



# Annual Conveyance System Report 2015-2016

*Clayton County Water Authority*



*“Providing Quality  
Water and Quality  
Services to Our  
Community”*



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## 1.0 INTRODUCTION

The Clayton County Water Authority (the Authority) Collection system consists of approximately 1032 miles of gravity main sewer, and 47 miles of force main serving approximately 76,000 customers within a service area of 98.142 square miles. The Conveyance section of the Distribution and Conveyance Department has the prime responsibility for the operation and maintenance of the collection system. In order to perform this function the Conveyance section is staffed with 38 full time positions. The Authority has been proactive in the inspection, maintenance, and management of the Collection System since the early 90's. This proactive way of thinking lead to the development of a CMOM (Capacity, Management, Operations and Maintenance) based approach to operating the collection system in 2001. Through the implementation of a CMOM based approach the Authority intends to prevent service interruptions and system failures, which can result in overflows and/or system backups while protecting the capital investment in the Collection System.

This document provides a summary of the programs and activities conducted by the Authority that are required to properly manage, inspect, maintain, and improve on the collection system and manage wastewater flows in Clayton County. It also provides information as required and referenced in the CMOM Consent Agreement No. EPD-WQ-6110 (as described in section 1 [a] through [g]) signed into effect on the 9th day of June, 2015. The document includes information on the following key components:

- Asset Inventory and Work Management Tracking
- Collection System Operations
- Environmental Compliance
- Sanitary Sewer Overflow (SSO) Overview
- Capital Improvement Planning and Implementation
  - Strategic Master Plan
  - Water Reclamation Facilities

## 2.0 ASSET INVENTORY AND WORK MANAGEMENT TRACKING

### Geographical Information Systems

As part of the 2000 Master Plan, the Authority began developing a Geographical Information System (GIS) to manage its liner assets. Currently, the mapping and inventory data of the Collection System assets are maintained by the Authority's GIS (Geographic Information System) section with the Program Management and Engineering (PM&E) department. The Authority maintains the GIS data in an Enterprise Geodatabase, which allows for multi-user editing, and versioning. The central database serves the entire company, and users either connect to it through the wide area network or via copies of the data. Currently each of the Conveyance Crew Leaders and Foremen has a complete, fully queryable GIS system on their laptops.

### Computerized Maintenance Management System

In 2004, the Authority implemented Cityworks, a Computerized Maintenance Management System (CMMS) to track, schedule and visually display collection system maintenance activities that are conducted on our assets that are stored in the GIS. Because it is integrated with the GIS, Cityworks is able to leverage the extensive GIS data warehouse. Users can create, view, and manage work orders and customer requests directly through a GIS interface, allowing them to associate calls, customer locations, crews, infrastructure, and work orders, viewing and querying them from within the map frame. Work orders created for the Conveyance Section are attached directly to the physical asset within the GIS, which allows the Authority to maintain a work history on our assets. In 2009 the GIS department began testing and training for a web based version of Cityworks. This version, along



with Wi-Fi access on laptops, allows crews to use the CMMS in the field. Cityworks is currently being used by all field crews within the Conveyance Section. Work orders are received and created in the field and the use of hard copy work orders has been eliminated.

### 3.0 COLLECTION SYSTEM OPERATIONS

While there are activities conducted throughout the Authority that all contribute to effective management of our wastewater, the majority of these activities are conducted by the Distribution and Conveyance (D&C) Department. This section will provide a summary of the D&C organization as well as the inspections and maintenance activities conducted by this group.

#### Organization and Management

The D&C Department is charged with the critical task of ensuring the efficiency of the individual distribution and collection systems. It has the responsibilities of installing the Authority's water lines and water meters and maintaining both water and sewer lines. Work must be performed in compliance with standards established by the federal and state regulatory agencies as they pertain to water distribution and sewerage collection.

Responsibilities are accomplished per the general direction of the General Manager and the Assistant General Manager over operations. The Distribution and Conveyance Manager is responsible for the day-to-day operations of the department.

To better manage operating expenses, the department is broken down into specific programs, types of services, or functional areas of responsibility. There are ten budget units and the following five budget units pertain to the collection system:

- 601 - Distribution and Conveyance Department Manager
- 619 - Utility and Landscaping Services
- 621 - Wastewater Conveyance Maintenance
- 627 - Conveyance System Inspections
- 630 - Utility Locators

#### D&C Staffing Summary

A total of 99 employees are assigned to the D&C Department and of those 35 are dedicated to maintenance and inspection and another 15 contribute through utility locates or other landscaping and restoration activities that must be completed as repairs are made to the system. Exhibit 1 provides a summary of staff by budget unit for the previous two fiscal years and for the current fiscal year.



## EXHIBIT 1

## D&amp;C Department Staffing Summary

<i>Authorized Personnel</i>	FY 2014-2015 Budgeted	FY 2015-2016 Budgeted	FY 2016-2017 Budgeted
<b>Distribution and Conveyance Division</b>			
601 - Distribution & Conveyance Manager	4.00	4.00	4.00
610 - Meter Installation	0.00	4.00	4.00
612 - Water Distribution Maintenance	28.00	28.00	27.00
616 - Meter Testing and Repair	9.00	7.00	7.00
617 - Leak Detection and Repair	2.00	2.00	2.00
618 - Backflow Testing and Repair	5.00	5.00	5.00
619 - Utility & Landscaping Services	9.00	9.00	9.00
621 - Wastewater Conveyance Maintenance	16.00	15.00	15.00
627 - Conveyance System Inspections	20.00	20.00	20.00
630 - Utility Locators	3.00	3.00	6.00
<b>Total Full-Time Employees (FTEs)</b>	<b>96.00</b>	<b>97.00</b>	<b>99.00</b>

## D&amp;C Budget and Major Initiatives for FY 2016 – 2017

Exhibits 2 and 3 provide a summary of the Budget and Major Initiatives planned for the D&C Department Fiscal Year Beginning 16 (FYB16).



## EXHIBIT 2

## D&amp;C Department Budget

Department : Distribution and ConveyanceBusiness Unit : Department 600 - ConsolidatedOverview of Department Responsibilities

The primary responsibility of the Distribution and Conveyance (D&C) Department is ensuring the overall integrity of the water distribution and wastewater collection systems. The Department installs and maintains water lines and water meters. It also maintains the wastewater collection system. The activities are performed in accordance with federal and state laws which govern water distribution and wastewater collection systems. Tasks are generally undertaken based on the priorities established by the General Manager.

Budget Detail By Individual Categories	FY 2014 - 15	FY 2015 - 16		FY 2016 - 17	
	Actual	Budgeted	Estimated	Request	Budgeted
<b>Personal Services:</b>					
Salaries and Wages	\$ 4,183,085	4,541,472	\$ 4,073,177	\$ 4,926,909	\$ 4,926,909
Overtime Pay	206,517	223,000	277,049	274,500	262,500
F.I.C.A.	322,494	364,675	322,921	394,521	394,521
Pension	532,153	657,315	560,003	684,840	684,840
<b>Operating Expenditures:</b>					
Operating Materials & Supplies	2,085,004	1,495,534	1,448,494	1,648,144	1,656,144
Vehicle Supplies	270,947	328,300	212,041	274,615	268,615
Administrative Supplies	14,961	24,830	14,439	17,601	17,601
Safety Supplies	30,916	34,600	32,835	35,045	35,045
Special Purchases	1,952	1,960	1,960	1,960	1,960
Utilities	105,641	112,525	103,453	107,746	107,746
Rentals	5,231	7,850	5,440	8,100	8,100
Maintenance and Repairs	159,379	238,344	212,038	266,199	266,199
Outside Services	2,229,076	3,559,702	2,984,909	3,053,511	2,852,011
Interest	-	-	-	-	-
Employee Benefits	782,217	882,214	778,278	1,017,983	1,025,016
Retiree Health Benefits	-	-	-	-	-
General Expenses	162,812	214,886	123,307	106,200	222,861
Accounting Charges	-	-	-	-	-
<b>Debt Service:</b>					
Capital Financing	-	-	-	-	-
<b>Capital Outlay:</b>					
Capital Expenditures	472,305	627,413	227,319	819,372	765,674
<b>Other Financing Uses:</b>					
Intrafund Transfers Out:	2,416,538	1,800,000	1,875,000	1,875,000	100,000
<b>Total Appropriations</b>	<b>\$ 13,981,228</b>	<b>\$ 15,114,620</b>	<b>\$ 13,252,663</b>	<b>\$ 15,512,246</b>	<b>\$ 13,595,742</b>



## EXHIBIT 3

## D&amp;C Department Major Initiatives

Business Unit	Account Number	Budget Funding	Amount Budgeted	Initiative
<b>610</b>	51104	Operating	450,000	Meter Setting Materials-From Warehouse
	56141	Operating	400,000	Meter & Backflow Setting
	56146	Operating	200,000	Building and Repairing Meter Vaults
	<b>Grand Total</b>		<b>1,050,000</b>	
<b>612</b>	51104	Operating	375,000	Materials for Water Distribution Maintenance
	56118	Operating	310,000	Patching and Paving
	56128	Operating	225,000	Maint. Of Supply Mains <i>(Concrete, Vault repairs, Dump fees, Plumbing Repairs)</i>
			100,000	Flushing Program
	59303	Capital	100,000	Lee St @ Morrow Tank Valve Replacement (3)
	<b>Grand Total</b>		<b>1,110,000</b>	
<b>621</b>	51104	Operating	250,000	Materials for Conveyance Maintenance
	55106	Operating	160,000	Private Property Damage
	56118	Operating	155,928	Patching & Paving
	56124	Operating	531,574	Maintenance of Collections & Outfalls <i>(Concrete, Dump Fees, Plumbing Repairs)</i>
	<b>Grand Total</b>		<b>1,097,502</b>	
<b>627</b>	56105	Operating	87,000	Flow Monitoring
	56124	Operating	500,000	Maintenance of Collections & Outfalls <i>(Concrete, Dump Fees, Plumbing Repairs)</i>
	<b>Grand Total</b>		<b>587,000</b>	

## D&amp;C Levels of Service

The Distribution and Conveyance Division is the Authority's largest division. This group has 16 Key Performance Indicator (KPI) metrics that are associated with six of the seven goals of the Authority: "Superior Product Quality"; "Exceed Customer Expectations;" "Provide Employee Development;" "Optimize Operations;" "Infrastructure Sustainability;" and "Stakeholder Support" goals and strategies 2, 4, 5, 6, 7, 8, 13, 21 and 23. The department's performance on these metrics are captured in Exhibit 4.





