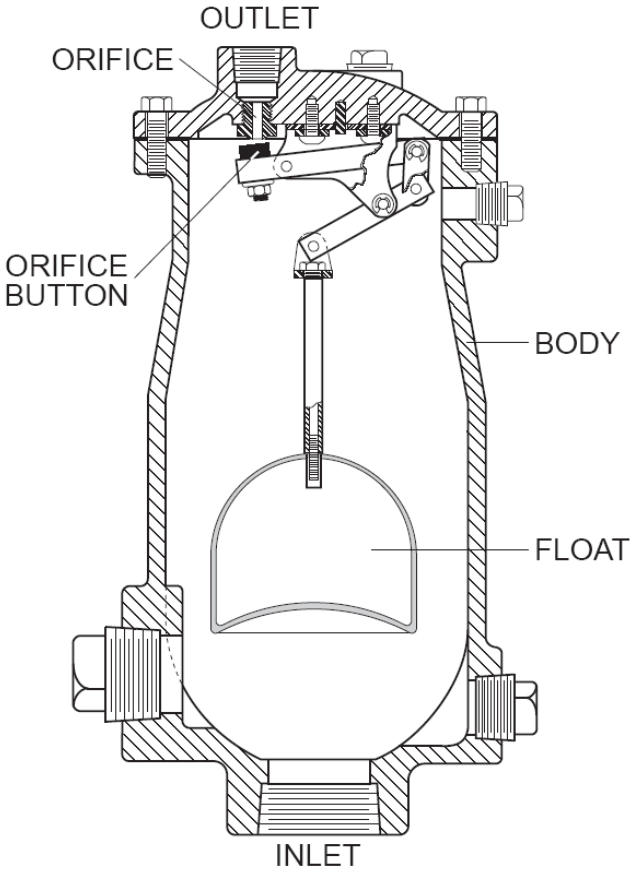


FIGURE 1. WASTEWATER AIR RELEASE VALVE

The lever mechanism provides mechanical advantage for the float. During system operation, the pipeline pressure exerts a strong upward force on the sealing component, the orifice button. The lever mechanism magnifies the weight of the float so that the orifice will open under high pipeline pressures. Additional ports are provided for flushing, testing and draining purposes.

INSTALLATION

The installation of the valve is important for its proper operation. Valves must be installed at the system high points in the vertical position with the inlet down. For pipeline service, a vault with freeze protection, adequate screened venting, and drainage should be provided. During closure, some fluid discharge will occur so vent lines should extend to an open drain area in plant service. A shut-off valve should be installed below the valve in the event servicing is required.

CAUTION: **Install valve with "INLET" port down or leakage will occur.**

VALVE CONSTRUCTION

The standard Wastewater Air Release Valve body and cover are cast iron. See the specific Materials List submitted for the order if other than standard cast iron construction. All internal components are stainless steel with the exception of the orifice button which is resilient. The general details of construction are illustrated in Figure 2. The body (1) is threaded for connection to the pipeline. The seat (4) is threaded into the cast cover (2).

ITEM	DESCRIPTION	MATERIAL
1	Body	Cast Iron
2	Cover	Cast Iron
3	Leverage Frame*	Stainless Steel
4	Seat*	Stainless Steel
5	Float*	Stainless Steel
6	Gasket*	Non-Asbestos
7	Cover Bolt	Alloy Steel
8	Retaining Screw*	Stainless Steel
10	Float Arm*	Stainless Steel
11	Orifice Button*	Buna-N
12	Pivot Pin*	Stainless Steel
13	Retaining Ring*	Stainless Steel
14	Pipe Plug	Iron
17	Float Retainer*	Stainless Steel
18	Lock Nut*	Stainless Steel
19	Link*	Stainless Steel
20	Extension Shaft*	Stainless Steel
21	Locating Pin	Stainless Steel
22	Orifice Button Arm*	Stainless Steel
28	Pipe Plug	Malleable Iron
30	Washer*	Stainless Steel
33	Clevis*	Stainless Steel
34	Lock Washer*	Stainless Steel
35	Retaining Screw*	Stainless Steel
36	Pipe Plug	Malleable Iron

*RECOMMENDED REPAIR PART KIT

TABLE 1. LIST OF PARTS

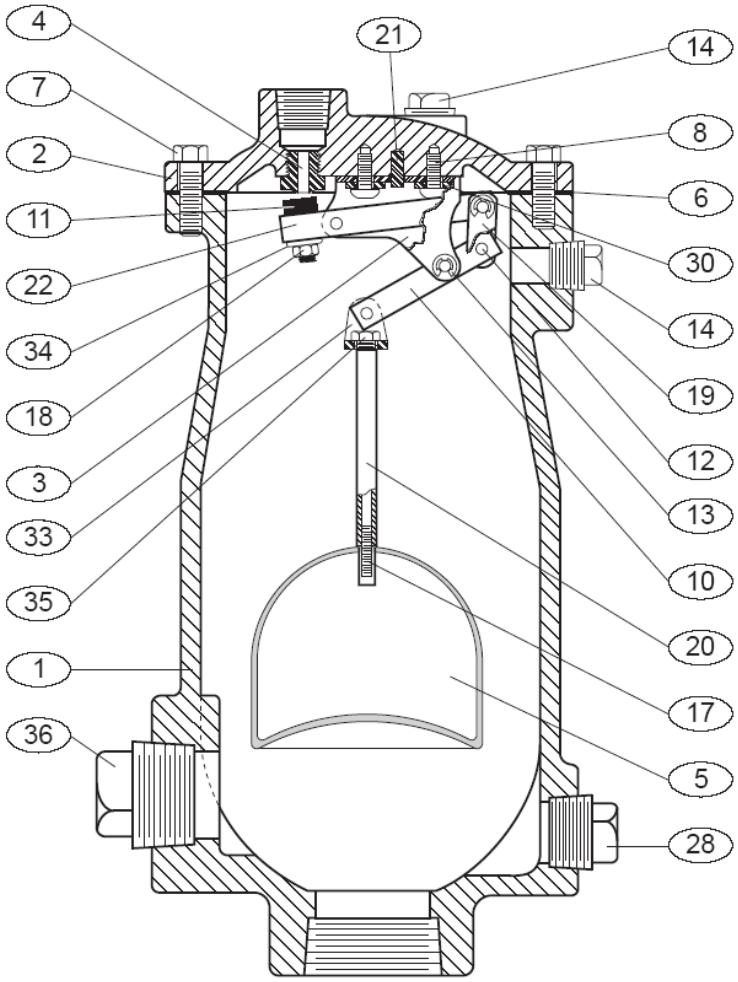


FIGURE 2. WASTEWATER AIR RELEASE VALVE

Option Backwash Assembly

Refer to the drawing on page 3 for the correct piping arrangement. Please note the each Kit contains extra fittings such as reducer bushings that may not be needed for your valve. The fittings should be installed with a standard pipe compound such as Oatey White Thread Sealant (supplied) or sealing tape. The quick disconnect fittings are designed for easy push and turn connections to a clean water source.

