

CITY OF ROSWELL STORMWATER UTILITY MASTER PLAN

February 2019



Acknowledgements

The City of Roswell Stormwater Utility, a division of the Environmental/Public Works Department, implemented a Master Planning Process to assess its ability to provide stormwater management services throughout the incorporated areas of the City of Roswell today and into the future. The following staff contributed to the development of this Master Plan.

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1.0 History of the Stormwater Utility

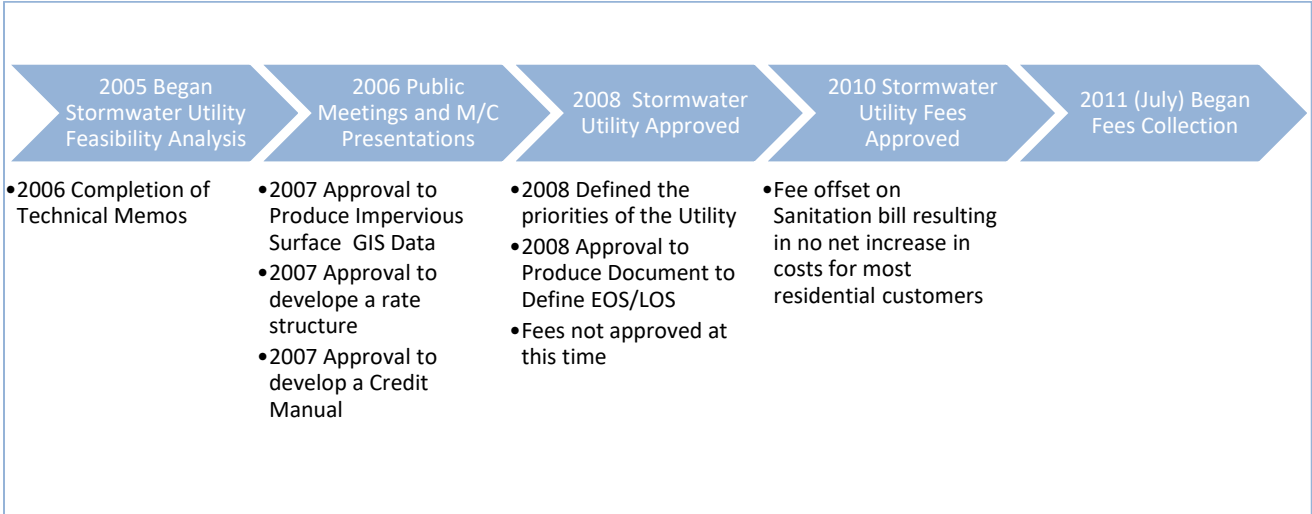
Beginning in 2005 the City of Roswell Environmental Public Works Department began evaluating the feasibility of creating a Stormwater Utility to provide a dedicated source of funding for managing stormwater and stormwater infrastructure in Roswell. Stormwater management for the City of Roswell includes satisfying regulatory requirements, identifying and implementing capital improvements for stormwater infrastructure, operations and maintenance, and the internal and external personnel and resources needed to perform the work.

The Stormwater Management Program (Program), while satisfying the minimum regulatory requirements and performing repairs and ongoing maintenance on stormwater infrastructure, was more reactive than proactive and lacked focus on water quality improvement. The Program, lacking dedicated stormwater funding, was primarily funded by the City of Roswell General Fund.

Implementation of a stormwater utility to provide a dedicated source of funds has been shown to be an effective way to provide stormwater management. Roswell began to investigate implementing a stormwater utility because of aging infrastructure, a long and growing Capital Improvement Program (CIP) list, higher regulatory standards, water quality concerns, and the need for longer term, watershed driven stormwater management.

The simplified timeline presented as Figure 1-1 provides the framework for the Stormwater Utility adoption. Details for the steps and approvals for the Stormwater Utility are included in the subsequent sections.

Figure 1-1 Stormwater Utility Formation Timeline



A Stormwater Utility Feasibility Study was completed in 2006 and was comprised of four technical memorandums including a five year stormwater management plan. This stormwater management plan provided a comprehensive view of the existing Program, quantifying what the Program had accomplished, and areas in that the Program was not focused. The document also suggested possible future needs based

on regulatory changes and customer expectations, and suggested Program priorities for consideration. This document was used as the baseline for developing the case for the Stormwater Utility. Also included in the Stormwater Utility Feasibility Study were supporting documents including a Public Outreach and Education Plan, a Preliminary Fund Analysis, and an Implementation Data Gap Analysis (Appendices 1-1, 1-2, 1-3 & 1-4). These plans together:

- Assessed future Program needs and priorities
- Evaluated current, and estimated future, Program costs
- Investigated the viability of implementing various funding options to provide additional financial resources in the existing Program
- Evaluated the legal implications of implementing the various funding methods
- Developed a recommendation of the most fair, equitable, and stable funding methods for the Program
- Formulated a strategy to implement the recommended funding method or combination of methods
- Formulated a rate structure
- Formulated a plan to obtain missing data
- Educated the public on various funding options and solicited feedback to provide to Mayor and City Council (M/CC)
- Defined the existing Extent of Service and existing Level of Service (EOS/LOS)
- Quantified costs for maintaining the EOS/LOS
- Estimated costs for expanding the EOS/LOS
- Developed a 5 year plan for Stormwater Management Improvement
- Evaluated and further developed the CIP

Numerous public education meetings and focus group meetings were held in 2006 and 2007 to solicit feedback and answer questions on a proposed stormwater utility and its possible implementation. In 2007 authorization was obtained from elected officials to develop data in support of a stormwater utility based on impervious area. Impervious surface delineation and database creation was conducted, a Credit Manual was developed, the rates and rate structure was developed, and a billing implementation process was recommended.

1.1 Financial Information Prior to Adoption of the Stormwater Utility

At the outset of evaluating the Program, the FY 2005 expenditures and revenue sources were evaluated. These were summarized in the Five Year Stormwater Management Plan (2006) and are summarized in Tables 1-1 and 1-2.

Table 1-1 Program Expenditures (FY 2005)

SWMP Budget Element	Cost
Personnel/Overhead	\$926,360
Operations	\$281,859
Capital Projects (Lakes and Ponds Program and CIP)	\$300,000
Consulting Services	\$183,951
Total	\$1,692,170

Table 1-2 Program Revenue (FY 2005)

Revenue Source	Cost
General Fund	\$1,238,770
Erosion Control Fees Per State Law (\$40 per acre)	\$23,900
LDA Permit and Plan Review Fees	\$100,000
Building Permits	\$79,500
Drainage Improvement Projects (Capital Funds allocation)	\$250,000
Total	\$1,692,170

As part of the evaluation of the program and funding options, areas where the lack of funding resulted in the inability to effectively implement all aspects of the Program were noted and quantified using relative terms as presented in Table 1-3 below:

Table 1-3 Future SWMP Cost Implications

SWMP Element	Cost
Administration	Minor
Public Education and Involvement	Minor
Development Regulations	Moderate
Regulatory Compliance	Moderate
Floodplain Management	Moderate
Watershed Monitoring & Restoration	Significant
Operations and Maintenance Comprehensive MS4 Inventory Proactive Drainage System O&M Capital Maintenance/Replacement	Significant
Capital Improvement Projects (CIP)	Significant
Overall Cost Implementation	Moderate to Significant

1.2 Stormwater Utility User Fee Rate Comparison

Table 1-4 presents fees charged by other municipalities in Georgia based on 2005 survey information. The City of Roswell rate information was entered into the data for comparison.