## EXHIBIT 4

## Levels of Service

Service Level Goal	Key Performance Indicator (KPI)	Division	Target	YTD 2015 - 2016	Actual 2014 - 2015	Actual 2013 - 2014
<b>SUPERIOR PRODUCT QUALITY</b>						
2 Potable water quality that meets customer expectations	# discoloration complaint calls (CCWA issue)	DC	< 200/Yr. - Reduce 10%/Yr.	713	529	477
	# water Taste and Odor complaint calls (CCWA issue)	DC	< 25/Yr. - Reduce 10%/Yr.	20	97	131
<b>EXCEED CUSTOMER EXPECTATIONS</b>						
4 Improve CCWA customer experience	% site visits within 2 hours of customer call	DC	> 90% / Month	94.1%	91.7%	89.6%
5 Minimize potable water service disruptions	# low pressure complaints:	DC	< 20 / Year	15	25	12
	% maintenance related water service disruptions <4 hours	DC	> 80% / Month	81.1%	91.2%	87.0%
6 Minimize customer sewer backups	Expense for sewer backup claims:	DC	< \$200,000 / Year	\$37,521	\$127,395	\$309,737
	# sewer backup damage claims:	DC	< 20 / Year	11	14	63
7 Complete all property restorations in 14 days	% property restorations completed <14 days	DC	100% / Month	51.9%	63.2%	60.3%
<b>PROVIDE EMPLOYEE DEVELOPMENT</b>						
8 Provide effective employee training and development	% DC employees with required certifications (Qtr)	DC	100%	96.3%	83.5%	88.0%
<b>OPTIMIZE OPERATIONS</b>						
13 Reasonable Cost of Service	\$/acct. of wastewater collection system pipe maintained (Apr)	DC	< \$373	N/A	\$79	N/A
	\$/acct. of water distribution system pipe maintained (Apr)	DC	< \$408	N/A	\$97.59	N/A
	% of Conveyance budget (Qtr)	DC	< 95%	69.1%	68.2%	82.0%
	% of Distribution budget (Qtr)	DC	< 95%	84.3%	96.8%	75.0%
<b>INFRASTRUCTURE SUSTAINABILITY</b>						
21 Provide a sustainable water supply	# water main breaks per 100 miles of pipe	DC	11	12	6	N/A
	# water main leaks per 100 miles of pipe	DC	25	33	16	N/A
<b>STAKEHOLDER SUPPORT</b>						
23 Environmental Stewardship and Sustainability	# SSOs to state waters:	DC	< 40 / Year	27	21	28

## Inspections

The inspection of the Collection System is crucial for condition assessment and the proactive search for existing and future problems. These problems can be structural defects, damaged structures, inflow and infiltration, line blockages, grease buildup, root intrusion, illegal cross connections, signs of previous surcharge, or vandalism that without the proper response from the maintenance section can lead to service interruptions and system failures, which can cause sanitary sewer backups or sanitary sewer overflows. The crews directly responsible for visual inspection of the collection system are the Collection System Inspection (CSI) crews and the Closed Circuit Televising (CCTV) crews. Inspections are also performed by various crews within the department.

In addition to the manhole inspections performed by the Conveyance crews, it was determined that D&C trouble shooters, who investigate customer complaints, could be a valuable tool inspecting manholes. Although the inspection is just a visual confirmation of correct functionality and not a detailed asset inspection, it is a valuable inspection as it can locate a possible problem within the system and prevent a possible SSO from occurring. The effort to locate blockages that have yet to cause an overflow is crucial in protecting the environment and staying proactive. These in-house inspection activities are in addition to the contracted inspections performed as part of the Authority's Sanitary Sewer Evaluation Survey (SSES) as described in the Capital Improvement Planning section of this document.



## Manhole Inspections

The Conveyance System Inspection (CSI) crews are responsible for the inspecting the existing CCWA sanitary sewer manhole structures. Manhole structures are inspected to locate possible structural defects, damaged structures, inflow and infiltration, or signs of surcharging or vandalism that can lead to service interruptions and system failures, which can cause sanitary sewer backups or SSO's. The CSI crews perform as many inspections as practicable per fiscal year which allows the Authority to maintain an accurate inventory of the system as well as identify possible problems.

All manhole inspections are tracked using Cityworks. By assigning manhole inspections a work order type the work performed by the CSI crews is able to be properly tracked. In addition to the tracking of work performed through Cityworks the crews are also tasked with tracking their daily activities on a weekly log. The current format requires the crews to track the location of their activities as well as statistical information such as manhole inspection count, footage inspected and problems encountered. The information recorded on the weekly log is compiled into a Levels of Service spreadsheet for goal setting and production review by the Conveyance Supervisor.

In addition to the standard manhole inspection process the CSI crews also use additional methods to increase accuracy and verify geographical location of the manhole when needed. These methods include Pole Camera inspections and the GPS inspection process. Each of these inspection methods is tracked through work orders and the weekly log. The use of Pole Cameras allows the CSI crews to record visual data of the manhole inspection with the addition of the ability to zoom into the incoming and outgoing pipes for additional possibilities of locating a problem. The crews look for structural defects, inflow and infiltration, as well as verification of pipe material compared to recorded data in the GIS. Problems located during Pole Camera Inspections are input into Cityworks for work order generation.

The use of GPS units to inspect manholes allows for the location of the structure to be verified. The Authority's in-house survey team as well as the GIS Department worked together to develop methods, techniques, and data requirements for the project. The CSI crews use the GPS units, which are Topcon GMS -2 models, as an electronic data collector, using a preset pull-down menu to gather structural data of the manhole. The data collected is downloaded, and after a quality control inspection by PM&E, it is merged with the GIS. Any map discrepancies or new structures can be inspected with the GPS unit and corrected or added to the GIS Geodatabase.

## Right of Way Inspections

CSI crews are responsible for the inspecting the existing CCWA sanitary sewer right-of-ways (ROW). The ROW is land that the Authority has an easement for ingress/egress to inspect, maintain, repair, or upgrade sanitary sewer infrastructure. Crews perform ROW inspection on the terrain located between manholes during manhole inspections. The purpose of inspecting the sanitary sewer ROW's is to locate possible structural defects, erosion of pipe coverage, failing rip rap areas, damaged structures, inflow and infiltration, illegal connections and cross connections that can lead to service interruptions, and capacity overloads and system failures that can cause sanitary sewer backups or sanitary sewer overflows.

## Exposed Pipe Inspections

The Exposed Pipe Inspection Program (EPIP) focuses on the inspection of all pipes that are without ground cover, adjacent to, crossing over, or parallel to a stream, waterway, or dry drainage area. The purpose of collecting inspection data on these structures is to guarantee that the pipes are in proper operating condition and to reduce the possibility of a washout, pipe rupture, or interruption of regular sanitary sewer flow which can lead to sanitary sewer overflow.



## Emergency Stream Inspection

The Emergency Stream Inspection Program (ESIP) was developed in-house by the Conveyance section with input from the Water Resources Engineer, Fats, Oils, and Grease (FOG) program staff, and laboratory personnel. The purpose of the program is to provide an outline of the steps that will need to be followed in order to minimize the environmental impact on the watershed due to SSO's. This is done by performing a review of stream sampling data to determine potential areas where raw sewage may be escaping the collection system. Should the data review indicate a potential issue, field inspections are immediately initiated to locate possible defects in the collection system, and to respond to located defects with immediate remediation actions. The intent of the program is to outline the minimal required standards that must be followed to effectively inspect streams and the collection system based upon sampling data.

The ESIP coordinates the efforts of multiple departments with the single goal of providing a fast and appropriate response to the possibility of an SSO. This coordinated effort established a chain of communication and a documented approach to providing a timely response.

## Force Main Inspections

The inspection of Force Main ROW's is conducted by the CSI crews. The ROW is visually inspected from the lift station to the gravity dump manhole and during the inspection crews look for any indication that a force main may be compromised or damaged. These visual inspections target possible sink holes, washouts, erosion, or signs of effluent discharge that could indicate a problem with the force main. The air release valves are inspected once a year by the tap and repair crews under the direction of the Maintenance and Repair foreman. Repairs are made as needed.