Backwash Accessory Kits			
Type	**Inlet**	**Backwash Kit**	**Valve Models**
Air Release Valve	2”	SPK-48ABW	48ABW, 48A.4BW
			49ABW, 49A.4BW
	3”	SPK-48A.2BW	48A.2BW, 48A.5BW
			49A.2BW, 49A.5BW
	4”	SPK-48A.3BW	49A.3BW, 48A.6BW
			49A.3BW, 49A.6BW

MAINTENANCE

The Wastewater Air Release Valve should be scheduled for regular inspection on an annual basis. Based on experience in service, a more frequent backwash regimen may be desirable to minimize leakage.

WARNING: Wear safety glasses to look into the valve outlet after installation. Released fluid can cause injury.

Inspection: Periodic inspection to verify operation can be performed. The valve should not leak fluid at any connection or through the outlet. If there is leakage through the outlet, perform a backwash procedure on the valve. Check to see that air is being released by cracking open the lower drain valve. If a large amount of air is released from the drain valve, then the main valve may be clogged and cleaning or a backwash procedure should be performed.

Lubrication: The Wastewater Air Release valve is a self-contained automatic valve and does not require and lubrication to enhance its operation.

Tools: No special tools are needed to maintain or repair the valve. The valve can be equipped with backwash valves and hoses for ease of backwashing.

Backwash Procedure: In order to properly backwash the valve, a ½" clean water supply of at least 30 psi is needed. This supply should be connected to the rubber hose with quick disconnect couplings as provided with the wastewater valve and shown in Figure 3.

1. Pipe valve B to a drain prior to backwashing.
2. Close inlet valve A.
3. Open valve B.
4. Connect water supply to E and supply water for 3 minutes to flush seat and mechanism area.
5. Re-connect water supply to C and open valve D to wash the valve body for 1 minute.
6. Close valves D and B.
7. Slowly open valve A to place unit back in service.

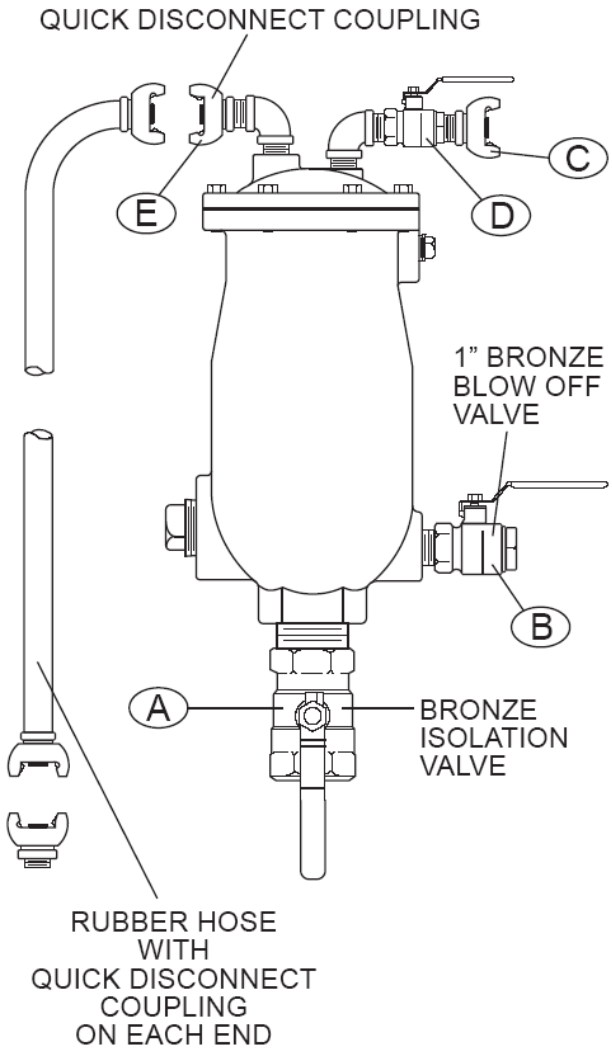


FIGURE 3. BACKWASH HARDWARE

TROUBLESHOOTING

Several problems and solutions are presented below to assist you in troubleshooting the valve assembly in an efficient manner.

- Leakage at Bottom Connection: Tighten valve threaded connection. If leak persists, remove valve and seal threads with Teflon* sealant.
- Leakage at Cover: Tighten bolts per Table 2, replace gasket.
- Valve Leaks when Closed: Backwash valve to remove debris. Disassemble and inspect seat, orifice button, and float. NOTE: Many floats contain sand for weight but if water is detected, replace float.
- Valve not Venting Air: Check that operating pressure does not exceed Working Pressure on nameplate. Backwash valve.

DISASSEMBLY

The valve can be disassembled without removing it from the pipeline. Or for convenience, the valve can be removed from the line. All work on the valve should be performed by a skilled mechanic with proper tools. No special tools are required.

WARNING:	**The valve must be drained before removing the cover or pressure may be released causing injury.**

1. Close inlet shut-off valve. Open drain valve or remove drain plug. Remove the cover bolts (7) on the top cover.
2. Pry cover (2) loose and lift off valve body.
3. Remove the 2 retainer rings (13) and pivot pins (12) that pass through the lever frame (3). The float (5) and linkage will be free from the cover. Disconnect float from lever (10).

DISASSEMBLY (Cont'd)

4. To remove lever frame (3), remove two round-head fasteners (8). Rotate seat (4) counter-clockwise to remove.
5. Remove locknut (18) and orifice button (11) from orifice button arm (22).
6. Clean and inspect parts. Note: some floats contain sand for extra weight; if water is detected, replace float. Replace worn parts as necessary.

REASSEMBLY

All parts must be cleaned and gasket surfaces should be cleaned with a stiff wire brush in the direction of the serrations or machine marks. Worn parts, gaskets and seals should be replaced during reassembly. Refer to Figure 2 on page 2.

1. Apply Loctite PST thread sealant to seat (4) and assemble to cover with maximum torque of 10 ft-lbs; DO NOT OVER-TORQUE.
2. Assemble lever frame (3) to cover over locating pin (21) in cover. Secure with screws (8) and washers (30).
3. Install new orifice button (11) flush to arm (22). Assemble lockwasher (34) and locknut (18) over orifice button but do not tighten.
4. Connect arms (10 & 22) and assemble to lever frame (3) with four pivot pins (12) and retaining rings (13); rings should snap over pins.
5. Adjust orifice button (11) so that orifice button arm (22) slopes away from cover about 1/16" when resting gently against seat (4). Secure button by tightening lockwasher (34) and nut (18).
6. Attach float (5) and guide shaft (20) by installing last pivot pin (12) into lever frame (3). Float should move freely pressing the orifice button (11) against the seat (4) when pushed upward. Verify that all retainer rings (13) are properly secured.