Table 1-4 2005 Georgia Stormwater Utility User Fee Rates Comparison

Community	ERU/Month	Cost Per 1000 SF of Impervious Surface Per month
City of Covington	\$4.79	\$1.84
City of Decatur	\$5.00	\$1.72
City of Griffin	\$3.50	\$1.59
Douglas County	\$4.00	\$1.57
City of Woodstock	\$4.20	\$1.56
Athens-Clarke County	\$3.60	\$1.38
DeKalb County	\$4.00	\$1.33
City of Fairburn	\$4.08	\$1.24
Rockdale County	\$3.39	\$0.99
City of Roswell	\$3.95	\$0.96
City of Peachtree City	\$3.95	\$0.86
Columbia County	\$3.20	\$0.80
City of Fayetteville	\$2.95	\$0.77

1.3 Recommendations to Elected Officials

Several meetings were held throughout 2008, 2009 and 2010 to clarify the vision for the proposed stormwater utility and to establish clear priorities for the utility going forward. Additional funds were needed to implement the Program.

- Extent of Service and existing Level of Service (EOS/LOS) clarification and establishment of standard operation procedures for implementing the EOS/LOS were needed.
- Additional personnel (Operations and Maintenance crew) were needed to perform the operations and maintenance (O&M) work and to make progress on the backlog of O & M projects.
- Watershed management was an area that needed additional focus.
- Additional equipment was needed to perform in-house work.

1.4 Stormwater Utility Approval

On October 6, 2008, Roswell’s Mayor and City Council adopted the Stormwater Utility Ordinance and on December 27, 2010 the resolution to establish fees for the Stormwater Utility was approved (Appendix 1-5). Stormwater Utility (Utility) billing began July 1, 2011. The aim of the Utility was to “be responsible for stormwater management services throughout the incorporated areas of the city, and that shall provide for the management, protection, control, regulation, use and enhancement of the city's stormwater management services” (Article 24.8). Utility fees are based on the amount of impervious area on a parcel.

A Credit Manual (Appendix 1-6) was approved in 2010 which outlines the methodology for evaluating individual properties for credits to reduce the stormwater fee for the property. Credits are provided for properties which include stormwater management facilities and Best Management Practices which reduce the impact of the property on the Utility. Evaluations are conducted upon request. Note that all parcels with impervious area are subject to the Utility, with the exception of those parcels which are found to be

No Impact Parcels. The City of Roswell pays a stormwater fee based on the impervious area of roads in the City of Roswell right of way and for other impervious areas including buildings and parking lots. Similarly, schools, churches and other not for profit entities are subject to Utility fees.

1.4.1 Approved Rate Structure and Rates

The following rates and Customer Class rate structure was approved for implementation:

1. Residential Tier 1 Customers (Up to 3,400 square feet of impervious area) - \$2.57 per month (0.65 Equivalent Residential Unit (ERU));
2. Residential Tier 2 Customers (3,401 to 4,950 square feet of impervious area) - \$3.95 per month (1.0 ERU);
3. Residential Tier 3 Customers (4,951 to 10,000 square feet of impervious area) - \$5.92 per month (1.5 ERU);
4. Residential Tier 4 Customers (Greater than 10,000 square feet of impervious area) - \$3.95 per ERU (4,100 square feet) per month; and
5. Non-Single Family Residential customers \$3.95 per ERU (4,100 square feet of impervious area) per month.

Along with the Utility fee, a reduction in the sanitation fee for all property accounts was approved amounting to 1.0 ERU (\$3.95) for residential properties and 3.0 ERU (\$11.85) for non-residential properties.

1.4.2 Approved Utility Program Priorities

Upon adoption of the Utility, the following priorities were established:

- Protect public safety during storms
- Comply with State and Federal regulations
- Protect streams
- Improve water quality
- Replace failed infrastructure
- Perform periodic maintenance
- Ensure reasonable and sustainable cost of service

1.4.3 Accomplishments of the Stormwater Utility

Since its inception in 2012, the Utility has built projects, maintained infrastructure, responded to citizens and interacted and inform our citizens.

- Completed 62 Projects on the CIP Project List
- Educated thousands of schoolchildren about environmental concerns
- Completed and submitted test results to remove parts of Rocky Creek and Willeo Creek from the 303(d) Impaired Streams list
- Completed more than 3,300 work orders repairing structures in the stormwater system
- Installed 10,000 square feet of bioretention gardens at Roswell Area Park
- Installed 11,500 square feet of pervious pavers on Goulding Place
- Installed 10,000 square feet of pervious pavers on Myrtle Street and Zion Circle

- Installed 4,000 square feet of pervious pavers on East Alley
- Established an Interdepartmental Green Infrastructure Team
- Notable CIP projects include Farm Trace, Worthington Hills Drive and Pine Grove Road

The following succession of photographs illustrates the progression of a project. The culverts at Worthington Hills Drive were frequently blocked by debris. Maintenance was performed on a regular basis by O & M crews, and a new double culvert was designed, permitted, and constructed.



Photograph 1:
Worthington Hills Drive
culverts blocked by debris.



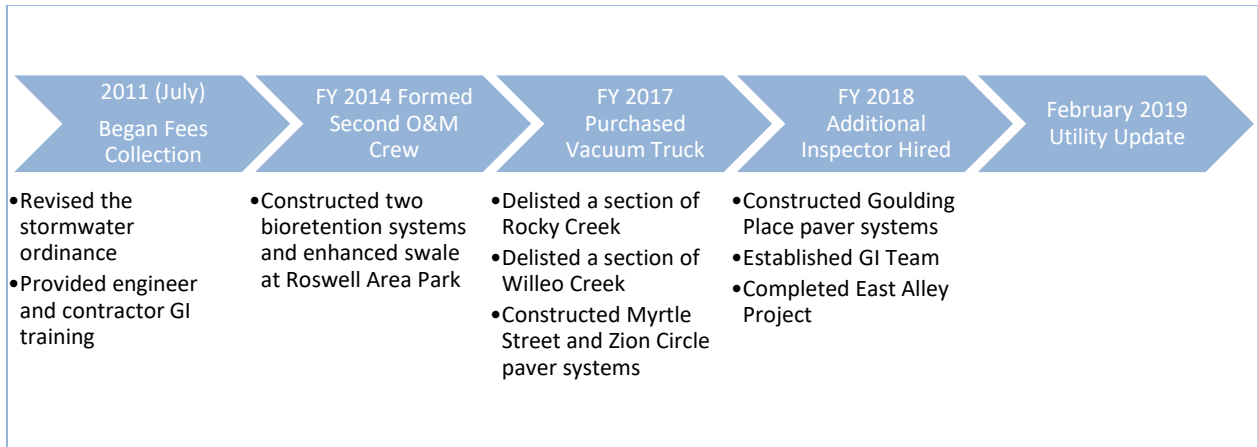
Photograph 2:
Worthington Hills Drive
culverts maintained.



Photograph 3:
Worthington Hills Drive
culverts replaced.

The following timeline in Figure 1-2 summarizes some of the accomplishments of the Utility.

Figure 1-2 Stormwater Utility Operational Timeline 2011-2019



2.0 Stormwater Utility Program Overview

The City of Roswell Stormwater Utility (Utility) has specific responsibilities, service priorities, and aims to accomplish particular goals. The Utility's most important task is to protect public safety by maintaining and replacing aged or failing stormwater infrastructure. The Utility has a responsibility to comply with federal and state regulations. The Utility must also perform periodic repairs and maintenance. The Utility has goals of protecting streams, improving water quality, and providing services in a sustainable manner. The following service areas describe how these priorities are addressed.