## Smoke/Dye Testing

The Conveyance section CSI crews are responsible for conducting smoke and dye testing of the Authority's collection system. The purpose of performing smoke tests and dye tests is to locate possible structural defects, damaged structures, confirm customers tied into the system, inflow and infiltration, illegal connections, and cross connections. The crews use two oil based blowers to perform smoke testing and rotate locations throughout the service areas based on various factors including customer complaints, historical problem areas, CCTV data, visual inspection data, and inner department requests. Dye tests have historically been performed to locate customer connections or verify defects in coordination with CCTV work. Dye tests are performed on an "as needed" basis.

## Easement Clearing

The Conveyance section has a full time crew dedicated to clearing of sanitary sewer ROW's. The purpose of clearing the ROW's is to allow more precise inspections of the ground above the sanitary sewer tangents, fast and safe access for inspection crews, reduction of intrusive vegetation, and allow vehicle access for emergency situations such as blockages or repairs. The crew consists of crew leader and two equipment operators that work in direct coordination with the Preventive Maintenance Foreman. The crew uses specialized equipment including a Kubota Farm Tractor with a Bush-Hog attachment, and a TEREX Skid Steer with special forestry attachment. The crews also clear with chainsaws and bladed cutters. The clearing crew is instrumental in the development of access roads for special projects that require specialized equipment such as CCTV units and hydraulic jet trucks. The crews haul rock and gravel and develop permanent ingress/egress structures for the conveyance section. While performing clearing activities, the crews also perform visual inspections of the ROW's and manhole structures. The work performed by the clearing crew is tracked in Cityworks. Since the terrain and situations for each outfall cleared vary from job to job, a numeric goal for the clearing crew is not useful, however, the Preventive



Maintenance Foreman reviews work orders and linear footage counts to assure the crew is maximizing production.

### Closed Circuit Televising

The CCWA Conveyance section has two CCTV units. The units are used to visually inspect the existing inventory of sanitary sewer structures to locate and document structural deficiencies, illegal tap connections, root intrusion, inflow and infiltration, grease buildup, utility conflict, and damaged structures. These inspections help to prevent service interruptions and system failures, which can result in overflows, system backups, or reduction in pipe capacity. In addition, the CCTV units are used to document changes within the system inventory, locate lateral connections, and locate manholes that are buried. CCTV crews document inspections using the PACP (Pipeline Assessment and Certification Program) coding system. The Authority provided PACP training and certification for the CCTV staff as well as Conveyance staff members that use inspection data obtained from the CCTV units to schedule repairs.

The two CCTV units are specialized for the different types of terrain encountered when performing CCTV work. One unit is a standard box truck unit used to perform CCTV in roadways and areas adjacent to roadways while the other unit is mounted on an all-terrain vehicle to access hard to reach areas and locations that standard CCTV units could not navigate. Both CCTV units record all CCTV inspections using the granite XP software system and operate Cues CCTV equipment. CCTV inspections are linked directly to the GIS and CCTV data is reviewed in-house by the Tap and Repair Foreman for designation and scheduling of needed repairs. In addition to the two CCTV units the Tap and repair crews have mobile Sea Snake CCTV units which allow CCTV work to be performed on small aperture pipes such as cleanout caps and taps directly into manholes. The Sea Snake CCTV work performed on cleanouts is mainly used to determine locations of small blockages and make determinations of ownership between the CCWA and customer plumbing. The Tap and Repair crews are also equipped with a Rovver X Inspection Crawler. The Rovver X is a portable self-propelled CCTV unit that the crews use in conjunction with the Cured In Place Pipe (CIPP) point repair system. This allows the repair crews to perform their tasks without requiring the Authority's CCTV crews to be present.

### Maintenance

In addition to the Inspection Crews the Conveyance section also has full time crews dedicated to the maintenance and repair of the collection system. These crews are specialized for their appropriate tasks but have the ability to work on all structures when needed. These crews perform daily maintenance and repair of the collection system in response to inspection data, customer complaints, and internal requests or after hour calls. These crews consist of Manhole Raising, Tap and Repair, and the Jet Truck units.

### Manhole Rehabilitation

The Conveyance section has a full time crew dedicated to maintaining the manhole structures located within the collection system. This crew consists of four full time employees which include a crew leader, and operator, and two mechanics. Manhole structures are the access points for the CCWA sanitary sewer collection system. Manhole structures are placed at directional changes, and grade changes on sanitary sewer collection lines. Manhole structures that have been paved over, located within new construction, or have been covered with fill become inaccessible. These manholes are made accessible and safe through physical adjustment of cone sections, rings, and covers. The manhole crew is also responsible for the rehabilitation of existing CCWA manhole (MH) structures. The department performs various rehabilitative actions in response to detected problems including MH replacement (complete), MH replacement (partial), ring plastering and lockdown, ring and cover replacement,



brick MH re-building, MH inflow and infiltration removal (grout, hydraulic cement), and MH bench construction and repair.

CCWA also utilizes private contractors for manhole rehabilitation jobs that require deep excavation, are located in very wet or swampy conditions, or require equipment that is not available to D&C staff. CCWA has an annual contract for these types of repairs and uses the contractor only when needed.

### Pipeline Maintenance

The CCWA Wastewater Maintenance Tap and Repair crews are responsible for repairs made to the pipe structures located within the CCWA sanitary sewer collection system. There are two tap and repair crews each consisting of a crew leader, operator, and two mechanics. The crews remove root masses, replace defective pipe segments, repair illegal tap connections, repair damage to pipe structures, correct pipe washouts, and are responsible for tap installations on existing sanitary sewer pipe structures. The crews use standard open excavation repair techniques as well as a CIPP spot repair system. In order to use this system the Tap and Repair crews have been trained in the operation of a mobile self-propelled CCTV unit that the crews use during the installation of the CIPP spot repair. This system allows the crews to perform structural repairs without the need for excavation.

Large sanitary sewer line repairs and emergency repairs are contracted out to a private contractor. The contractor works under the supervision of CCWA staff. The private contractor is used when dealing with large diameter pipe, boring of roadways, extreme terrain challenges, or the workload of the CCWA repair staff is heavy. All repairs to the collection system are tracked in Cityworks. The goal of sewer line repairs is to eliminate sanitary sewer backups and overflows, and guarantee system capacity. The staff goal is to perform prompt and correct repairs to the CCWA sanitary sewer collection system and to install all tap requests promptly, correctly, safely and in a timely manner. Since corrective actions are initiated by inspection activities such as CCTV, manhole inspection, SSES results, smoke tests, etc., no numeric goals can be set for this activity. However, the Tap and Repair Foreman reviews production numbers for the Tap and Repair crews for possible improvements or increases in overall productivity.

### Air Release Valve Maintenance

Air Release Valve (ARV) inspection and maintenance is scheduled and performed by the Conveyance Tap and Repair crews. ARV's are inspected annually and a spare parts inventory as well as switch out units are stored on site for repairs and replacement. Work performed on ARV's is tracked in Cityworks.

### Hydraulic Cleaning

The Authority operates two Vactor Hydraulic Cleaning Units and one combination vac/cleaning unit. The combination vac/cleaning unit has the ability to clean debris out of manholes as well as pump liquids. This combined vac/cleaning unit allows crews to perform a wider range of maintenance tasks and increases the response time when manholes require emergency bypass pump down. Each of the three hydraulic cleaning units is staffed with a crew leader and an equipment operator. The units perform routine cleaning, root cutting, debris removal, and clearing of blockages and stoppages from the sanitary sewer collection system. The crews also use a grease-fighting chemical to combat heavy grease. The grease fighting chemical is stored in an on-board reservoir located on each of the two Vactor Units.

The jet trucks are responsible for the operation of the hydraulic root saws that perform root removal and cutting of debris build up on the pipes. The crews perform root cutting based upon work orders or internal customer requests. The overall goal of the hydraulic cleaning effort is to keep all sanitary sewer lines open and flowing and





routinely cleaned to prevent blockages or stoppages that can lead to service interruptions, capacity overloads, and system failures, which can cause sanitary sewer backups or SSO's.

### Cured in Place Pipe Rehabilitation

Since 2002, the CCWA has had an annual contract with a private contractor to perform cured-in-place pipe (CIPP) Rehabilitation. The CIPP work consists of a placing a resin impregnated flexible tube within existing CCWA pipe structures. After curing, the pipe is now structurally sound and will conduct sanitary sewer flow, resist chemical erosion, eliminate root intrusion, and increases the life expectancy of the sanitary sewer pipe. All work performed must meet or exceed the minimum requirements as set forth in the most recent version of ASTM F1216 (Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube), and ASTM F1743 (Rehabilitation of Pipelines and Conduits by Pulled-In-Place Installation of a Cured-In-Place Thermosetting Resin Pipe). The PM&E Department's Construction Services Section is responsible for the review and scheduling of all CIPP work including the inspection of the installation process. The Construction Services Section has a Civil Engineer, two Construction Services Supervisors and seven Construction Inspectors who oversee all outsourced pipeline construction for the Authority.