REASSEMBLY (Cont'd)

7. Lay new cover gasket on clean surface. Assemble gasket (6) and cover (2) over bolt holes in body (1).

8. Insert lubricated bolts (7) and tighten to the torques listed in Table 2.

9. Place valve back in service. Refer to the Installation instructions on page 2. Slowly open inlet isolation valve.

Model Number	Bolt Size	Torque (ft-lbs)
48A, 48A.2 48A.4, 48A.5	7/16”	30
49A, 49A.2 49A.4, 49A.5	1/2”	45

TABLE 2. VALVE COVER BOLT TORQUES

PARTS AND SERVICE

Parts and service are available from your local representative or the factory. Make note of the valve Size and Model No. located on the valve nameplate and contact:

Val-Matic Valve and Mfg. Corp.
905 Riverside Drive
Elmhurst, IL 60126
PH: 630 / 941-7600
FAX: 630 / 941-8042

A sales representative will quote prices for parts or arrange for service as needed.

LIMITED WARRANTY

All products are warranted to be free of defects in material and workmanship for a period of one year from the date of shipment, subject to the limitations below.

If the purchaser believes a product is defective, the purchaser shall: (a) Notify the manufacturer, state the alleged defect and request permission to return the product; (b) if permission is given, return the product with transportation prepaid. If the product is accepted for return and found to be defective, the manufacturer will, at his discretion, either repair or replace the product, f.o.b. factory, within 60 days of receipt, or refund the purchase price. Other than to repair, replace or refund as described above, purchaser agrees that manufacturer shall not be liable for any loss, costs, expenses or damages of any kind arising out of the product, its use, installation or replacement, labeling, instructions, information or technical data of any kind, description of product use, sample or model, warnings or lack of any of the foregoing. NO OTHER WARRANTIES, WRITTEN OR ORAL, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE AND MERCHANTABILITY, ARE MADE OR AUTHORIZED. NO AFFIRMATION OF FACT, PROMISE, DESCRIPTION OF PRODUCT OF USE OR SAMPLE OR MODEL SHALL CREATE ANY WARRANTY FROM MANUFACTURER, UNLESS SIGNED BY THE PRESIDENT OF THE MANUFACTURER. These products are not manufactured, sold or intended for personal, family or household purposes.

VAL-MATIC®

VALVE AND MANUFACTURING CORP.

905 Riverside Dr. • Elmhurst, IL 60126
Phone (630) 941-7600 • Fax (630) 941-8042
www.valmatic.com

Operating and Maintenance Instructions for
Automatic Air and Vacuum Valve for Potable Water and Waste Water
Model 986 (from Year of manufacture 2013)

1. Intended use

The H-TEC automatic air and vacuum valve, Model 986, is used for aerating and de-aerating of pressure pipe line systems for a pressure range between 0 – 250 psi (17.2 bar), as well as in vacuum systems. The Medium: potable water, domestic waste water (industrial or domestic waste water with a high content of acid or alkali only on consultation).
Please note this product must be maintained at least once per year, and even more frequently in case of waste water pressure lines with a high degree of contamination or a tendency to saponification. Observe also the applicable standards and general regulations for the prevention of accidents.

Air and vacuum valves contain compressed air. Therefore, isolate the air and vacuum valve from the operating system. Before starting any maintenance work the valve must be depressurized via the ball valve!

2. Product description

The H-TEC automatic air and vacuum valve is an two-way air valve, both aerating and removing air enclosed in pipelines. The valve operates automatically and is designed to reduce water hammers. The seat of this air valve is not in contact with the medium. The air and vacuum valve is rated for a maximum operating pressure 250 psi (17.2 bar).

3. Installation

The air and vacuum valve, Model 986, must be installed on a vertical outlet on top of the pressure pipeline. Installation should be as close to the pipeline as possible to reduce the danger of freezing. Note: The lateral arrangement of air valves may considerably influence the control behavior of the valve. Moreover, in case of heavy contamination there may be problems in the pipeline area upstream of the air valve. A laterally displaced arrangement of air valves shall be avoided.

In case of large pipeline dimensions care should be taken that the air is actually carried to the air valve. Therefore it is recommended to choose the connection to the pipeline as large as possible and to subsequently provide for reduction to the valve and its nominal width by means of a double flanged taper simultaneously acting as an air dome holding a larger amount of air (example: pipeline 8”, outlet at the pipeline 6”, double flanged taper reducing to 3”, air valve 3”)

There should always be a shut-off facility below the air and vacuum valve to allow maintenance work. This automatic valve is intended for installation in shafts. Please, observe the applicable standards and guidelines for this shaft, especially the regulations for the prevention of accidents in case of access to the shaft.
At the air relief outlet of the H-TEC air and vacuum valve a pipe can be connected. Note that the connection of a vent line may possibly influence the control behavior of the air valve. The same applies to any odor filters that may be installed additionally. In this case it is important to use sufficiently large components to avoid backwater in the valve.

4. Start-up and pressure testing

During pressure testing of new pipeline systems air valves should be generally put out of service. To this end the shut-off facility below the valve shall be closed. There is always some residual air enclosed even in a properly vented pipeline. If the air valve is placed correctly, this residual air is carried to the valve possibly causing it to blow off during pressure testing. As a consequence the pipeline system is wrongly assumed to be leaking.
Air valves are tested by the manufacturer so that they need not be included in the pressure testing. After completion of pressure testing of the pipeline the shut-off facility is opened slowly and the air valve and its flange connections are visually inspected under operating pressure.
For filling the pipelines please make sure not to exceed the maximum filling rates. Before filling the pipelines it should be checked if the vent holes of the air shafts concerned are actually free. If necessary, the covers should be opened.

Note: Before scavenging a pipe line section with compressed air the valve should be put out of service.

5. Service – maintenance of automatic air and vacuum valve, Model 986

The reliability of the H-TEC automatic air and vacuum valve can be considerably increased by checking it for possible contamination at regular intervals. Make sure to isolate the air valve from the pipeline system before starting any maintenance work by closing the shut-off valve and to reduce any overpressure possibly existing in the air valve via the ball valve of the flushing line.
Due to its coating the H-TEC automatic air and vacuum valve is well protected against deposits. Nevertheless, depending on the properties of the medium, the operability of the valve should be checked at regular intervals and possible contamination should be removed, especially in case of larger bodies of dirt that cannot be flushed out via the lateral flushing connections.
All work at H-TEC automatic air and vacuum valves should be performed by personnel which either is trained or read this manual!
We recommend the first maintenance to be done after a period of approx. 4 – 8 weeks and to define further maintenance intervals on the basis of the result of this first maintenance. To this end open the valve according to the below description.

In the course of maintenance, check also the ball valve and all other components for leakage and contamination.

Procedure:

1. Open body screws.

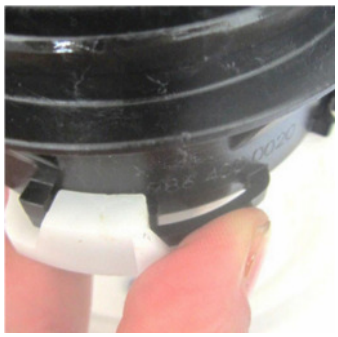
2. Pull the flange together with the complete valve mechanism upward and out and put it upright on a solid base

3. Open the retaining ring on the flange top side by means of an appropriate tool and pull the flange upward and off.



Note: Blue epoxy powder coating for potable water on request.