2.1 Approved Extent of Service/Level of Service

The Extent of Service (EOS) refers to the components of the storm drainage system that is maintained by the City. The Extents includes storm drainage components located in the City of Roswell Right Of Way (ROW) or on City of Roswell property, and stormwater infrastructure that is directly connected to infrastructure in the ROW. These Extents are referred to as the Public Drainage System. Figure 2-1 provides a graphic representation of the EOS.

The EOS excludes all infrastructure that is not part of the Public Drainage System including lakes, detention ponds, retention ponds, pipes, junction boxes, inlets, headwall, creeks, swales, channels, or other components, whether within a drainage easement or outside of a drainage easement.

The Level of Service (LOS) refers to the maintenance activities performed by the City. The City of Roswell inspects, prioritizes, and provides necessary maintenance and repairs, as funds allow, for the Public Drainage System. In private drainage systems, the City provides regulatory enforcement and may provide emergency response in isolated instances. The City of Roswell Utility does not maintain stormwater infrastructure in the Right-of-Way of State Routes. Operation and maintenance of stormwater infrastructure in the Right-of-Way of State Routes is the responsibility of the Georgia Department of Transportation.

2.2 Components of the Conveyance System

The stormwater conveyance carries stormwater from the street or other property to a creek or other outfall. As discussed in the section above, some components of the conveyance system are included as part of the Public Drainage System. In 2018, the Public Drainage System includes:

- 143 miles of conveyance storm pipe
- 5,263 catch basin
- 23 miles of roadside ditches
- 6,084 other structures (other inlets, junction boxes, headwalls, etc.)

The Utility is responsible for the inspection, maintenance, repair and replacement for this system. Curb and gutter maintenance and repair is provided by Roswell Department of Transportation.

2.3 Geographic Information System for Asset Management

The Utility creates, updates, and maintains a Geographic Information System (GIS) database populated with data for the drainage system in Roswell. Public infrastructure data is collected and verified in the field and

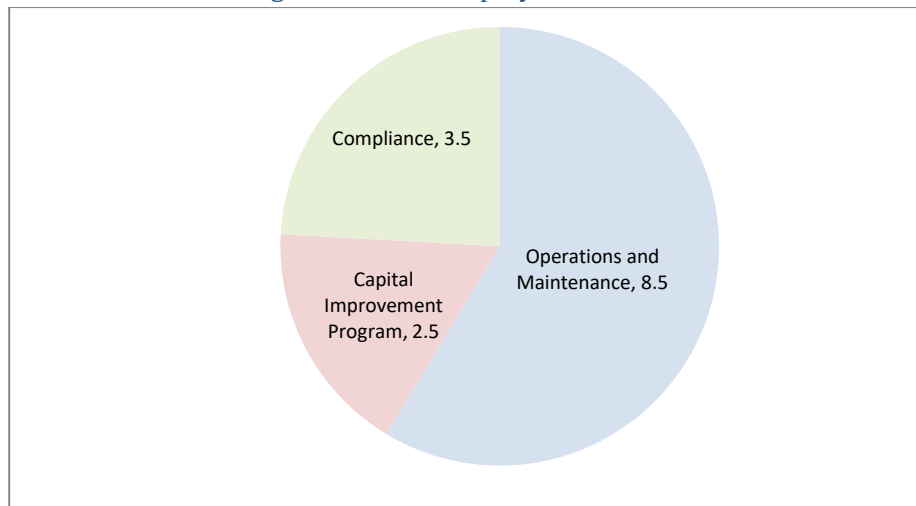
updated by physical inspection. The Utility uses an innovative mobile device application to verify and add field collected data. Data collected provides important information for managing assets and for providing timely and accurate field information.

2.4 Personnel

The Utility employs a total of 11 full time people and additional management staff who devote part of their time to supporting the Utility for a total of 14.5 full time equivalent people. Figure 2-2 below shows the breakdown of how staff is utilized in the areas of O&M, CIP support and Compliance support.

- **Maintenance:** The Utility employs a supervisor and two 3-person maintenance crews who prioritize projects from the Work Order list, make repairs, and provide maintenance on the drainage system.
- **CIP Support:** The Utility provides funding for providing major repairs to the existing stormwater system and for installing new stormwater infrastructure. The Utility employs a full time construction coordinator to oversee projects while under construction and to help prioritize future projects.
- **Compliance Support:** The Utility employs two full time compliance inspectors who visually inspect and document the existing stormwater system. Approximately twenty percent of the system is inspected per year and 100 percent of the system is inspected every 5 years. Structures requiring repair or maintenance are identified during inspections and added to the Work Order List or CIP list, depending on the severity of the repair. Utility employees also conduct IDDE inspections, Industrial inspections, Municipal inspections and Highly Visible Pollutant inspections. The Utility employs an Environmental Education Coordinator who provides public education as well as coordinating volunteer opportunities for the public to get involved in programs that protect water resources.

Figure 2-2 Employee Allocation



2.5 Operations and Maintenance

Maintaining, repairing, and replacing components of the stormwater infrastructure is a critical part of the Utility’s work to serve the citizens of Roswell. When items needing maintenance are discovered by Utility personnel or reported by citizens, and after appropriate investigation, the item is added to the Work Order list. The type of work includes installing or replacing new headwalls, installing riprap in channels and at pipe outlets, replacing inlet lids, cleaning pipes and junction boxes, repairing sinkholes, and removing debris from structures.

An important aspect of the maintenance work is monitoring a list of “hot spots” when rain events occur. The Utility maintains a list of areas of the City’s road network that have a tendency to become clogged by debris or need more frequent cleaning during rain events for some other reason.



An important addition to the tools available to the Utility was the purchase of a vacuum truck to aid in removal of debris and sediment in inlets and storm pipe. Prior to purchase of the truck the Utility rented a vacuum truck periodically. Having fulltime access to a vacuum truck has increased the efficiency and effectiveness of the maintenance crews.

At the inception of the Utility the work order backlog was approximately 2.5 years. After the addition of the second crew in 2014, the current backlog of projects is approximately 6 months. Table 2-1 provides the number of work orders that were completed each fiscal year.

Table 2-1 Stormwater Utility Work Orders Completed

Fiscal Year	Work Orders Completed
2012	451
2013	547
2014	535
2015	471
2016	414
2017	418
2018	476

An existing limitation of the Utility’s ability to conduct repair and maintenance work is the equipment currently owned by the utility. The purchase and use of select pieces of larger equipment would increase the amount of large maintenance and repair projects that the Utility could perform in-house.

2.6 Regulatory Compliance

A major component of the Utility is to help the City of Roswell comply with relevant regulations with regard to water resources protection. The Utility includes programs that are required by Roswell’s Municipal Separate Storm Sewer System (MS4) Phase I National Pollutant Discharge Elimination System permit. The

Utility complies with the MS4 permit by implementing the approved Storm Water Management Plan (SWMP). The Utility implements the approved that is comprised of the following components:

- Structural and Source Control Measures
- Illicit Discharge Detection and Elimination program (IDDE)
- Industrial Facility Storm Water Discharge Control
- Construction Site Management
- Highly Visible Pollutant Sources
- Enforcement Response Plan
- Monitoring for Discharges to Impaired Water Bodies
- Public Education
- Public Involvement
- Post Construction
- Monitoring and Reporting

Section 4 of this document provides details for how the components of the MS4 Permit are implemented.