### Lift Station Maintenance

Routine daily maintenance is performed on all of the CCWA lift stations. Daily maintenance checks include the electrical breakers, electronic pressure switch, control levels, pump and piping. Preventative maintenance is performed annually on the generators. The inspection and maintenance are performed through contracted services. The generators have different inspections to perform on a monthly, quarterly, and annual basis. The CCWA has invested heavily in a SCADA to monitor the operation of the lift stations within the system. The CCWA SCADA system is designed to monitor the lift station system and remotely access data that can be useful as a troubleshooting tool. The SCADA system also collects pertinent data both real time and historically. Through the proper operation, preventive maintenance, and predictive monitoring the Authority helps reduce possible overflows caused by lift station failures.

The lift station SCADA system allows online, interactive, menu driven, and configuring application software for operation and monitoring of the system through IFix Prophecy 5.8. From the IFix System Operations will be able to monitor, control, and gather data using Ifix, MDS 9810 radios, AB Controllogix units, and AB Micrologix 1500.

This includes the following signals and systems:

- Analog
- Digital
- Error Message
- Alarm Handling
- Win911 Reporting
- Log Changes
- Historical Trending
- Graphic Display
- Report generation (XL Reporter)

The SCADA system is controlled by 2 RAD 5 IBM servers. Each server is polling the system and gathering data. If one server should fail operation still can use the other to gather data and control the system. Inside the main PLC control cabinet is 2 Controllogix redundant PLC units; they monitor and maintain the radio system and polling cycles for the lift station. If one PLC drops out the other will take over seamlessly no data will not be lost.



The SCADA system is broken down into several parts: menu, data, alarm, trending, win911, XL reporter, and configuration. The system allows for easy menu-driven movement from screen to screen. Operational staff can click on the lift station text and drop down a menu of all the stations in the system. Also by clicking on the green arrow button on the top left the operator can move from screen to screen. Operations can monitor real-time data from the graphic screens. Signals such as pump on/off, alarm event, level, and flows are presented on the screen. The data is updated every 5 seconds according to the polling cycle of the system. Pump status on/off are represented by the color red and green. The level indication in the middle of the screen will move up and down giving a graphic view of the level in the wet well along with a digital number. Data points indicate pressure and flow from each pump as well as the flow leaving and entering the station. This representation allows operation for a quick scan of the station. Also on the graphic screen operation can start and stop any pump by clicking on the force run and stop buttons for each pump. A log is kept by the system when any changes are made to the graphic interface with time stamp and operation member name that made the change. The pumps run in auto but there are times when maintenance and checking of the pumps is done from the SCADA system. A log is kept by the system when any changes are made to the graphic interface with time stamp and operational member name that made the changes.

The SCADA system receives alarm events that are stored in the alarm Log and the system will display all new alarms. All alarms stay active until they are acknowledged by operations. A log is created inside the SCADA system that puts a time stamp when the system received the alarm and when it was acknowledged. The system also will specify which operational staff checked the alarm. These alarms include generator running, high water, generator fail, and other system alarms. All trending done by the SCADA system is historic trending. The data is stored inside the system to allow operation to travel back in time to view specific data events. The trending display allows for 8 signals to be displayed at one time. It also allows configuration for time spans. This trending is used to monitor level, pressure, generator and pump run times, and flow. This becomes a valuable tool when operation selects pump stats and level. Operations can see the cycles of the pumps and run times and determine if one pump is running too long or is missing cycles and can compare that to the level in the station. A long pump time or a quick cycle may suggest a pump failure.

The WIN 911 system allows operations to select alarms that the system will call operations on for after hours or for emergency alarms. The system is set up with voice software and the alarms are determined by operations. The system will call the on-call phone number to ask for verification from the operations staff. If the first call number is not answered it moves on to the next until a response is received. A time stamp is created inside the system that is logged telling the time of the call, what operational member received the call, and what action was taken. XL reporter is integrated into Microsoft XL and it allows operations to print daily and monthly report summaries from the historical data. The SCADA system is configurable to fit the needs and wants of the operations staff. All graphics screens and trends can be created and modified using the system draw function.

## Emergency Response

During regular operating hours the D&C Department has four full-time Trouble Shooters that respond to all calls and determine if the situation requires additional staff or maintenance activities. In order to better serve the customers of Clayton County and provide immediate response to situations that occur outside of regular operating hours the D&C Department has a standby program that assures all emergency calls are responded to in a timely manner. A rotating schedule of standby staff is responsible for responding to customer complaints and resolving issues during afterhours. In addition to the regular standby staff, there is a troubleshooter position that works second shift to answer field calls and prioritize needed maintenance activities. All the activities of the trouble shooters and after-hour staff are tracked in the Authority's Cityworks CMMS program.



Exhibit 5 provides a summary of the results of the inspection and maintenance activities described in this section, for calendar year 2015.

## EXHIBIT 5

### Conveyance Section Production Data, Calendar Year 2015

Wastewater Conveyance	January	February	March	April	May	June	July	August	September	October	November	December
Number of MH Overflows	3	6	3	2	6	3	1	2	4	1	5	10
Overflows to State Waters - Number of Spills	3	3	1	0	3	2	1	1	2	1	3	8
Total Volume to State Waters	4,000	13,450	11,700	0	18,600	11,700	3,000	675	96	2,400	23,000	1,345,450
Repairs by CCWA	26	18	23	28	22	18	24	23	21	17	13	16
Repairs by Contractor	0	0	1	2	0	1	0	1	0	0	0	0
Footage Cleaned	66,945	44,994	78,529	86,394	61,461	100,323	121,199	90,989	104,269	64,346	64,977	62,966
Footage Cleaned/CCTV by Contractor	0	0	0	0	0	0	0	9363	0	0	0	0
Footage Root Cut	1,166	1,714	1,934	14,802	5,976	5,644	1,594	895	3,202	1,183	0	2,082
Footage Root Control applied by Contractor	0	0	0	0	0	0	0	0	4,281	0	0	0
Footage Inspected - Visual	35,842	12,690	15,013	14,654	32,022	42,653	41,075	36,764	3,856	52,914	100,734	42,482
MH's Inspected	1,720	1,338	2,160	3,925	1,822	2,101	2,492	2,530	1,522	2,200	2,864	2,159
Footage Inspected - CCTV	8,151	6,544	18,427	11,394	12,214	760	10,461	11,428	5,385	16,283	5,670	10,977
MH's Rehabilitated	29	12	40	43	43	73	75	75	66	87	114	127
Footage Smoke tested	21,669	7,882	7,004	14,094	10,559	8,756	6,885	12,476	1,385	1,044	1,085	11,949
Footage CIPP	0	0	2,564	0	0	0	1,277	0	0	732	911	271
Service Requests - Total	107	93	118	97	62	69	64	69	81	71	71	110
Service Requests - CCWA Problem	24	18	32	27	26	15	14	13	24	13	20	18
Service Requests - Customer Problem	83	75	82	70	36	53	50	53	57	58	51	92
Average Response Time	0.7	0.56	0.6	0.58	0.62	0.67	0.52	0.73	0.53	1.05	0.51	0.5
Odor Complaints - Total	4	5	4	8	5	4	8	12	11	4	8	9



## 4.0 ENVIRONMENTAL COMPLIANCE

The Water Reclamation Department manages three programs related to environmental compliance that are intended to maximize system capacity; Sewer Use, Industrial Pretreatment, and Grease Management.

The Sewer Use Ordinance sets forth uniform requirements for users of the Publicly Owned Treatment Works for Clayton County and enables Clayton County Water Authority to comply with all applicable State and Federal laws, including the Clean Water Act (33 United States Code § 1251 et seq.) and the General Pretreatment Regulations (40 Code of Federal Regulations Part 403). The federally mandated objectives of this ordinance are:

1. To prevent the introduction of pollutants into the Publicly Owned Treatment Works that will interfere with its operation;
2. To prevent the introduction of pollutants into the Publicly Owned Treatment Works that will pass through the Publicly Owned Treatment Works, inadequately treated, into receiving waters, or otherwise be incompatible with the Publicly Owned Treatment Works;
3. To protect both Publicly Owned Treatment Works personnel who may be affected by wastewater and sludge in the course of their employment and the general public;
4. To promote reuse and recycling of industrial wastewater and sludge from the Publicly Owned Treatment Works;
5. To provide for fees for the equitable distribution of the cost of operation, maintenance, and improvement of the Publicly Owned Treatment Works; and
6. To enable Clayton County Water Authority to comply with its National Pollutant Discharge Elimination System permit conditions, sludge use and disposal requirements, and any other Federal or State laws to which the Publicly Owned Treatment Works is subject.

For complete statistical data and program documentation see the CCWA Grease Management Program submitted to the EPD as part of compliance order EPD-WQ-5355.

### Industrial Pre-Treatment

The Industrial Pre-Treatment Program focuses on Significant Industrial Users (SIUs). A SIU is defined as a user subject to categorical pretreatment standards or discharges greater than an average of 25,000 gpd of process wastewater. CCWA may also designate a user as SIU on the basis that it has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement. All SIUs are issued a CCWA discharge permit.