4. Remove debris screen (white) by pressing the safety lock (black). Turn debris screen clockwise. Move upper air valve part upward.

5. Clean the slots of the valve cage and rinse them.

6. Roll diaphragm out and look for remains of debris or mechanical damages. Remove debris with a wet towel. In case a change of the whole diaphragm is necessary, remove used diaphragm from the groove and replace it by an unused diaphragm.

Assembly of the diaphragm:

7. Pull the diaphragm over the diaphragm holder (white).




8. Check the correct placement of the diaphragm within the groove.

9. Assembly of the diaphragm within the upper air valve part:
   Put the end of the rubber string through the bore whole of the upper air valve part. Pull the string upward until the wider part of the rubber string moves through the bore whole. You either can hear or feel this final step. Diaphragm is in place now.




(Upper air valve part in cut sample view)

10. The rest of the assembly follows the steps vice versa 4 through 1 of this manual.
    Visual check of all connections and flushing openings. Leakage test!

Operating and Maintenance Instructions for
ARV Set for underground installation
Model 986

1. Intended use

The H-TEC air valve set, Model 986, is used for aerating and de-aerating of pipe lines for a pressure range of 0 – 250 PSI (17.2 Bar). Medium: domestic sewage (industrial sewage, waste water with a high content of acid or alkali only on consultation) and potable water.

Note that air valves must be maintained at least once per year and even more frequently in case of waste water pressure lines with a high degree of contamination or saponify. Please, observe also the applicable standards and codes, the regulations for the prevention of accidents.

The advantage of this air valve set lies in the fact that by using this product the hazards usually associated with shafts can be eliminated, since the necessary maintenance work can be normally done from the road surface.

2. Product description

The H-TEC air valve set is a combined shaft and air valve both aerating lines and removing air enclosed in pipelines. The air valve set operates automatically and is designed to reduce water hammers. The gasket seal of this air valve set is not in contact with the medium. The air valve set is rated for a maximum operating pressure of 250 PSI (17.2 Bar).

3. Installation

The H-TEC air valve set, Model 985, must be installed on a vertical outlet of the pressure pipeline. Installation should be as close to the pipeline as possible to reduce the danger of freezing. Note: The lateral arrangement of air valve sets may considerably influence the control behaviour of the valve. Moreover, in case of heavy contamination there may be problems in the pipeline area upstream of the air valve sets. A laterally displaced arrangement of air valve sets shall be avoided.

In case of large pipeline dimensions care should be taken that the air is actually guided to the air valve. Therefore it is advisable to choose the connection to the pipeline as large as possible and to subsequently provide for reduction to the valve and its nominal width by means of a reducing adaptor simultaneously acting as an air dome holding a larger amount of air (example: pipeline size 8”, outlet at the pipeline 6” or even 8”, double flanged taper reducing to 3”, air valve 3”).
The H-TEC air valve set is provided with a shut-off facility that can be opened and/or closed by a half turn. Therefore, an additional shut-off valve is not required.

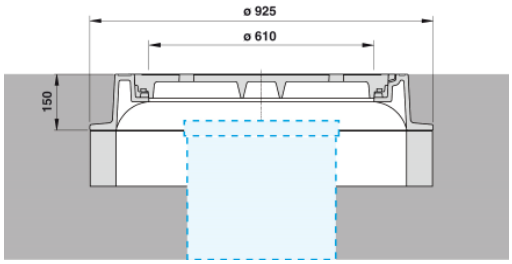
At the air outlet of the H-TEC air valve set a pipe can be connected. Note that the connection of a vent line that is too long or too small may possibly influence the control behaviour of the air valve set. The same applies to any odour filters that may be installed behind the air outlet. In this case it is important to use sufficiently large components to avoid backwater in the valve.

The air valve set is closed at the top by means of a manhole ring and manhole cover. When installing the H-TEC air valve set make sure to provide for a sufficiently dimensioned gravel backfilling, e.g. of round gravel, from the road surface to the pipeline to drain off any accumulating rainwater. Moreover, the H-TEC air valve set is equipped with a drain-off fitting that can either be connected to a PE pipe (e.g. for discharge to a draining ditch or gravel backfilling) or be closed by means of an end fitting („pump sump solution“).

Recommended installation: Manhole frame and cover of cast iron, bituminized, with inscription „WASTE WATER“.

The air valve set shall be installed in such a way that the distance from the road surface to the upper edge of the air valve set is 6 inch (150 mm)!

For installation of automatic air valve sets with BAIO®- spigot end a dirt cover and locking ring between spigot end and BAIO® socket has to be used, H-TEC Model 490.



4. Start-up and pressure testing

During pressure testing of the pipeline air valves should be isolated. To this end the shut-off facility below the valve shall be closed. There is always some residual air enclosed even in a properly vented pipeline. If the air valve set is placed correctly, this residual air is carried to the valve possibly causing it to blow off during pressure testing. As a consequence the pipeline system is wrongly assumed to be leaking.

Air valves are tested by the manufacturer so that they need not be included in the pressure testing. After completion of pressure testing of the pipeline the shut-off facility is opened slowly and the air valve set and its connections are visually inspected under operating pressure.
For filling the pipelines please make sure not to exceed the maximum filling rates. Before filling the pipelines it should be checked if the vent holes of the air shafts are actually free. If necessary, the covers of the surface boxes should be opened.
Note: Before scavenging with compressed air the H-TEC air valve set, Model 986, should be put out of service.

5. Service – maintenance of the air valve set

The reliability of the valve of the H-TEC air valve set, Model 986, can be considerably increased by checking it for possible contamination at regular intervals. Make sure to isolate the air valve from the pipeline system before starting any maintenance work by closing the shut-off facility and to reduce any overpressure possibly existing in the valve via the ball valve of the flushing line.

When entering shaft constructions the general safety precautions must always be observed. When working in shafts we recommend to provide for forced ventilation of the construction and to perform maintenance only with the pumps switched off.

Due to its coating the H-TEC air valve set, Model 985, is well protected against deposits. Nevertheless, depending on the properties of the medium, the operability of the valve should be checked at regular intervals and possible contamination should be removed, especially in case of larger bodies of dirt that cannot be flushed out via the lateral flushing connections.

All work at H-TEC air valve set, Model 986, should be performed by personnel which is either trained or read this manual!

We recommend the first maintenance to be done after a period of approx. 4 – 8 weeks and to define further maintenance intervals on the basis of the result of this first maintenance. To this end open the valve according to the below description.

In the course of maintenance, please check also the ball valve and all other components for leakage and contamination.