2.7 Capital Improvement Program

The Capital Improvement Program (CIP) catalogues, prioritizes, designs and constructs major improvements and replacements to the stormwater system. The projects in this category are designed and constructed using on-call designers and construction companies. The types of projects included in the program are individual structure replacements and multiple structure system replacements, installation of new drainage systems where none exists currently, pipes that require lining, large scale maintenance projects on systems and areas, and implementation of watershed



improvement plans. Because of the nature of the stormwater system, areas that require repair or replacement are discovered through inspections or other channels and added to the CIP list. The CIP list is periodically evaluated based on set criteria to determine the highest priority projects.

2.8 Post Construction Controls and Green Infrastructure/Low Impact Development (GI/LID)

Roswell's MS4 permit requires that ordinances are adopted that address development, redevelopment and enforcement of post construction controls. The latest Georgia Stormwater Management Manual (GSMM) or equivalent be adopted and implemented and requires that stormwater be treated (water quality), stream channels are protected (channel protection), downstream overbank protection be enforced, and extreme flood protection is provided. Further, GI/LID practices are encouraged for new and redeveloped properties. To satisfy this requirement, the following measures have been incorporated into the Utility.

- *Post Construction Controls* - The GSMM and additional ordinances have been adopted and are used for plan review for all new or redevelopment properties that meet the minimum threshold as defined in the documents. This process is further described in the Construction Site Management section above.
- *GI/LID Program, Techniques, and Practices* – The Utility is in the process of developing and applying for approval of a comprehensive GI/LID Program that describes the processes and practices of the Utility to encourage more GI/LID practices.
- *GI/LID Structure Inventory and Inspection Program* – The Utility developed an inventory of all known GI/LID practices on parcels within the City, excepting those practices on residential properties. The inventory is updated annually and currently includes 86 private GI/LID practices and 20 practices on City owned parcels. See Figures 2-3, 2-4, 2-5, 2-6 and 2-7 for GI infrastructure location maps by inspection area. During the 2017-2018 reporting cycle, 47 Inspections were conducted. The GI/LID Program calls for 100% of inventoried practices to be inspected over a 5 year cycle. See Appendix 2-1 for more information on the GI/LID Program.

3.0 Environmental Protection

An important mission of the City of Roswell and the Utility is to protect the watersheds, creeks and other water resources in Roswell. As with many cities in urbanized areas, the water resources in Roswell are impacted by people on the land. Critical activities that affect water resources include changing hydrology as a result of land development, removal of native trees and vegetation, high creek flows causing bank erosion, and water quality degradation caused by the mobilization of sediment, pet waste and other pollutant sources. The City of Roswell and the Utility have specific programs to help alleviate these challenges on our water resources, and these programs are summarized below and discussed in detail in future sections.

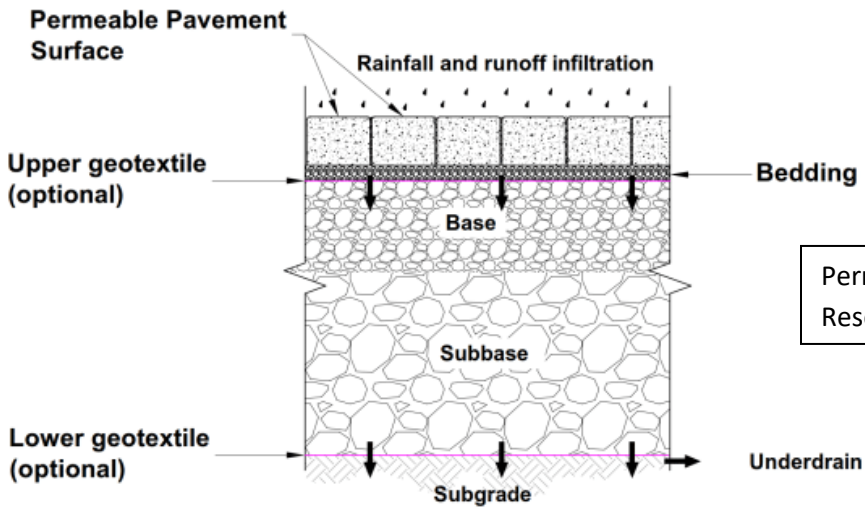
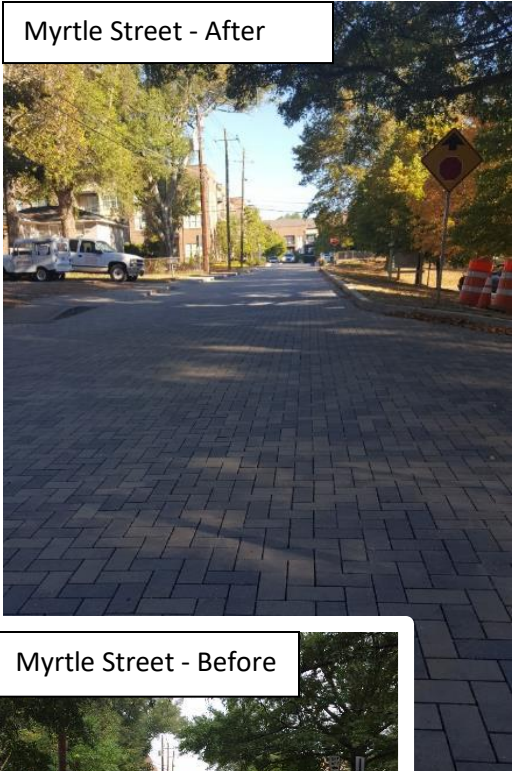
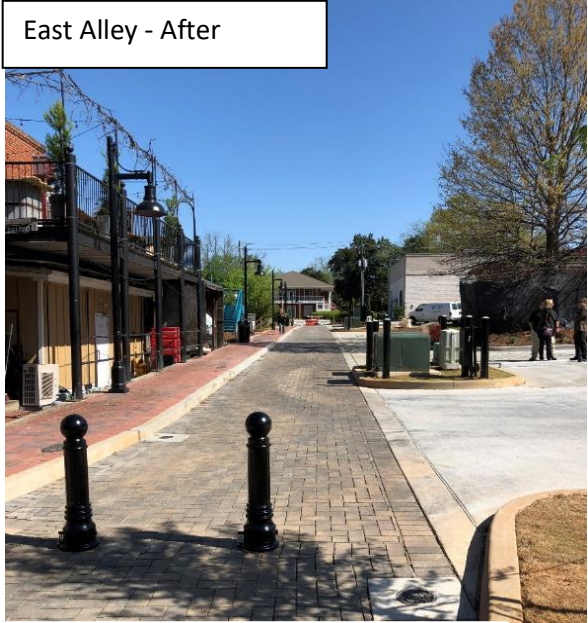
3.1 Green Infrastructure Practices

Green Infrastructure (GI) includes structural components and development practices which allow the land to mimic the natural hydrologic cycle. As a requirement of development or redevelopment of land in Roswell, the installation of features which cause the stormwater that falls on the site to mimic the natural hydrologic cycle is obligatory.

GI can take many forms and usually includes one or a combination of the following:

- **Infiltration:** Allowing water to infiltrate into the subgrade reduces the amount of water that flows off of the property, cleans the water by natural filtration processes, reduces high flow events in adjacent creeks, and supplies water to creeks when it is not raining.
- **Increased Vegetation:** Maximizing grass, trees, conserved undisturbed areas, and wooded natural areas reduce the water flow from the site and reduce pollutants in stormwater.
- **Biological Uptake and Evapotranspiration:** Plants uptake and clean water of pollutants as well as transpiring into the atmosphere stormwater that would otherwise flow offsite.
- **Disconnection of Impervious Surfaces:** Smaller, disconnected impervious areas reduce the quantity of water exiting a site and lessen the intensity of the water exiting a site.