The Discharge Permit must contain:

- A statement that indicates wastewater discharge permit duration, which in no event shall exceed five (5) years;
- A statement that the wastewater discharge permit is nontransferable without prior notification to CCWA in accordance with Sec. 98-9 (E) of this ordinance, and provisions for furnishing the new owner or operator with a copy of the existing wastewater discharge permit;
- Effluent limits based on applicable pretreatment standards;
- Self-monitoring, sampling, reporting, notification, and record-keeping requirements. These requirements shall include an identification of pollutants to be monitored, sampling location, sampling frequency, and sample type based on Federal, State, and local law; and



- A statement of applicable civil and criminal penalties for violation of pretreatment standards and requirements, and any applicable compliance schedule. Such schedule may not extend the time for compliance beyond that required by applicable Federal, State, or local law.
- Other conditions as deemed appropriate by the Manager to ensure compliance with this ordinance, and State and Federal laws, rules, and regulations.

Permits are also issued to Groundwater Remediation Sites, Liquid Waste Haulers, and Single Event Dischargers. During fiscal year (FY) 2016, CCWA permitted 17 SIUs, 0 Liquid Waste Haulers, 1 Groundwater Remediation Sites, and 1 Single Event discharges.

### User Inventory, Monitoring, and Inspection

Environmental Compliance staff performs at least annual inspections and monitoring is conducted routinely as needed and at quarterly intervals on SIUs. Surveillance sampling and analysis and self-monitored data or unexplained changes in water quality may require changes to the monitoring and inspection cycle. The Authority may at any time conduct compliance monitoring/inspection in order to identify and document violations to the permit/sewer use ordinance.

### Grease Program

The Grease Program falls under the jurisdiction of the Water Reclamation Department. The environmental Compliance & Lab Coordinator is responsible for overseeing the program. For complete statistical data and program documentation see the CCWA Grease Management Program submitted to the EPD as part of compliance order EPD-WQ-5355. The following section is an overview of the program. The purpose of this program is to minimize the introduction of fats, oils, greases, and sand into the CCWA wastewater collection system. The main components of the program are the proper sizing, installation, and maintenance of grease interceptors. All proposed or newly remodeled food service facilities inside the CCWA Wastewater Service area shall be required to install an approved properly operated and maintained grease interceptor. All interceptor units shall be installed outdoors of the Food Service Facility building unless the user can demonstrate to CCWA that an outdoor interceptor would not be feasible. All interceptor units shall of the type and capacity approved by the County and CCWA.

All existing food service facilities inside the CCWA Wastewater Service area are expected to conduct their operations in such a manner that grease is captured on the user's premises and then properly disposed.

Existing Food Service Facilities will be handled under CCWA's Grease Management Program in the following manner:

- CCWA will periodically inspect each Food Service Facility on an as-needed basis to assure that each facility is complying with the intent of the Grease Control Program. The as needed inspection shall be determined by the CCWA.
- Each Food Service Facility in the vicinity of the problem area will be inspected. The facilities' grease control practices and the adequacy of their grease control interceptor/equipment will be assessed. Maintenance records will also be reviewed.
- Following the inspections, CCWA will send written notice to the inspected food service facilities, containing a summary of the policy requirements, and the results of the inspection. The inspections will typically result in one of the following actions:





- Facilities equipped with an appropriate and adequately sized grease interceptor who are meeting the intent of the Grease Management Program through effective grease control practices will be commended for their compliance.
- After notice and an opportunity to be heard, facilities not in compliance shall be required to develop and submit to CCWA a proposed plan designed to achieve compliance through improved housekeeping and/or increased maintenance and pumping on the existing grease interceptor/equipment
- Facilities that are not successful in achieving compliance with the intent of the Grease Management Program through improved housekeeping and increased maintenance and pumping on the existing grease interceptor/equipment will be required to install the necessary interceptor/equipment to bring the facility into compliance.

Design criteria consist of construction materials, access, load-bearing capacity, inlet/outlet piping, and proper sizing. Outdoor grease interceptors shall not have a capacity of less than 1,500 gallons nor exceed a capacity of 3,000 gallons. If the calculated capacity exceeds 3,000 gallons, then multiple units in series shall be installed. Grease interceptor designs represent minimum standards for normal usage. Installations with heavier usage require more stringent measures for which the user is responsible and shall pay the costs to provide additional measures if required by CCWA. CCWA reserves the right to evaluate interceptor sizing on an individual basis for facilities with special conditions, such as highly variable flows, high levels of grease discharge, or other unusual situations.

All grease interceptors shall be maintained by the user at the user's expense. Maintenance shall include the complete removal of all contents, including floating materials, wastewater, and bottom sludges and solids. Decanting or discharging of removed waste back into the interceptor from which the waste was removed or any other grease interceptor, for the purpose of reducing the volume to be disposed, is strictly prohibited. Outdoor grease interceptors must be pumped out completely a minimum of once every three months. Under-sink or in-line grease interceptors must be pumped/cleaned out completely a minimum of once every month.

Authorized personnel of CCWA, bearing proper credentials and identification, shall have the right to enter upon all properties subject to this program, at any time and without prior notification, for the purpose of inspection, observation, measurement, sampling, testing or record review, as part of this program. All interceptors are inspected at least twice each year. All users must keep a record of any cleaning or maintenance of their grease interceptor. Records including manifests must be kept on-site at the food service facility for a period of three years. The Water Reclamation Department manages three programs related to environmental compliance that are intended to maximize system capacity, Sewer Use, Industrial Pretreatment, and Grease Management.

## 5.0 SSO OVERVIEW

The D&C Department is responsible for the documentation and response effort in the continued effort to reduce SSO's. The CMOM based approach to managing the collection system was implemented in 2002. This included the development of the documentation process and defining the roles of the various crews within the section that are responsible for SSO documentation, response, and follow up procedures. The Environmental Compliance Specialist and the Conveyance Preventive Maintenance Foreman are tasked with keeping the program moving forward and overseeing activities of the section regarding SSO's.



## SSO Documentation

All SSO's to the ground, State Waters, or Major spills (<10,000 gallons) are documented. Field documents are used to take preliminary data in the field as site assessments are performed by responding crews. This data from the field is used to populate electronic Cityworks Work Orders and Inspections that attach the SSO data directly to the physical assets in the Authority's GIS. Once the data has been transferred to Cityworks the final spill report can be generated for notification purposes and review. All related work activities and follow up inspections can be attached to the asset where the event happened. Custom reports have been developed that allow searches on SSO events and review of SSO data. SSO's are also tracked within the Departmental Levels of Service (LOS) Report that is used for managerial review of Department production numbers.

## SSO Response Plan

The Authority developed the Wastewater Emergency Spill Response Plan (WSERP) to insure a prompt and appropriate response to any spill, release, or diversion of wastewater from the CCWA sanitary sewer collection system. The WSERP is designed to set basic strategic guidelines for Authority personnel and/or authorized representatives to mobilize persons, materials, tools and equipment in order to prevent, correct, or repair any condition that has the potential to cause or contribute to a sanitary sewer overflow. The WSERP was originally drafted in 2001, and was upgraded in May 2016. The document is reviewed yearly or as needed by the Environmental Compliance Specialist to assure it is current.

## Emergency Sanitary Sewer Bypass and Repair

The Emergency Sanitary Sewer Bypass and Repair Program (ESBAR) establishes the plan of action, a trained response team, and the materials needed to safely, and quickly respond to damaged sanitary sewer structures, and reduce environmental impact of sanitary sewer overflows (SSO). The ESBAR unit consists of a trailer stocked with the needed materials to safely perform a bypass pump-around of any sanitary sewer structures that may be damaged or blocked.

## Sanitary Sewer Site Mitigation Canister

The Conveyance section budgeted for, and purchased a container in 2011 that will be used to de-water sanitary sewer removed from the collection system during a repair, general cleaning, or an emergency situation. A ramp was built on site to allow large tanker vehicles to access the canister. The canister is directly attached to a sanitary sewer manhole located on the Authority's property allowing liquid dewatered from the canister to re-enter the collection system while insuring solids do not re-enter the system and can be disposed of properly.

## Catastrophic Rain Events/Repeat Overflows

On June 9, 2015, the Clayton County Water Authority and the Environmental Protection Division (EPD) executed Consent Agreement No. EPD-WQ-6001. Condition No. 3 of the Order requires the Authority to pay a stipulated penalty for certain sanitary sewer overflows. In addition to the stipulated penalties the EPD reviews the reported spills for repeat locations that could indicate further issues. In a letter received by the Authority on May 12, 2016, the EPD indicated that their database showed four (4) locations that reported spills on more than one occasion during the first quarter of 2016.

The events occurred at the following locations as listed on the letter from EPD:

1. 805 Jesters Lake Drive, Jonesboro
2. 240 Flint River Road, Jonesboro
3. 8890 Roberts Road, Jonesboro
4. 5900 North Cheryl Drive, Morrow



These overflow events occurred during periods of substantial rain well above the average rain events that occur in Clayton County. During regular rain events these locations do not overflow. Although the events occurred during this catastrophic period of rain and flooding the Authority is addressing these issues as part of the ongoing effort to improve the collection system with short and long term planning. The Authority's ongoing SSES program as well as the Strategic Master Plan have targeted areas that these SSO events occurred within. The Authority, nor any sewerage utility, can guarantee that their collection system can function during severe flooding and sustained periods of heavy rain, but is taking positive action to remedy the capacity based issues that can lead to overflows during these catastrophic conditions. The following breakdown addresses the events listed in the EPD's letter.