5.1 Maintenance „light“

The H-TEC air valve set, Model 986, is equipped with a lateral flushing opening and a flushing connection on the three-way valve making maintenance very easy. For maintenance clear water is pressed into the air valve via the flushing connection at the three-way valve, and any bodies of dirt are flushed out via the lower flushing opening.

Procedure:

1. Close the shut-off valve via the offset handle bar by a half turn (clockwise) – to this end the handle bar must before be shifted by 180°!

2. Note: After closing the shut-off facility the air valve is still under pressure. Therefore open the ball valve at the lateral flushing pipe carefully and only after mounting a hose at the flushing connection provided for this purpose, and safely drain off any emerging medium.

3. If the emerging medium is relatively clean then further maintenance steps may possibly be omitted.

4. Connect the flushing connection of the three-way valve to a flushing line and open the ball valve by a quarter turn towards the shaft bottom (red operating lever pointing vertically downward).

5. Continue flushing until only clear water emerges. (Flushing is usually done with „clear“ water, adding some purifying agent if necessary, pressure not higher than 30 PSI / 2 Bar).

6. Dismantle the flushing lines and close the two ball valves. (Note: The three-way valve must be turned in such a way that the handle points horizontally to the shaft outside wall – observe marking at the handle!)

7. Close the ball valve of the lower flushing opening.

8. Slowly open the shut-off facility below the air valve (counter-clockwise). After opening shift the handle bar again by 180° (locking against self-releasing of air valve)!

9. Visual check of all connections and flushing openings.

5.2 „Full“ maintenance

If there are foreign bodies in the valve that are too large to be flushed out via the lower flushing opening, the valve should be dismantled and the foreign body be removed. To this end please proceed as follows:

1. Close the shut-off facility via the offset handle bar by a half turn (clockwise) – to this end the handle bar must before be shifted by 180°!

2. Note: After closing the shut-off facility the air valve is still under pressure. Therefore open the ball valve at the lateral flushing pipe carefully and only after mounting a hose at the flushing connection provided for this purpose, and safely drain off any emerging medium.

3. Dismantle the three-way valve. To this end loosen the screw connections.

4. Pull the handle bar upward and out of the air valve set.

5. Turn the valve counter-clockwise until the bayonet coupling is released.

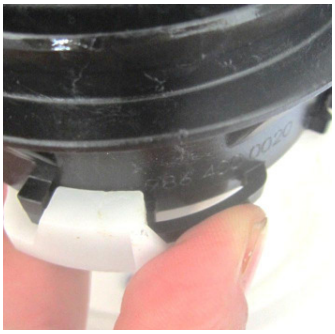
6. Pull air valve upward and out of the air valve set at the two eye bolts by means of a suitable lifting tool.

7. Open the screws of the body.

8. Pull the flange together with the complete valve mechanism upward and put it upright on a solid base.

9. Open the retaining ring on the flange top side by means of an appropriate tool and pull the flange upward and off.

10. Remove debris screen (white) by pressing the safety lock (black). Turn debris screen clockwise.
Move upper air valve part upward.



11. Clean the slots of the valve cage and rinse them. Roll diaphragm out and look for remains of debris or mechanical damages. Remove debris with a wet towel. In case a change of the whole diaphragm is necessary, remove used diaphragm from the groove and replace it by an unused diaphragm.

Assembly of the diaphragm:

12. Pull the diaphragm over the diaphragm holder (white).



13. Check the correct placement of the diaphragm within the groove.

14. Assembly of the diaphragm within the upper air valve part:
    Put the end of the rubber string through the bore whole of the upper air valve part. Pull the string upward until the wider part of the rubber string moves through the bore whole. You either can hear or feel this final step. Diaphragm is in place now.



(Upper air valve part in cut sample view)

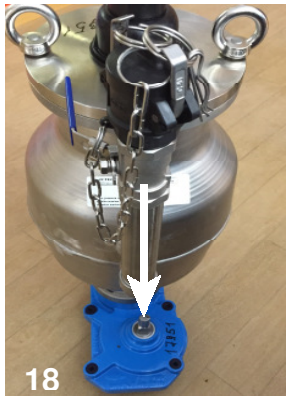
15. The rest of the assembly follows the steps vice versa 9 through 10 of this manual.
    Visual check of all connections and flushing openings.

16. Screw the flange together with the complete valve mechanism back on again.

    Attention: Check the correct fit of the O-ring seal!

17. Before installation of the air valve into the set clean all sealing surfaces.

18. Put the air valve from above onto the bayonet locking, that way the stainless steel flushing pipe is in one direction to the spindle top of the shut-off valve underneath.



19. Engaging it clockwise.

20. Put the three-way valve back in place and tighten the screw connections manually until the connections are tight.

21. Put on the handle bar.

22. Make sure that the ball valve of the stainless steel flushing pipe is in closed position!

23. Slowly open the shut-off valve below the air valve (counter-clockwise). The air release valve begins to operate.

    After opening shift the handle bar again by 180° (locking against self-releasing of air valve)!

24. Visual check of all connections and flushing openings.

Appendix E-1: Spill Volume Estimation in the Field

City of San Diego
Metropolitan Wastewater Department

Reference Sheet for Estimating Sewer Spills from Overflowing Sewer Manholes

All estimates are calculated in gallons per minute (gpm)

Wastewater Collection Division
(619) 654-4160

5 gpm

25 gpm

50 gpm

100 gpm

150 gpm

200 gpm

225 gpm

250 gpm

275 gpm

All photos were taken during a demonstration using metered water from a hydrant in cooperation with the City of San Diego's Water Department.

rev. 4/99

City of San Diego Manhole Overflow Picture Chart

Appendix E-2: Methods for Estimating Spill Volume

Methods for Estimating Spill Volume

The volume of a sanitary sewer overflow or building backup can be determined using a variety of methods. This section describes the two methods that are most commonly employed. The person preparing the estimate shall use best judgment to determine the method that is most appropriate for the sewer overflow incident. Every effort shall be made to make the best possible estimate of the volume.

Method 1 – Measured Volume

Based on geometry of spill:

To calculate the amount of gallons in a sewage discharge, the volume of the discharge must be determined.

Step 1: Sketch the shape of the spill that is contained

Step 2: Measure the length and width

Step 3: Measure the depth in several locations

Step 4: Convert all dimensions to feet

Feet = inches / 12

Step 5: Calculate the area using the following formulas

Rectangular Area (ft^2) = Length (ft) x Width (ft)

Circle Area (ft^2) = Diameter (ft) x Diameter (ft) x 0.785

Triangular Area (ft^2) = Base (ft) x Height (ft) x 0.5

Step 6: Multiply the area times the depth to get the volume

Volume (ft^3) = Area (ft^2) x Depth (ft)

Step 7: Multiply the volume by 7.48 gallons/ft^3 to convert it to gallons

Gallons = Volume x 7.48 gallons/ft^3

Example 1:

A discharge 100ft x 100ft x 0.5ft

100' x 100' x 0.5' x 7.48 = 37, 400 gallons

Based on time elapsed and number of service connections:

If a spill has been discharging into a storm drain, the gallons must be estimated by the elapsed time of the overflow multiplied by the number of service connections on the collector sewer multiplied by 200 gallons per household per 24 hrs.