The City of Roswell has adopted the latest stormwater model ordinance, and abides by the latest edition of the Georgia Stormwater Management Manual when evaluating sites in the permitting process. City staff frequently helps engineers, developers, and contractors to select the most practical and effective GI practices for their sites. The Utility has recently developed a GI Program which details the process that the Utility and other departments follow to encourage the use of GI practices. The program is included as Appendix 2-1. The following photographs show projects that were constructed by the Utility which include Green Infrastructure components, specifically paver systems, as well as a detail of the paver system.



Permeable Paver System Schematic
Researchgate.net

3.2 Watershed Management and Watershed Improvement Plans

Protecting water resources based on a watershed approach is a tool that the City of Roswell uses to most effectively direct financial and staffing resources. Managing watersheds including upstream areas of watersheds protects the downstream resources. Watershed Improvement Plans (WIPs) have been prepared to direct water monitoring efforts and to suggest projects or areas of focus which could improve water quality.

Among recommendations in the WIPs, is stream water quality monitoring. The Utility evaluates the quality of the water in major creeks in our jurisdiction to better understand what challenges the creeks face and how to best improve the water quality. A Bacteria Source Tracking (BST) project has also been completed to determine bacteria sources. Bacteria originating from Canine feces were found in the highest concentrations in sampled waters.

More than a decade of water quality monitoring has validated the need to continue protecting and improving the development and management practices of watersheds. As a result of annual monitoring, portions of Willeo Creek and a section of Rocky creek have been De-Listed (removed from the 305(b)/303(d) Impaired Streams list) because monitoring successfully showed these sections are supporting their designated use.

3.3 Stream Buffers

In addition to the State mandated 25-foot No Disturbance Stream Buffer, Roswell is proactive in expanding stream buffers around creeks with a minimum of 20 acre watershed, or meeting other criteria. In addition to the State Buffer and depending on creek flow characteristics and watershed area, Roswell enforces a 75- or 150-foot No Impervious setback, in which lies a 50- or 100-foot No Disturbance Stream Buffer.

3.4 Shared Stormwater Policy

The City of Roswell has adopted a policy which outlines procedures for consideration and participation in shared stormwater management facilities. In some cases the City will participate as an owner in a stormwater facility. This program can simplify redevelopment and encourage environmentally sound development. Appendix 3-1 provides the adopted policy.

The City of Roswell has constructed a shared stormwater facility in the right-of-way (ROW) of Myrtle Street and Zion Circle. The facility is a pervious paver system underlain by a rock reservoir which can provide both water quality treatment and water quantity detention. Private property owners wishing to redevelop properties within the watershed where the paver system is located can voluntarily purchase volume in this facility to reduce the amount of stormwater compliance infrastructure for the property redevelopment.

3.5 Floodplain Protection

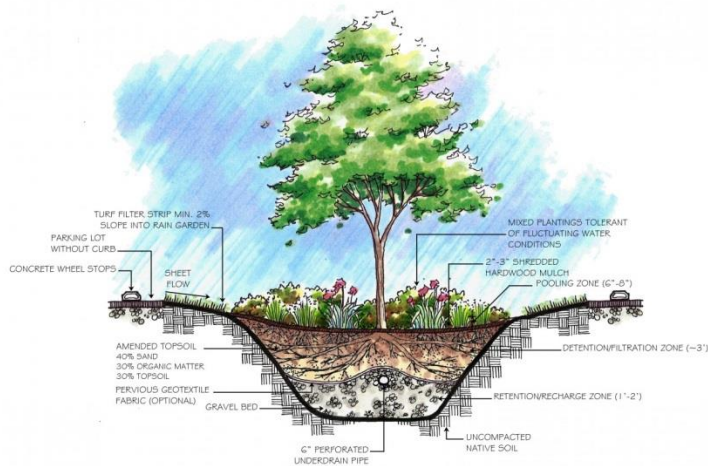
Roswell has 276 linear miles of streams within its jurisdiction. Many of these streams have regulated and nonregulated floodplain. Flooded land and overtopped roads create hazards to people and property around the country, and Roswell is no exception. Preservation of floodplains, and careful regulation with regard to construction within, uses of, and crossings of floodplains, are critical to protecting the citizens of Roswell. Roswell enforces the model floodplain ordinance and also participates in the Community Rating

System (CRS) which provides tools to empower communities to reduce the flooding hazards while also reducing the cost of floodplain insurance to property owners within the regulated floodplain. Annual activities and a five year recertification process are required to maintain standing in the CRS program.

3.6 Ordinances and Policies

The City of Roswell and the Utility has adopted the following policies and ordinances. See Appendices 2-1, 3-2, 3-3, 3-4 & links below.

- Stormwater Management Ordinance (Appendix 3-4)
- GI/LID Program (Appendix 2-1)
- Stream Buffer Ordinance (Appendix 3-4)
- Tree Protection Ordinance (Appendix 3-4)
- Landscaping and Screening Ordinance (Appendix 3-3)
- Land development ordinances (Appendix 3-2)
- Soil Erosion, Sedimentation and Pollution Control (Appendix 3-4)
- Shared Stormwater Policy (Appendix 3-1)
- UDC Design Guidelines (www.roswellgov.com)
- Georgia Stormwater Management Manual Volume I and II (<https://atlantaregional.org/natural-resources/water/georgia-stormwater-management-manual>)
- Flood Damage Prevention Ordinance (Appendix 3-4)
- CRS Program (<https://www.fema.gov/community-rating-system>)



Bioretention cell schematic.
Clemson.edu

4.0 Regulatory Compliance

4.1 Compliance Overview

Early Environmental Regulations

The Clean Water Act, as amended in 1972, established the structure for regulating pollutant discharges into the Water of the State by establishing the National Pollutant Discharge Elimination System (NPDES) program under the Environmental Protection Agency (EPA). NPDES regulations gave EPA the authority to implement pollution control programs focused on the point where pollutants enter Waters of the State, particularly where industrial facilities and municipal sewage facilities discharged to State Waters. Monitoring and regulation was often delegated to state environmental offices. Point Source pollution regulation effort resulted in large improvement of water quality throughout the United States.

Non-Point Source Regulations

In 1987, the Clean Water Act was amended to regulate Non-Point Source pollution. These regulations gave EPA the authority to regulate pollutant sources that are not specific to a location, and expanded the list of regulated chemicals and substances, including sediment. Through time the responsibility to monitor and regulate Non-Point Source pollutants has been delegated to the states and further delegated to municipalities.

Roswell Compliance Tools

Roswell falls under NPDES regulations as a Phase 1 Municipality. The goal of the NPDES permit is to reduce pollution in Roswell's Municipal Separate Storm Sewer System (MS4). Appendix 4-1 presents the permit. Roswell has an approved Storm Water Management Plan (SWMP) which describes how Roswell must implement the MS4 permit. See Appendix 4-2 for the SWMP and its associated appendices. Roswell has a legal responsibility to comply with the NPDES MS4, and individual penalties can be imposed for non-compliance.

As part of NPDES compliance, the City of Roswell maintains and updates a number of ordinances and regulations which support water quality improvement goals, development guidelines and enforcement actions.

Water Quality Based Approach to Clean Water Act

EPA regulates waterbodies based on water quality. The Clean Water Act Section 303(d) (Georgia 305(b)) Impaired Waters and Total Maximum Daily Loads (TMDLs) define water quality standards based on intended use, monitor waterbodies, and compile data. Waterbodies which do not meet the assigned water quality standards, and therefore cannot meet the waterbody's intended use, are tabulated as 305(b)/303(d) Impaired Streams. TMDL values or other pollutant reduction measures are assigned by EPA or its delegates. Plans to implement waterbody restoration actions must be developed by the NPDES permittee in whose jurisdiction the waterbody is located.