**805 Jesters Lake Drive, Jonesboro**

This location has had an emergency repair to the pipe structures immediately downstream of the SSO event. These repairs were in response to a washout caused during the catastrophic rain events that also caused the hydraulic overload on the system. The repair of the pipe cost the Authority approximately \$610,000. In addition to the emergency repair these pipe structures as well as additional segments were scheduled for rehabilitation as part of the Jester's Lake Rehabilitation Project (Phase 2 and 3) in response to SSES work performed on drainage basin 40. The project is estimated to cost the Authority approximately 2.2 million dollars and is scheduled to begin in 2016. Once the repairs have been performed, performance flow monitoring will be conducted to determine the efficiency of the SSES effort. Results from these activities will be included in the Authority's 2017 Annual Conveyance System Report.

**240 Flint River Road, Jonesboro**

This location is just north of the W.B. Casey Water Reclamation Facility and is located on an 18" gravity main connected directly to a 48" line headed directly into the plant. During the period of sustained rainfall the 48" line was flowing at capacity and the 18" was unable to flow freely into the 48" line due to a hydraulic roadblock, thus causing the surcharge and the SSO. During a regular rain event this site does not have SSO events. This intersection of pipes falls within the Authority's Flint River Outfall Pipeline Replacement Project. The 48" line has been upgraded to a 60" Fiberglass Reinforced Pipe (FRP). The project consists of 4,300 feet of FRP with 24 High-density polyethylene (HDPE) lined manholes at an estimated cost to the Authority of \$4.7 Million. These improvements as well as continued Inflow and Infiltration removal efforts should help remedy this event from reoccurring. In addition to the line improvements Conveyance crews have performed inspections upstream of the event site in order to determine possible locations for Inflow and Infiltration (I&I) that could contribute to the increased flows during heavy rain events. Any substantial problems detected will be repaired and an updated progress report included in the Authority's 2017 Annual Conveyance System Report.

**8890 Roberts Road, Jonesboro**

These events occurred within the construction area of the Authority's Flint River Outfall Pipeline Replacement Project. Although the events were small in overall volume (4,125 and 1,581 gallons) the Authority considered them very serious events and has taken precautions to assure they do not reoccur. The transfer pump stations are fully operational and are under a continued inspection and maintenance program. The bypass pumps used to divert flow around the construction area are under continued inspection and maintained by the contractor performing the pipe rehabilitation.

**5900 North Cheryl Drive, Morrow**

The events that occurred at this site were due to the sustained periods of heavy rain. The gravity lines upstream of this site are currently being investigated as part of the Authority's ongoing SSES Program. Drainage Basins 116, 117, and 118 are being 100% inspected for signs of possible inflow and infiltration. These inspections include Closed Circuit Televising, Smoke Testing and Manhole Inspections. Results from the SSES will be reviewed and



follow up repairs performed on all structural problems that are located. Once the repairs have been performed, performance flow monitoring will be conducted to determine the efficiency of the SSES effort. Results from these activities will be included in the Authority's 2017 Annual Conveyance System Report.

## 6.0 CAPITAL IMPROVEMENT PLANNING AND IMPLEMENTATION

The PM&E Department provides support services to CCWA's operational departments, which includes the Distribution and Conveyance (D&C) Department. PM&E manages the various software programs used for asset management (GIS, Cityworks, Granite XP). They also provide plan review, engineering, construction planning and inspection, survey, and are responsible for development and implementation of the Authority's long term capital plans. The following provides an overview of the capital improvement planning activities as it relates to the conveyance system as well as treatment at the Authority's Water Reclamation Facilities.

### 2015 Update of the Strategic Master Plan (SMP)

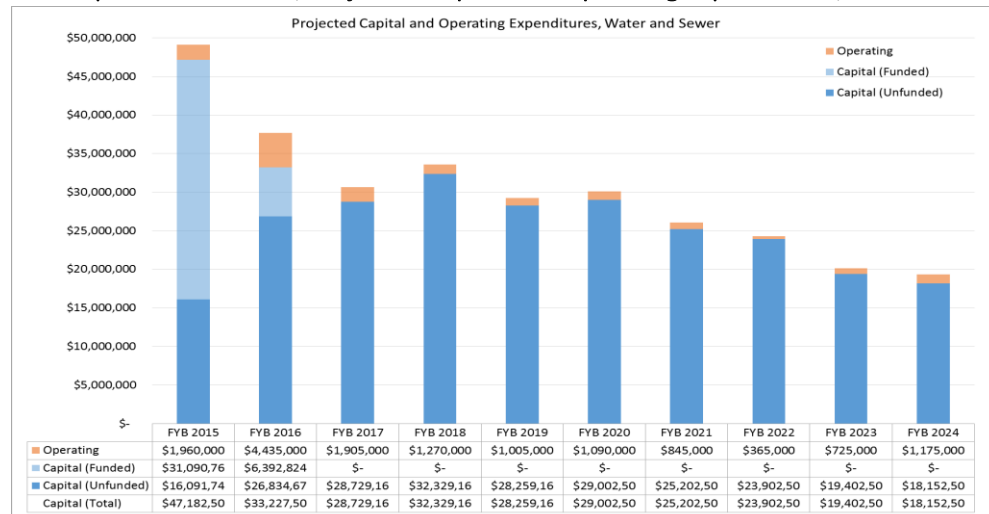
Since 1960, the Authority has developed 10-year master plans to identify regulatory challenges, growth drivers, and identify the infrastructure needed to respond to these conditions. The SMP is a framework with tools for planning, managing and evaluating Authority-wide performance. It also provides a design template to guide services, projects, and operations, for CCWA's departments and budget units.

In response to a decrease in growth following the rapid growth of the 1990's, the development of another 10-year capital plan was not enough. In 2010, CCWA developed its first Strategic Master Plan (SMP). The change in our operating environment required that the Authority be more efficient and disciplined in not only its operations, but also in how it prioritized its operating activities and its capital projects or programs. CCWA also completes 5-year updates of our master plans, and the 2015 Update of the SMP serves as an update to the 2010 SMP and is the comprehensive guide in continuing to achieve CCWA's vision of Quality Water, Quality Service. The approach taken to develop the plan prioritizes the operating and capital projects according to CCWA's strategic priorities. Additionally, the projects are scheduled based on the priority, predecessor or successor projects, and other schedule requirements and a 10-year cash flow schedule was developed. Projects scheduled for FY 2016 - 2017 were incorporated into the budgeting process, and moving forward, this document will continue to support the strategic planning and budgeting process.

The 2015 SMP identified 95 water, sewer, and stormwater projects that represent \$367.1 million dollars over 10 years. Exhibit 6 shows the projected expenditures over the 10-year planning period for the water and

#### EXHIBIT 6

#### 2015 Update of the SMP, Projected Capital and Operating Expenditures, Water and Sewer





sewer fund. Of those projects, \$162 million is estimated to be needed for pipeline asset management needs. Considering the amount and age of CCWA's system, there is significant work to complete. CCWA maintains almost 1,500 miles of water distribution lines, 1,100 miles of sewer conveyance pipe, and 500 miles of stormwater pipe. As shown in Exhibit 7, our pipes, laid end to end, would span from Miami to Seattle.

**EXHIBIT 7**  
Pipeline Asset Summary



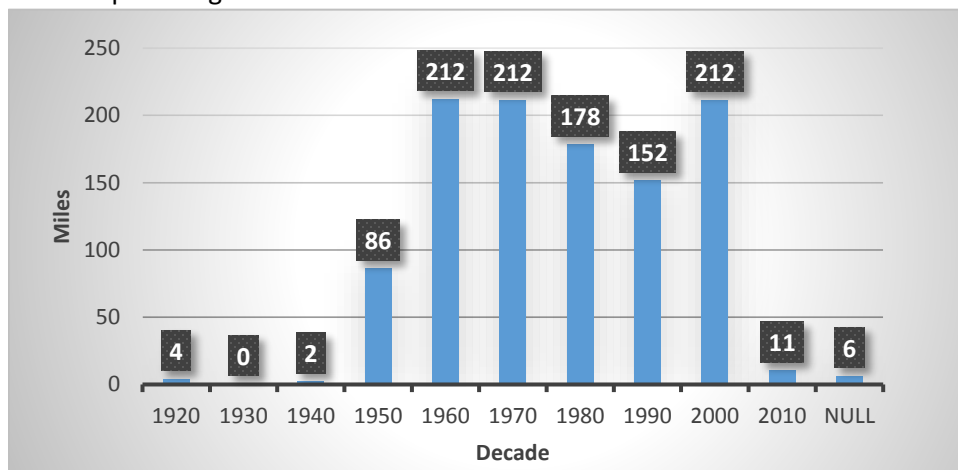
Many factors contribute to the lifespan of a pipeline that among other things could include age, material, corrosion, and construction quality. As shown in Exhibit 8, looking at age alone, 300 of the 1100 miles of sewer pipe in our system would need to be replaced or rehabilitated. As we learn more about our system through continued preventive inspections and other projects discussed in this section, CCWA will be able to develop a better understanding of the long-term renewal and replacement needs.