Example 2:

If there are 6 houses on a line and it has been overflowing for 24 hrs;

Volume = 6 houses x 200 gal/house/24 hrs x 24 hrs = 1200 gallons

Example 3:

If there are 60 houses on a line and it has been overflowing for 1 hr:

60 houses x 200 gal/house/24 hrs x 1 hr = 500 gallons

Method 2 – Duration and Flow Rate

The duration is the total elapsed time from when the sewer overflow started until it stops.

The flowrate at which the sewer overflow is flowing is usually expressed as gallons per second (gps), gallons per minute (gpm) or gallons per hour (gph).

Often sewer overflows run into dry ditches or street gutters. The total volume of flow can be quantified by measuring the cross-sectional area and speed of the flow.

Step 1: Measure a set distance paralleling the sewer overflow route.

Step 2: Measure, in inches, the midway width and depth of the flow over this distance.

Step 3: Measure the time, in seconds, it takes a float to travel the set distance.

Step 4: Record the total time of the sewer overflow flow.

Example 4:

If the:

Set distance = 20 ft

Width at midway point = 28 inch

Depth at midway point = 3 inches

Float travel time = 20 Seconds

The total time of the sewer overflow = 20 minutes.

Total Volume (gal) = Velocity (ft/sec) x Area (ft^2) x Total Time (sec) x 7.48 gal/ft^3

= 20ft / 20 sec x (28x3) / 144) ft^2 x (20 min x 60 sec/min) x 7.48 gal/ft^3

= 5,220 gallons

Method 3 – Orifice Tables

Orifice tables can be used to estimate volume from a force main under pressure. The following 3-page table contains various sizes of "hole" columns verses various pressure rows, which can be used to look up the flow from the orifice.

Step 1: The hole size is measured once the pipe section has been cut out and replaced with a new section of pipe.

Step 2: The pressure is obtained from SCADA historic records.

Step 3: The volume rate of flow of the release is obtained by following the appropriate hole size column down to the appropriate pressure row.

Step 4: The duration time starts at the time the spill was reported and ends at the time the crew was able to stop the spill.

Step 5: The flow rate is converted to a volume by multiplying the flow rate times the duration time for the spill.

Example 5:

"Hole" in the force main = 5 inches

Pressure reading taken from SCADA = 20 psi

Total time of the sewer overflow = 30 minutes

Use the lookup table to determine Q = 3270 gpm

Total Volume (gal) = Q x t

= (3270 gpm) x (30 mins)

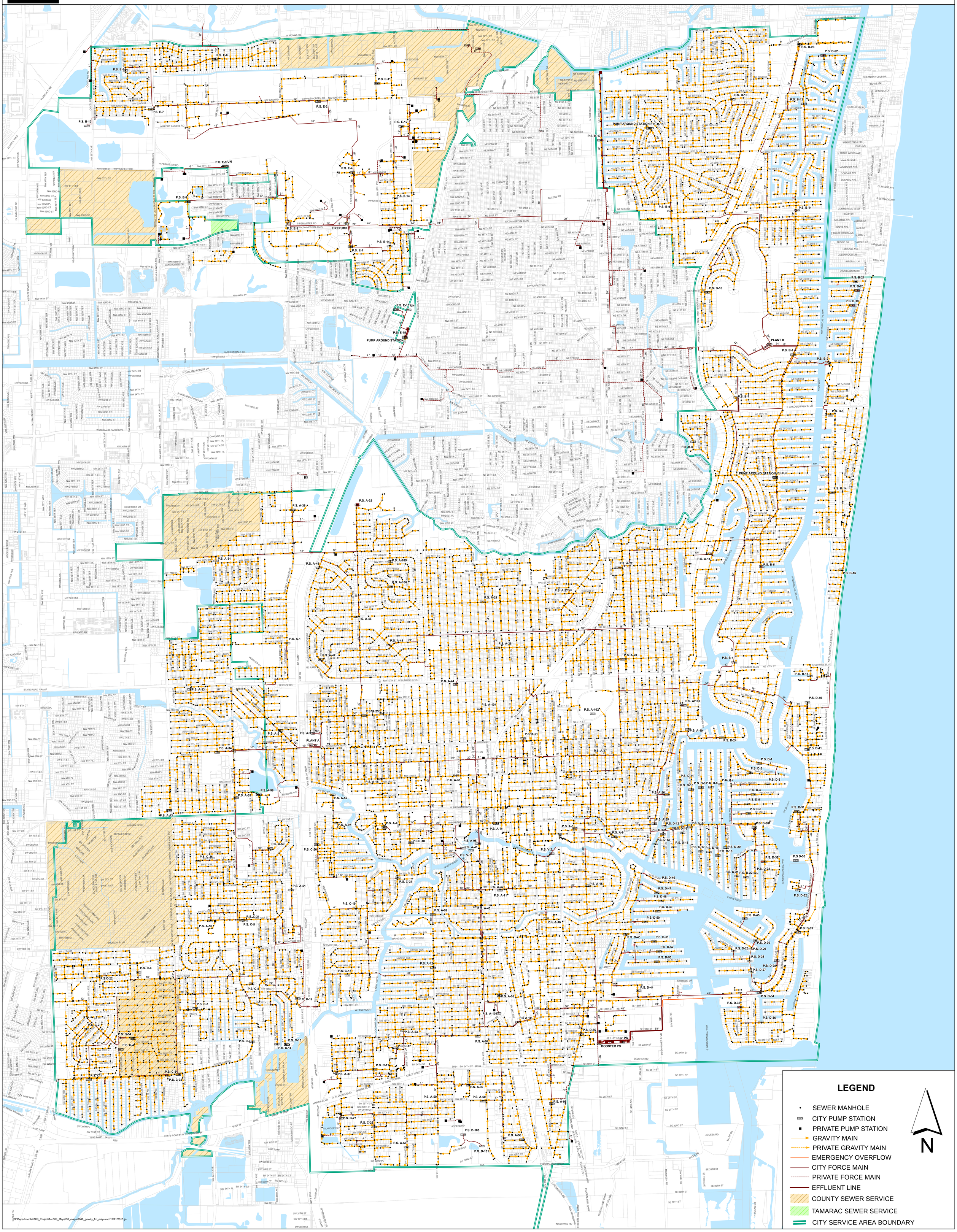
= 98,100 gallons

Method 4 – Pump Curves

Pump Station releases are calculated using manufacturers pump curves with the historic SCADA pressure readings to determine the pump flow rate in gpd and multiplied by the duration of the spill to estimate the total volume in gallons.