Impaired Streams List

The City of Roswell can be delineated into eight watersheds. Six of the watersheds flow to the Chattahoochee River basin and two watersheds flow to the Coosa River basin. The EPD evaluates creeks for

water quality as part of the Georgia 305(b)/ 303(d) program. Six creek reaches and two river reaches which are within the jurisdiction of the City of Roswell have been evaluated. Figure 4-1 presents the watersheds as well as the evaluated river and stream reaches. Table 4-1 presents data including the assessment result and the cause of the impairment from the EPD 2016 Integrated report.

Table 4-1 Georgia 305(b)/303(d) Evaluated Reaches in Roswell Jurisdiction*

Name of Waters	Reach Location	River Basin	Designated Use	Assessment Result	Cause of Impairment
Hog Waller Creek (Crossville Creek)	Tributary to Big Creek	Chattahoochee	Fishing	Not Supporting	Fecal Coliform
Foe Killer Creek	Headwaters to Big Creek	Chattahoochee	Fishing	Not Supporting	Fecal Coliform, Biota Impacted
Big Creek	GA 400 to Chattahoochee	Chattahoochee	Fishing, Drinking Water	Not Supporting	Fecal Coliform
Willeo Creek** (upper 3 miles)	Gilhams Lake to lower Willeo reach	Chattahoochee	Fishing	Supporting	
Willeo Creek (lower 2 miles)	Downstream of Willeo Rd	Chattahoochee	Fishing	Not Supporting	Fecal Coliform
Chattahoochee	Johns Creek to Morgan Falls	Chattahoochee	Drinking Water, Recreation	Not Supporting	Fecal Coliform
Rocky Creek**	Upstream of Garrett Lake	Coosa	Fishing	Supporting	
Little River	Highway 140 to Lake Allatoona	Coosa	Fishing	Not Supporting	Fecal Coliform

* Source: 2016 305(b)/303(d) Integrated Report - Approved October 4, 2018

**Previously listed as Non-Supporting. Quarterly stream monitored indicated sufficient improvement to remove these reaches from the list of Impaired Streams.

4.2 MS4 Overview

The primary vehicle for displaying Roswell’s environmental compliance is the preparation and submittal of the MS4 Annual Report. The MS4 Annual Report compiles the results of the activities, inspections, testing, outreach, monitoring, and municipal permitting completed during the previous reporting period to address specific goals delineated in the NPDES MS4 Permit. Approximately 19% of the annual project Utility budget and 24% of the personnel budget is devoted to environmental compliance. The following components and descriptions detail the compliance work that the Utility performs each year.

4.2.1 Structural and Source Control Measures

Roswell’s Phase 1 NPDES MS4 permit requires that a program be implemented that incorporates structural and source control measures to reduce pollutants from runoff from commercial and residential areas to the MS4. To satisfy this requirement, the following measures have been incorporated into the Utility.

- *MS4 Control Structure Inventory and Map* – The Utility maintains an inventory of the components of the MS4 system including pipes, catch basins, ditches, inlets, junction box, outlets, publicly

owned ponds, and other types of components. The inventory is updated annually with new structures, deleted structures, and revised structures. Figures 4-2, 4-3, 4-4, 4-5 & 4-6 provide inventory maps of the MS4 system by inspection area. Figures 4-7, 4-8, 4-9, 4-10 & 4-11 provide inventory maps of the ditches and outfall in the MS4 system by inspection area.

- *MS4 Inspection and Maintenance Program* – Inspections of the MS4 components are conducted such that all structures are inspected each 5 year cycle. Table 4-2 shows the number of each type of structures and the number of inspections for the 2017-2018 reporting cycle. Required maintenance is identified and added the O&M list or to the CIP list, as the situation dictates.

Table 4-2 Structures Inspected 2017-2018 Reporting Cycle

	Components*	Ponds	Ditches (Miles)	Pipes (Miles)
Total in MS4	11,347	14	23	143
Inspected in 2017-2018	2360	8	23	29
Maintained in 2017-2018	622	0	0	77**

*Includes catch basins, area inlets, junction boxes, grated inlets, flared end sections, headwalls, pipe terminations, etc.

**Maintenance or repairs on 77 individual locations

- *Planning Procedures* – A comprehensive planning document to provide ways to help reduce pollutants in new or redeveloped areas of the MS4 was prepared and is updated annually.
- *Street Maintenance* – A street maintenance and cleaning program is enacted by Roswell Department of Transportation and the results are tracked and reported by the Utility. In the 2017-2018 reporting cycle a total of 9,400 miles of streets were swept and approximately 790 tons of material removed from the streets in the MS4. In addition to street sweeping, Roswell has 58 active Adopt-A-Road groups where 514 individuals volunteered 868 hours to collect 421 bags of trash along 205 miles of city road.
- *Flood Management Projects* – The City of Roswell complies with procedures to ensure that new development and redevelopments are assessed for water quality impacts. The Utility tracks and reports the assessments in the Annual Report. During the 2017-2018 reporting year 52 new projects triggered, then assessed for, water quality requirements as a condition of the Land Disturbance Permit for the project. The Utility evaluates at least one existing structural flood control device annually for possible retrofitting to improve water quality treatment. The Utility also maintains a total 25 detention ponds (See Figure 4-12).
- *Municipal Waste Facilities* – The Utility maintains and updates annually an inventory of municipal waste facilities. The City of Roswell has one municipal waste facility. The Utility implements a program to inspect the facility and to implement a program to control runoff from the facility.
- *Municipal Facilities with the Potential to Cause Pollution* – The Utility maintains and updates annually an inventory of municipal facilities with the potential to cause pollution. The Utility implements a program to inspect the facilities such that 100% of the facilities are inspected over a 5 year cycle and makes recommendations to control runoff from the facilities. As of the 2017-2018 reporting cycle, the inventory includes 18 locations that are listed as facilities that could potentially cause pollution: Sixteen of these facilities were inspected during the 2017-2018 reporting cycle.

- *Pesticide, Fertilizer, and Herbicide Application* – Training is provided to municipal employees who use pesticides, fertilizers, and/or herbicides (PFH). The training covers the minimization, use, storage, spill response and safe disposal of PFH's.

4.2.2 Illicit Discharge Detection and Elimination Program (IDDE)

Roswell's MS4 permit requires that a program is implemented and enforced that detects and eliminates illicit discharges and improper disposal of pollutants to the MS4. To satisfy this requirement, the following measures have been incorporated into the Utility.