Exhibit 9 lists the 20 conveyance system related programs and initiatives that were included in the 10-year master plan. The estimated duration is listed and shows that 8 of the projects are planned to continue throughout the 10-year period. For

example, Project 614, Basin Level Sanitary Sewer Rehabilitation is anticipated to be an ongoing activity over the entire SMP period. The need for each of the projects is addressed and validated annually as part of each year's budgeting process.

The following section shifts the focus from CCWA's long term planning to specific conveyance related activities completed during CCWA's Fiscal Year Beginning 2015 (FYB15).

**EXHIBIT 8**  
Sewer Pipeline Age





**EXHIBIT 9****SMP Final Project List**

Project ID/Project Name	Planning Level Estimated Cost	Total Benefit Score	Estimated Duration
110 / Asset Management Program Assessment	\$250,000	47.40	1 year
117 / Business Process Evaluation and Improvements	\$200,000	57.20	1 year
121 / Enhance Compliance Reporting	\$250,000	37.00	1 year
604 / Expand Sewer Service to Key Unsewered (Septic Tank) Areas	\$5,000,000	20.50	3 years
611 / Infiltration/Inflow Program, Flow Monitoring/RDII Analysis (Shoal Creek Basin)	\$350,000	37.80	1 year
612 / Develop Sewer Model (Shoal Creek Basin)	\$150,000	37.80	1 year
613 / Infiltration/Inflow Program, SSES Studies (for all three basins)	\$15,000,000	65.40	10 years
614 / Basin Level Sanitary Sewer Rehabilitation (for all three basins)	\$20,000,000	75.60	10 years
615 / Flint River, Phase 1A - Large Interceptor Rehabilitation	\$6,000,000	73.40	1 year
616 / Large Interceptor Condition Assessment	\$1,100,000	49.80	10 years
617 / Large Interceptor Rehabilitation (Flint River Phases 1B, 2, 3, R.L. Jackson, Jesters Creek, ...)	\$60,000,000	73.40	10 years
618 / Post Infiltration/Inflow Rehabilitation Flow Monitoring, Analysis, and System Capacity Update (for all three basins)	\$500,000	54.80	10 years
619 / Identification, Evaluation and Selection of Recommended Odor and Corrosion Control Technologies	\$250,000	38.80	1 year
620 / Design & Implement Selected Odor and Corrosion Control Technologies	\$5,000,000	38.80	3 years
630 / Conveyance Modifications to take DeKalb County Flows	\$13,200,000	21.40	3 years
636 / College Park Contract WW Flows	\$7,900,000	23.50	2 years
638 / Pressure Sewer Condition Assessment	\$2,000,000	37.80	10 years
639 / Pressure Sewer Rehabilitation	\$12,000,000	78.60	10 years
902 / Lift Station Assessment	\$250,000	37.80	1 year
903 / Lift Station Rehabilitation	\$11,000,000	78.60	10 years
<b>Total</b>	<b>\$160,400,000</b>		

## SMP Implementation FYB15 (May 2015 – April 2016)

This section shifts the focus from CCWA's long term planning to specific conveyance related activities completed during CCWA's Fiscal Year Beginning 2015 (FYB15). A brief description of staff who implement the projects is provided as well as a summary of the work that was completed for each program.

### Organization

Management of pipeline contractors who complete the capital pipeline improvement projects generally falls to the Construction Services group within PM&E. In FYB15, Staff was doubled for a total of 10 full time equivalents in the Construction Services group. The D&C Department and other sections within PME such as Engineering and GIS provide significant support for the projects ultimately implemented by Construction Services.

Once specific pipeline projects are identified by PM&E, D&C, or others, Construction Services inspectors are responsible for planning and implementing the construction required to correct the issues.



The following is a list of some of the responsibilities of this staff:

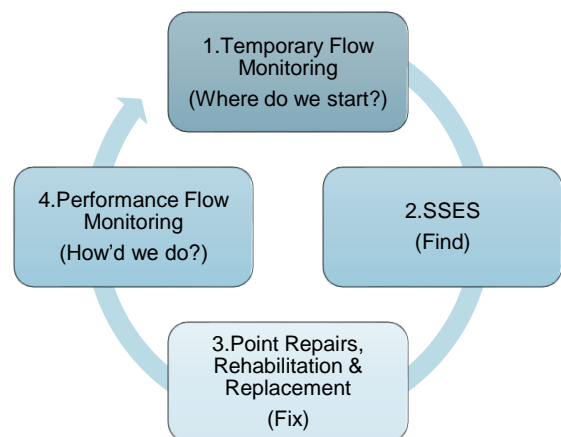
- Review data available such as CCTV, as-builts, GIS, etc.
- Prepare project scope and cost estimate
- Prioritize projects and schedule work
- Coordinate with Engineering and GIS with design, easement, permit needs
- Write contracts for projects to be bid
- Procure and order materials
- Inspect work performed daily; full time for large projects
- Review and process contractor invoices

Conveyance system related engineering studies and other initiatives are supported in large part by our On-Demand Engineering Services contractors.

### SSES Program

Several years ago, CCWA began developing a program focused on removing Inflow and Infiltration (I/I) and renewing its sewer system. As shown in Figure 10, CCWA's process began by conducting temporary flow monitoring across each WRF basin. The I/I study analyzed results and assigned priority to each of the flow monitored basins based on the level of I/I. The basins with the biggest I/I problems were then prioritized for SSES work. SSES activities such as CCTV, smoke testing, manhole inspections were conducted in these high priority basins to identify defects and help to determine the "fixes" required to improve the pipe condition. This could include a variety of things such as individual point repairs, rehabilitation (cured-in-place-pipe), or replacement through open-cut methods. Once the fixes were completed, performance flow monitoring in the basin was performed to determine the effectiveness of our fixes. This process is then repeated throughout our system.

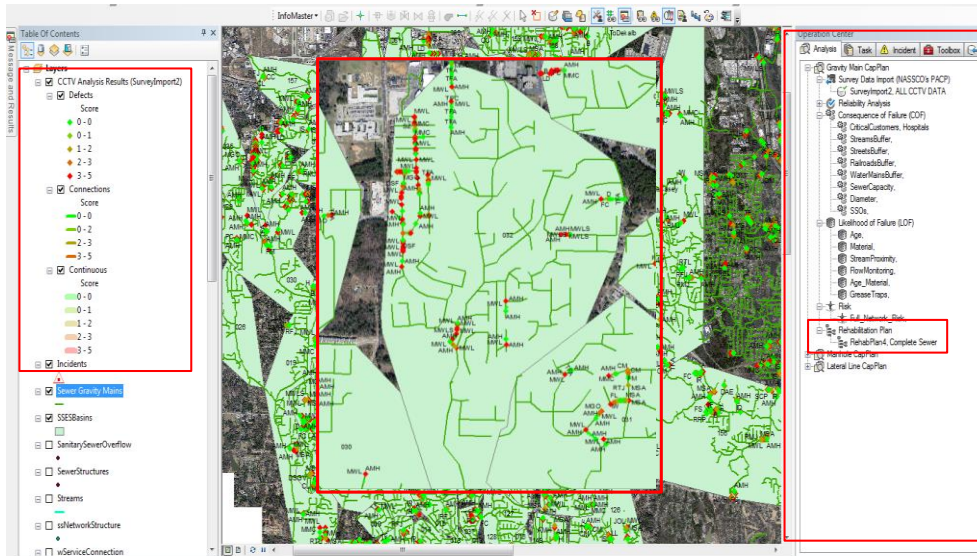
**EXHIBIT 10**  
Inspection and Renewal Process



Due to the large amount of SSES data CCWA is collecting, a methodology was developed to mass process the data in an automated way using Infomaster Sewer. This was chosen because it seamlessly integrates with our current software including ESRI (GIS), Cityworks (CMMS), and Granite XP (CCTV). Data is collected in a specific database format from the contractor and run through quality assurance/quality control (QA/QC) processes. Once CCWA determines the data is acceptable, it is imported into Infomaster, and the data is run through a decision matrix that makes a recommendation for each pipe segment that could include the following: point repair, pipe replacement, pipe rehabilitation, no action. Typically, point repairs are coordinated with the D&C Department and larger projects (such as replacement or rehabilitation along full pipe segments) are executed by the PM&E Department for completion by CCWAs pipeline annual services contractors. Exhibit 11 shows a screen capture of the Infomaster tool.



## EXHIBIT 11 Infomaster



CCWA is currently working in the W.B. Casey WRF basin. To date, SSES activities have been completed in all of the 52 basins that were identified as a priority based on I/I. Renewal and Rehabilitation (R&R) activities have been completed in 24 of those basins, and another 15 basins are being assessed to determine the effectiveness of the fixes. Eight basins are considered complete. To date, \$3.1 million has been spent on Flow Monitoring and SSES activities in the W.B. Casey basin. CCWA will incorporate data from the capacity models into the process for determining where this work is to be completed. The Northeast WRF basin has 41 priority basins (based on I/I) and additional work will begin once W.B. Casey work is completed. Temporary flow monitoring is currently being completed in the Shoal Creek and DeKalb County basins.

## Basin Renewal

Basin renewal projects address pipes 15-inches and smaller and the majority of these projects are a direct result

of data collected the SSES program. Ten projects were opened in FYB15 which will result in 19,777 feet of pipe being replaced or rehabilitated. Exhibit 12 provides construction photos of a CIPP and Open Cut project. A total of \$1.53 million was spent on these projects during FYB15.