Appendix F-1: Collection System Map

CITY OF FORT LAUDERDALE COLLECTION SYSTEM


P.S. E-10
P.S. E-6
P.S. E-7
P.S. E-2
P.S. E-11
P.S. E-12
P.S. E-9 UN
P.S. E-4
P.S. E-8
P.S. E-13
P.S. E-3
P.S. E-14
P.S. E-1
P.S. E-16 UN
P.S. E-15
PUMP AROUND STATION
P.S. B-23
P.S. B-22
P.S. B-10
P.S. B-12
PUMP AROUND STATION P.S. B-13
P.S. B-17
P.S. B-9
P.S. B-11
P.S. B-18
P.S. B-21
P.S. B-20
P.S. B-19
PLANT B
P.S. B-1
P.S. B-2
P.S. B-7
P.S. B-3
P.S. B-8
PUMP AROUND STATION P.S. B-6
P.S. B-14
P.S. B-5
P.S. B-15
P.S. A-38
P.S. A-32
P.S. A-31
P.S. A-105
P.S. A-48
P.S. A-106
P.S. A-1
P.S. A-46
P.S. A-45
P.S. A-47
P.S. A-29
P.S. A-28
P.S. A-22
P.S. A-14
P.S. A-33
P.S. A-23
P.S. A-104
P.S. A-102
P.S. A-100
P.S. A-2
P.S. A-3
PLANT A
P.S. A-34
P.S. A-21
P.S. A-19
P.S. A-17
P.S. A-98
P.S. A-35
P.S. A-18
P.S. A-36
P.S. A-52
P.S. A-43
P.S. A-97
P.S. A-4
P.S. A-7
P.S. A-8
P.S. A-50
P.S. A-96
P.S. A-41
P.S. A-9
P.S. A-25
P.S. A-51
P.S. A-99
P.S. A-40
P.S. A-16
P.S. A-15
P.S. A-42
P.S. A-11
P.S. A-26
P.S. A-66
P.S. A-44
P.S. A-12
P.S. A-55
P.S. A-101
P.S. A-10
P.S. A-53
P.S. A-54
P.S. A-37
P.S. A-39
P.S. A-60
P.S. A-95
P.S. A-58
P.S. A-57
P.S. A-100
P.S. D-100
P.S. D-101
P.S. C-20
P.S. C-26
P.S. C-10
P.S. C-21
P.S. C-19
P.S. C-31
P.S. C-5
P.S. C-6
P.S. C-22
P.S. C-7
P.S. C-2
P.S. C-8
P.S. C-12
P.S. C-13
P.S. C-4
P.S. C-9
P.S. C-15
P.S. C-14
P.S. C-11
P.S. C-17
P.S. C-27
P.S. C-28
P.S. D-54
P.S. C-1
P.S. C-3
P.S. C-32
P.S. V-1
P.S. V-2
P.S. D-1
P.S. D-2
P.S. D-3
P.S. D-4
P.S. D-5
P.S. D-6
P.S. D-7
P.S. D-9
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Appendix F-2: Pump Stations Map

CITY OF FORT LAUDERDALE PUMP STATIONS

P.S. E-5
P.S. E-6
P.S. E-7
P.S. E-10
P.S. E-9
P.S. E-8
TAMARAC PLANT
P.S. E-4
P.S. E-13
P.S. E-3
E REPUMP
P.S. E-1
P.S. E-14
P.S. E-2
P.S. E-11
P.S. E-12
P.S. E-16 UN
P.S. E-15
P.S. B-17
P.S. B-13
P.S. B-10
P.S. B-12
P.S. B-22
P.S. B-23
P.S. B-9
P.S. B-11
P.S. B-18
P.S. B-21
P.S. B-20
P.S. B-19
P.S. A-32
P.S. A-38
P.S. A-31
P.S. A-48
P.S. A-105
P.S. A-106
P.S. A-46
P.S. A-1
P.S. A-47
P.S. A-33
P.S. A-2
UN P.S. A-3
PLANT A
P.S. A-34
P.S. A-98
P.S. A-35
P.S. A-43
P.S. A-97
P.S. A-4
P.S. C-20
P.S. A-50
P.S. C-26
P.S. A-51
P.S. C-19
P.S. A-56
P.S. C-5
P.S. C-31
P.S. C-6
P.S. C-22
P.S. C-7
P.S. C-2
P.S. D-54
P.S. C-4
P.S. C-1
P.S. C-3
P.S. C-32
P.S. C-30
P.S. C-8
P.S. C-9
P.S. C-14
P.S. C-15
P.S. C-12
P.S. C-13
P.S. C-27
P.S. C-28
P.S. C-21
P.S. A-45
P.S. A-23
P.S. A-18
P.S. A-52
P.S. A-36
P.S. A-37
P.S. C-11
P.S. A-39
P.S. A-59
P.S. A-60
P.S. A-54
P.S. A-10
P.S. A-53
P.S. A-55
P.S. A-10
P.S. A-12
P.S. A-42
P.S. A-11
P.S. A-40
P.S. A-99
P.S. A-96
P.S. A-41
P.S. V-1
P.S. C-10
P.S. A-4
P.S. A-50
P.S. A-97
P.S. A-7
P.S. A-8
P.S. A-9
P.S. A-25
P.S. D-12
P.S. D-14
P.S. D-16
P.S. D-13
P.S. D-15
P.S. A-22
P.S. A-27
P.S. A-29
P.S. A-28
P.S. A-20
P.S. A-44
P.S. A-104
P.S. A-102
P.S. A-100
P.S. A-19
P.S. D-24
P.S. A-17
P.S. A-21
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P.S. D-36
P.S. A-95
P.S. A-58
P.S. D-100
P.S. D-101
P.S. A-57
P.S. A-15
P.S. A-16
P.S. B-1
P.S. B-2
P.S. B-3
P.S. B-4
P.S. B-16
PLANT B
SS-1
SS-2
SS-4
SS-5
BOOSTER PS
PS
STORM STATION