- *Outfall Inventory and Map* – The Utility has developed an outfall inventory and a map that are updated annually. As of the 2017-2018 reporting cycle, a total of 1,397 outfalls were identified in the MS4. Figure 4-5 provides the outfall map.
- *IDDE Plan* – A plan to detect and address non-stormwater related discharges was developed. The components of this plan are enacted by the Utility annually. The Utility conducts dry weather screening on outfalls such that 100% of the outfalls are inspected in a 5 year cycle. If non-stormwater discharges are found, investigative and follow-up procedures are enacted and identified illicit discharges are eliminated. During the 2017-2018 reporting cycle, 261 dry weather screenings were conducted. During the 2017-2018 reporting cycle, two dry weather outfalls were found to have flow during dry weather. Water samples were taken from these outfalls and evaluated. The testing confirmed that the outfalls were conveying groundwater. These outfalls were reclassified and no additional enforcement actions were necessary.
- *Spill Response Procedures and Public Reporting*– If hazardous materials spills occur, these incidents are tracked by Roswell Fire Department and procedures are followed to minimize exposure to the MS4. Fulton County maintains and operates the sanitary system that serves the City of Roswell and maintains records regarding suspected or confirmed sewage spills. IDDE incidents and hazardous material spills are reported in the MS4 Annual Report. Additionally, citizen concerns of water quality, illicit discharge, dumping, or water quality concerns are investigated, tracked, and resolved or eliminated. During the 2017-2018 reporting cycle two spill incidents occurred of ten gallons and one gallon, respectively. Roswell Fire Department personnel responded to the spill incidents and responded appropriately. No additional enforcement actions were necessary. During the 2017-2018 reporting cycle three illicit discharge incidents were discovered. Appropriate follow-up was conducted as outlined in the spill response plan. No additional enforcement actions were necessary.
- *Proper Management and Disposal of Used Oil and Toxic Materials* – The Roswell Recycling Center accepts motor oil, antifreeze, used cooking oil, automotive batteries, printer cartridges, tires, electronics and latex paint from residents. The Recycling Center also hosts Household Hazardous Waste collection events that accept many more hazardous chemicals. During the 2017-2018 reporting cycle, three Household Hazardous Waste collection events were held where 26 tons of hazardous material was collected and then properly disposed.

4.2.3 Industrial Facility Stormwater Discharge Control

Roswell's MS4 permit requires that a program be implemented to monitor and control pollutants in stormwater discharges from industrial facilities to the MS4. To satisfy this requirement, the following measures have been incorporated into the Utility.

Industrial Facility Inventory, Inspections, Enforcement and Education – The compiled industrial facilities inventory list based on the Georgia Environmental Protection Division Industrial Stormwater General Permit, Notice of Intent (NOI's) permits, and No Exposure Exclusion online listings, is reviewed annually and the Utility Industrial Inventory is updated. The Utility conducts inspections of industrial facilities such that 100% of the facilities are inspected in a 5 year cycle. During the inspection, educational literature is distributed to the facility operator describing the dangers of illicit discharges and spills and encouraging best management practices. All six of the industrial facilities were inspected during the 2017-2018 reporting period.

4.2.4 Construction Site Management

Roswell's MS4 permit requires that a program be implemented and enforced to maintain structural and non-structural Best Management Practices to reduce pollutants in stormwater from construction sites to the MS4. To satisfy this requirement, the following measures have been incorporated into the Utility and the City of Roswell Community Development Department.

- *Site Plan Review* – The City of Roswell is a Local Issuing Authority and remains compliant with the Georgia Sediment Erosion Control Act and requires compliance with the Roswell Soil Erosion and Sedimentation Control Ordinance. During the 2017-2018 reporting period, 486 Land Disturbance applications were received, and 474 site plan reviews were conducted. A total of 313 site plans were approved for a Land Development Permit (LDP), 40 plans were denied, and 121 plans were exempt from requiring an LDP because of a small disturbance area and lack of proximity to state waters.
- *Inspection Procedures and Enforcement* – The City of Roswell employs trained and certified land development inspectors. During the 2017-2018 reporting period, 6,856 General Erosion inspections were performed. For sites found to be not in compliance with the plans and applicable ordinances, escalating enforcement procedures are followed. During the 2017-2018 reporting period, 551 violations were reported and resolved.

4.2.5 Highly Visible Pollutant Sources

Roswell's MS4 permit requires that a program be implemented and enforced to control pollutants in stormwater discharges from High Visibility Pollutant Source (HVPS) sites to the MS4. To satisfy this requirement, the following measures have been incorporated into the Utility.

- *HVPS Facility Inventory and Inspection Program* – The Utility maintains an inventory of businesses and facilities that are considered to be a source of highly visible sources of pollutants. The inventory is updated annually and the Utility conducts inspections of HVPS businesses and facilities such that 100% of the facilities are inspected in a 5 year cycle. As of the 2017-2018 reporting cycle, 210 locations were listed as HVPS facilities and the Utility inspected 100% of the facilities.

- *Enforcement and Education* – If a facility is found to have an illicit discharge during an inspection, escalating enforcement procedures as described in the approved Enforcement Response Plan (See Appendix) are enacted. During the 2017-2018 reporting cycle, three enforcement actions were taken and all compliance issues were resolved. During HVPS inspections, literature is distributed to facility owners about illicit discharges and stormwater best management practices. This information is also mailed to HVPS facilities annually.

4.2.6 Monitoring for Discharges to Impaired Waterbodies

Roswell’s MS4 permit requires that impaired water bodies be identified, and that the permittee propose a program to monitor and address pollutants of concern. To satisfy this requirement, the following measures have been incorporated into the Utility.

- *Identification, Monitoring and Implementation* - The Utility annually reviews Georgia EPD’s 305(b)/303(d) list of waters within the Roswell jurisdiction that are listed as not supporting their designated use. The Utility has a monitoring and implementation plan for Foe Killer Creek, the lower portion of Willeo Creek, Big Creek, and Hog Waller Creek. The Chattahoochee River and Little River are monitored by others. The plans include quarterly monitoring of water quality and evaluation of trends in water quality. Plans are updated and revised every 5 years.
- Along with the 2017-2018 Annual Report, a revised monitoring and implementation plan for Foe Killer Creek was submitted and approved.
- Roswell works closely with the City of Alpharetta and with Cobb County to share water monitoring data and monitoring responsibilities.
- As seen in Table 4-1, the constituent of pollution is Fecal Coliform Bacteria in each of the analyzed creek/river reaches. Fecal Coliform Bacteria is a generic term and does not distinguish between species of animal/human. Bacteria Source Tracking (BST) was conducted to evaluate the source of the bacteria in creeks in Roswell. Bacteria originating from Canine feces were found in the highest concentrations in sampled waters.
- As a result of annual monitoring, portions of Willeo Creek and a section of Rocky creek have been De-Listed (removed from the 305(b)/303(d) Impaired Streams list) because monitoring successfully showed the these sections are supporting their designated use.

4.2.7 Public Education and Involvement

Roswell’s MS4 permit requires that a public education program be conducted that addresses water quality issues and the protection of water resources, as well as encouraging the use of LID practices. To satisfy this requirement, the following measures have been incorporated into the Utility.

- *Rivers Alive* – This annual event is a joint effort between the City of Roswell, Keep Roswell Beautiful and the Chattahoochee Nature Center where litter is removed from creeks and rivers within Roswell by volunteer groups. During the 2017-2018 reporting year 140 volunteers collected and removed 380 pounds of litter from creeks and rivers.
- *Tree Recycling Program* – “Bring One for the Chipper” Christmas tree collection and recycling collects trees, chips and distributes mulch to residents in Roswell. During the 2017-2018 reporting period 575 trees were collected and chipped.

- *Educational Workshops* – A total of 22 educational workshops at various schools throughout the city that focus on non-point source pollution prevention were conducted. A total of approximately 1,998 students were educated during the reporting period.
- *Community Outreach* – Five community outreach events were conducted aimed at the population of the City as a whole. A total of 1,453 people participated in these events.
- *Adopt A Stream* – Three groups monitor Adopt-A-Stream locations and donated 16 hours during the reporting period.
- *Chattahoochee River Keeper Partnership* – Roswell partners with the Chattahoochee River Keeper for Neighborhood River Watch. This partnership monitors nine sites weekly or bi-weekly.
- *Storm Drain Stenciling and Door Hanger Distribution* – During the 2017-2018 reporting period, 284 storm drains were stenciled to help provide public awareness that storm drains flow to creeks. A total of 993 door hangers were distributed in areas deemed at high risk of stormwater pollution. This work was accomplished by 45 volunteers over 150 hours of volunteer time.