## EXHIBIT 12 Basin Renewal Construction Photos





## Large Outfall Renewal

Large Outfall Renewal projects address pipes larger than 15-inches and account for 76 miles of our system. Inspections helped CCWA to determine the first outfall replacement project would be the Flint River Outfall. The entire Flint River Outfall, shown in Exhibit 13, stretches from the W.B. Casey WRF Raw Water Pump Station up to Georgia Highway 85. Phase 1a begins at the W.B. Casey WRF Raw Water Pump Station and replaces 4,300 feet of reinforced concrete pipe (RCP) with Fiberglass Reinforced Polymer Mortar Pipe (FRP). The budget for Phase 1a was \$4.71 million and construction began in FYB15 and will extend a few months into FYB16. The next phase, 1b, has a budget of \$9.2 million and was awarded in May 2015. Design activities for Phase 2 also began in FYB15 and the current estimate for this phase is \$16 million. A total of \$2.7 million was spent on Large Outfall Renewal projects during FYB15.

## Sewer Force Main Renewal

Systematic inspection and renewal of force mains was identified as a need in the 2015 SMP. While the condition assessment program is being developed starting in FYB16, two replacement projects were identified and CCWA completed design activities. The projects are estimated at \$660,100 and are scheduled to be awarded in FYB16.

## Flow Monitoring

Temporary Flow Monitoring was initiated in FYB15 for the Shoal Creek and DeKalb County basins and is concluding in early FYB16. This will be used to determine the level of I/I issues and will form the basis for development of capacity models.

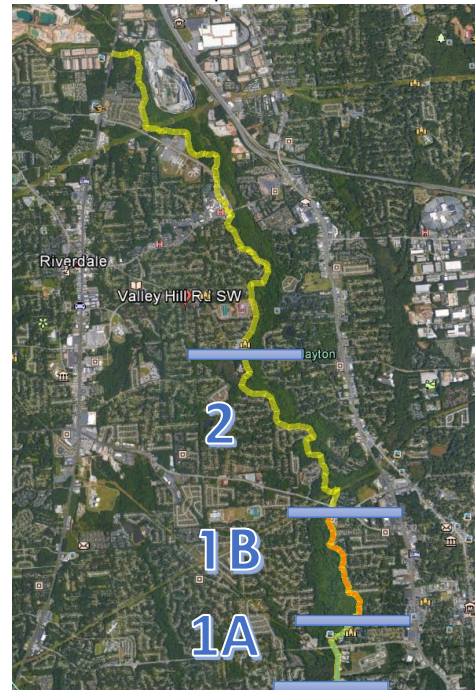
## Capacity Models

Projects were initiated in FYB15 to develop conveyance system models for pipes 10-inches and larger in the W.B. Casey and Northeast WRF basins. The models provide capacity information for dry and wet weather flows and when complete, will be used in conjunction with I/I, SSO, and other data to prioritize and plan for capital projects in the future.

## SMP Implementation Look Ahead to FYB16 (May 2016 – April 2017)

While the previous section described the work initiated and completed in FYB15, this section will list the programs and initiatives planned for during FYB16. Exhibit 14 lists the projects planned for in FYB16, based on needs identified in the SMP as well as other projects. A list of the project, budget, and brief description are provided.

**EXHIBIT 13**  
Flint River Outfall Replacement Phases







**EXHIBIT 14**  
FYB16 Programs/Initiatives

Programs/Initiatives	FYB16 Budget	Description
Sewer Pipeline Rehab Programs		
SSES	\$1,500,000	Systematic inspection of sewer basins based on priority. Criteria considered include inflow/infiltration severity, capacity, etc.
Basin Renewal	\$2,000,000	Replacement or renewal of gravity sewers, based primarily on the SSES program, and 15 inches or less.
Large Outfall Renewal	\$4,000,000	Replacement or renewal of large gravity sewers greater than 15 inches. Flint River Outfall Phase 1b will be constructed in FYB16 and design of Phase 2 will be completed. A large part of the Phase 1b budgets was accounted for in FYB15.
Sewer Force Main Renewal	\$1,000,000	Replacement or renewal of pressure sewers
Conveyance System Initiatives/Studies		
Large Outfall Condition Assessment	\$250,000	Review of previous condition assessment data and incorporation of that data, capacity model results, and risk for development of an initial renewal and replacement plan for large outfalls.
Shoal Creek and DeKalb Sewer Model	\$250,000	Development of sewer capacity models for all pipes 10-inches or greater in the Shoal Creek and DeKalb Sewer Models. Flow monitoring data from previous studies will be utilized for development and calibration.
Sewer Force Main Assessment	\$250,000	Development of a plan for systematic force main assessment that will identify methodology and frequency of inspections that can be used to feed into the force main replacement program.

## Water Reclamation Facilities: Current and Future Plans

### W.B. Casey WRF

The most recent plant upgrade was completed in July 2004 bringing the permitted design treatment capacity to 24 MGD. On average the facility operates at around 60% of its permitted capacity. The facility incorporates technologically advanced plant processes and equipment for discharging high quality effluent to maintain permit compliance. Facilities include preliminary, primary, biological and secondary treatment facilities. The facility also applies various chemicals for controlling plant processes and effluent disinfection. The final treatment process is constructed wetland treatment.

The W.B. Casey WRF has faced issues with high flows at the facility related to excessive rainfall events. These events not only caused operational issues within the plant but caused on occasion an overflow of treated plant effluent at the Casey Plant's effluent box. The plant staff exercise all options to try and prevent this situation from happening each and every time. CCWA initiated a flow and load study for the W.B. Casey WRF in 2010 and determined a path forward to mitigate the issues within the plant and at the effluent box related to high flow situations.

Currently the W.B. Casey WRF is under construction which includes a new preliminary treatment process and a forth secondary clarifier. The facility is also in the design phase for phosphorus polishing facility and discharge pipeline to the Flint River. Currently the facility is operating under its NPDES "B1" permit limits.





Design of the PTU includes:

- New screen structure and rotary drum screen
- Upgrades and rehabilitation of the existing PTU
- Grit removal process upgrades
- Odor control system modifications
- Misc. valves & yard piping
- Electrical, instrumentation and control equipment

This PTU will give the Authority the ability to:

- Allows existing PTU structure to be taken off-line for concrete rehabilitation
- Provides enhanced screening and grit removal to protect downstream treatment equipment
- Ability to bypass a portion of flow around the primary clarification process to help mitigate peak flow situations
- Improve pellet quality (solids handling)

Design of the Fourth Secondary Clarifier includes:

- New 4th secondary clarifier
- Upgrades & rehabilitation of the 3 existing clarifiers
- New return activated sludge pump
- Inlet gate
- Misc. valves & yard piping
- Electrical, instrumentation and control
- Benefits:
- Identified & recommended in the 2010 Casey Flow & Load Study
- Provides additional capacity /redundancy for maintenance
- Provides capacity to handle increasing flows and more stringent effluent requirements

Design of the Phosphorus Polishing Facility and Flint River Discharge Pipeline includes:

- New flow splitting and metering
- Phosphorus polishing facility
- Ultraviolet (UV) disinfection system
- Flint River effluent measurement flume
- Cascade aerator
- Chemical storage and feed system
- Benefits:
- Provides total of 24 MGD discharge capacity
- 6.6 MGD to a new Flint River discharge (replaces the LAS)
- 17.4 MGD to the Huie Constructed Wetlands
- Provides capacity to handle increasing flows and more stringent effluent requirements
- Mitigate potential overflows at the Casey effluent box
- Upon completion of the phosphorus polishing facility CCWA will ask the Environmental Protection Division for permission to start using the "B1" and "B2" permit limits



## Northeast WRF

The most recent plant upgrade was completed in 2008 bringing the permitted design treatment capacity to 10 MGD. On average the facility operates at around 37% of its permitted capacity. The facility incorporates technologically advanced plant processes and equipment for discharging high quality effluent to maintain permit compliance. Facilities include preliminary, primary, biological and secondary treatment facilities. The facility also uses UV for effluent disinfection.

Currently the facility is operating under its NPDES “B1” permit limits of 6 MGD. CCWA is planning to start a design for a phosphorus polishing facility in the near future in order to go to the “B2” NPDES permit limits of 10 MGD. Current tertiary treatment process can’t consistently meet the more stringent phosphorus permit limit.

Benefits:

- Currently, the plant operates under its original reduced capacity permit of 6 MGD
- Additional flows into the plant will trigger a need to ask EPD to increase our permit limit to 10 MGD
- Existing phosphorus removal processes at the plant can’t consistently meet the 0.18 mg/L effluent limit once the permit limit increase to 10 MGD
- Evaluation needed to determine most cost effective treatment option

## Shoal Creek WRF

The most recent plant upgrade was completed in 2002 bringing the permitted design treatment capacity to 4.4 MGD. On average the facility operates at around 36% of its permitted capacity. The facility also incorporates technologically advanced plant processes and equipment for discharging high quality effluent to maintain permit compliance. Facilities include preliminary, biological and secondary treatment facilities. The facility also uses UV for effluent disinfection. The final treatment process is constructed wetland treatment. Currently there are no immediate plans to upgrade or expand the Shoal Creek WRF.