N

CITY SERVICE AREA BOUNDARY
WATER WORKS SEWER AREAS ELIGIBLE FOR CONNECTION
COUNTY SEWER SERVICE
TAMARAC SEWER SERVICE

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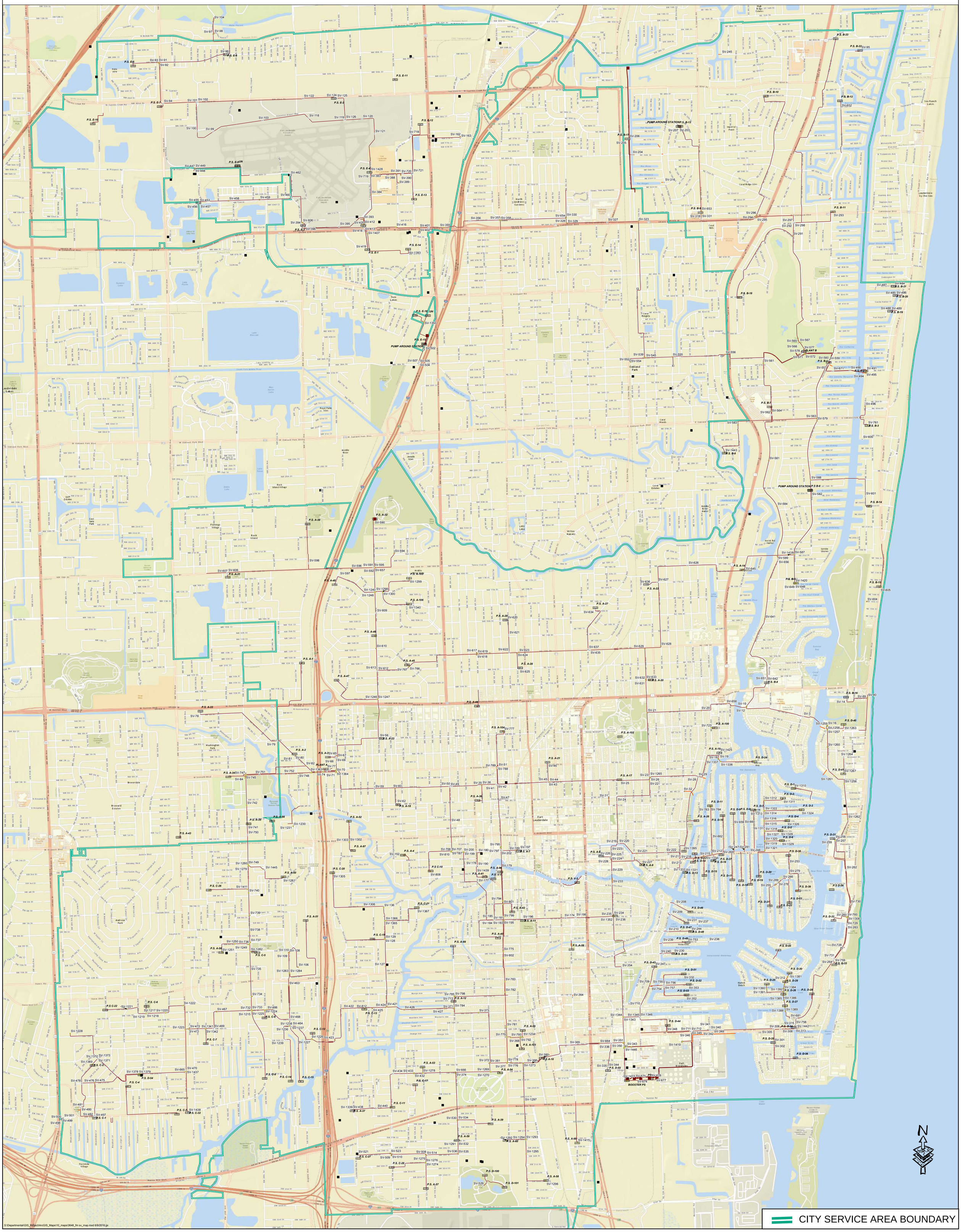
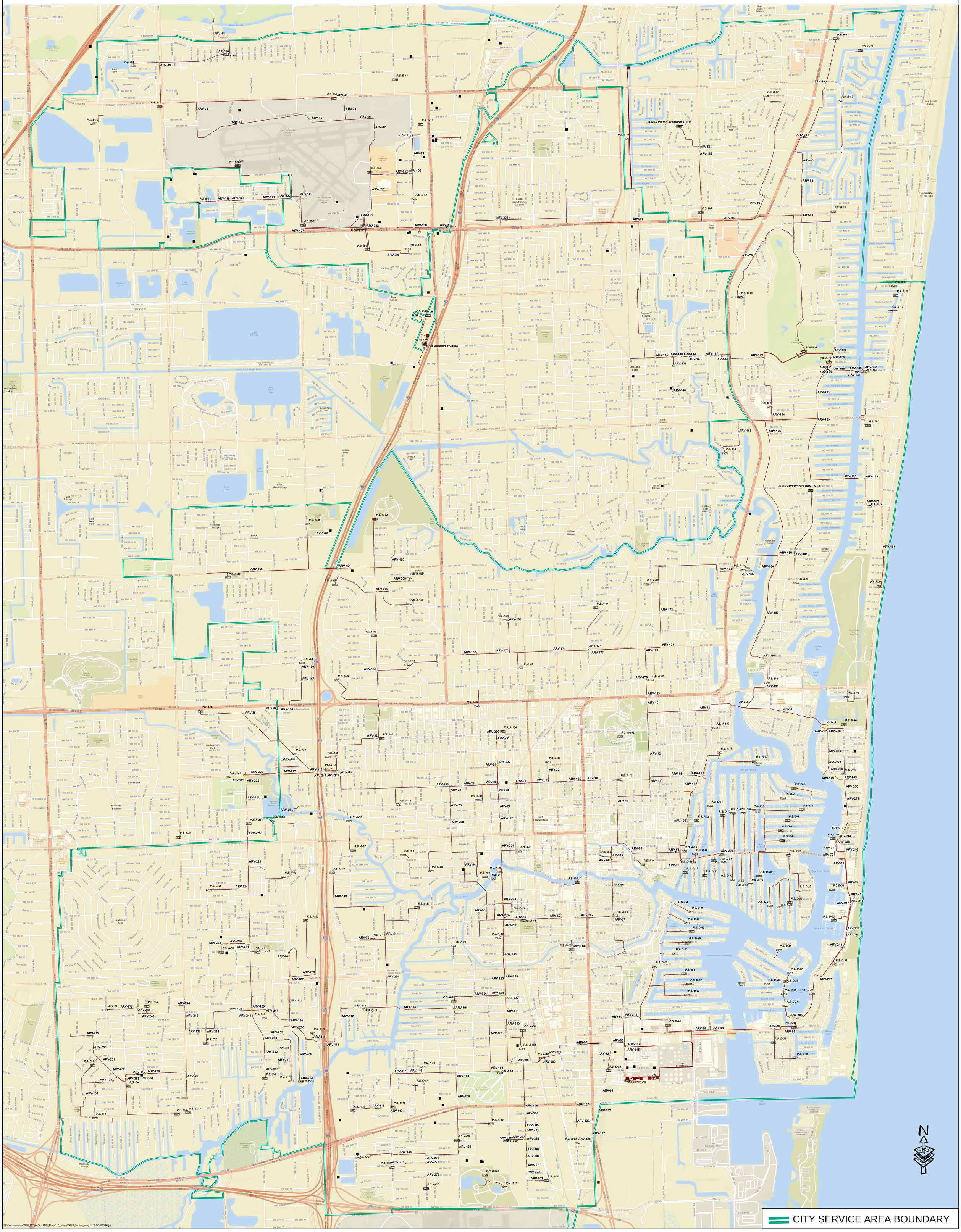
Appendix F-3: Force Main Valves Map

CITY OF FORT LAUDERDALE FORCE MAIN VALVES



Appendix F-4: Force Main Air Release Valves Map

CITY OF FORT LAUDERDALE FORCE MAIN AIR RELEASE VALVES



🟩 CITY SERVICE AREA BOUNDARY

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