4.2.8 MS4 Annual Report

Roswell's current NPDES MS4 Permit was issued June 11, 2014 and expires June 10, 2019. Phase I communities are required to compile an annual report covering the period from May 1 to April 30 of a given year (e.g., May 1, 2017 to April 30, 2018). The annual report is due June 15 of the given year (e.g., June 15, 2018) and summarizes the inspections, enforcements, activities, evaluations, and education outreach that the community has completed during the relevant reporting period. The report includes documentation of nearly every activity that the Utility is responsible to complete.

4.2.9 EPA Audit

In December 2016, Roswell was the first among many municipalities in the Atlanta metropolitan area and other areas of Georgia to be audited by EPA staff for compliance with the NPDES MS4 Permit. The three day audit evaluated records and record keeping, standard office and field procedures, forms used, formal and informal practices, and applicable ordinances and rules used to implement the MS4 Permit. A number of observations and recommendations were made by EPA staff to improve the MS4 Permit implementation. The Utility and other Roswell staff implemented changes to procedures, policies, practices to efficiently and effectively implement the MS4 Permit. In December 2017, the City and EPA legal counsel agreed that no further action was required by the City.

5.0 Capital Improvement Program

Between Fiscal Year 2012 and Fiscal Year 2018, approximately \$5.9 million has been spent on capital improvements to the stormwater system. Prior to the formation of the Utility, the CIP list included approximately \$16 Million of needed system improvements.

- Dedicated CIP funding has allowed many previously identified projects to be completed. The CIP backlog of projects is approximately equal to the CIP backlog at the inception of the Utility. While many projects were completed from the CIP list, additional projects were added the CIP list as projects were identified.
- At the inception of the Utility, a single 3-person O&M crew was employed. In 2014 the addition of three more people allowed a second crew to be staffed. With the addition of the second crew, larger and more complex projects were able to be completed in-house.
- The Utility also began to utilize pipe lining and spray-casting technology that reduces the cost of pipe replacement projects because less excavation is required to repair the pipe as compared to traditional construction.

5.1 CIP Criteria Explanation

As inspections and maintenance of the existing system occurs, as comments from citizens and interested parties are received, and as new development occurs in the City, drainage problems and opportunities are discovered which affect the MS4. It is necessary to rank projects as they are discovered so that limited CIP funds can be allocated to those projects with the highest priority. The following CIP criteria are used to rank projects as they are encountered.

Health and Safety Risk

Protecting the public is the highest priority of the Utility. During the analysis of a project, the likelihood that failing to act could pose a safety risk is evaluated and a score is assigned based on this risk, with a higher score corresponding to a higher risk. Score range between 0 and 20.

Property Damage Risk

Protecting property and infrastructure is an important priority of the Utility. During the analysis of a project, the likelihood that failing to act could result in property damage is evaluated and a score is assigned based on this risk, with a higher score corresponding to a higher risk. Score range between 0 and 10.

Ease of Construction

All things being equal, projects which are simpler to complete are preferable to those with significant obstacles for completion. Examples of aspects of a project which affect constructability include steep slopes, deep excavations, the absence of necessary easements, the presence of utilities, and the need to access a project across private property. Scores for this criterion are cumulative with a higher score indicating easier construction. Scores range between 0 and 10.

Paving Schedule

Projects in locations which are scheduled to be repaved soon score higher so that a newly milled and repaved street is not then disturbed by construction. Scores for this criterion are cumulative with a higher score indicating easier construction. Scores range between 0 and 5.

Other Factors

Other factors that may be present can make a CIP project more attractive. Some examples of other factors that can influence a project’s place on the CIP list include alignment with City goals, a project that supports a compliance goal, projects that support Watershed Improvement Plans, and the availability of external funding. Scores for this criterion are cumulative with a higher score indicating easier construction. Scores range between 0 and 10.

5.2 Completed Capital Projects

From FY 2012 to FY 2018, a total of 62 CIP projects were completed. Table 5-1 lists the backlog of projects per fiscal year. Tables 5-2 provide a summary of the number of completed projects since the Utility inception and the number of projects currently on the CIP list. Note that the backlog of CIP projects is nearly unchanged, even though money is spent each year to complete CIP projects.

Table 5-1 CIP Backlog per Fiscal Year

Fiscal Year	Approximate CIP Backlog	Percent Increase Compared to FY 2012
2012	\$ 15,800,000	
2013	\$ 16,500,000	4%
2014	\$ 16,400,000	4%
2015	\$ 17,800,000	13%
2016	\$ 15,200,000	-4%
2017	\$ 14,700,000	-7%
2018	\$ 14,300,000	-9%

Table 5-2 Projects Completed and To Be Completed by Project Type

Project Type	Completed CIP Projects 2012-2018	Identified Projects on CIP List as of July 2018	Estimated Construction Cost
Drainage System Replacement	15	22	\$3,400,000
Drainage Structure Replacement	12	18	\$700,000
New Drainage System Construction	0	9	\$2,000,000
Pipe System Lining	21	36	\$5,600,000
Large Maintenance	11	55	\$1,300,000
Watershed Improvement Plans	3	5	\$1,300,000
Total	62	145	\$14,300,000

5.3 Current Capital Projects

Using the CIP criteria explained above, all identified projects are evaluated and prioritized. Table 5-3 presents a list of priority projects for the Utility. This table is highly subject to change based on new information including the discovery of a structure in danger of eminent failure; new projects discovered which are higher priorities, internal manpower to manage projects, and budget constraints. The complete list of CIP projects is included as Appendix 5-1.

Table 5-3 Partial CIP Project List

Project Name	Project Type	Cost Estimate*
Martin Road DSUR3	Pipe System Lining	\$ 162,000
Martin Road DSTR1	Pipe System Lining	\$ 88,000
Mountain Park Road	Maintenance	\$ 53,000
Azalea Drive psl1	Pipe System Lining	\$ 296,000
Kensington Pond Court	Pipe System Lining	\$ 58,000
Martin Road DSUR12	Pipe System Lining	\$ 117,000
225 Hollyberry Ln	Pipe System Lining	\$ 52,000
2455 Powder Ridge	Pipe System Lining	\$ 24,000
Old Roswell Road	Maintenance	\$ 9,000
Amberside Court	Pipe System Lining	\$ 175,000
Cold Harbor Drive	Pipe System Lining	\$ 121,000
Huntwick Road	Pipe System Lining	\$ 231,000
Shady Marsh Trail	Pipe System Lining	\$ 242,000
LAKE FOREST WAY	Pipe System Lining	\$ 6,000
Pinebrook Road	Pipe System Lining	\$ 79,000
Hedgerose Lane	Pipe System Lining	\$ 21,000
Brightened Crest	Pipe System Lining	\$ 182,000
10475 Crabapple Rd	Maintenance	\$ 72,000
Kingsridge Dr	Pipe System Lining	\$ 39,000
Willow Stream Ct.	Pipe System Lining	\$ 36,000
Balmoral Lane	Pipe System Lining	\$ 186,000
Pine Gove Point Dr	Pipe System Lining	\$ 11,000
Winnmark Drive	Pipe System Lining	\$ 55,000
Old Alabama Rd	Maintenance/new pipe/str	\$ 92,000
Charleston Trace	Maintenance	\$ 18,000
Brookfield Club Drive	Storm Pipe Replacement	\$ 4,000

*Cost Estimates are in the process of being updated and are highly subject to change.

6.0 Financial Analysis 2012 Through 2018

The purpose of the financial analysis of this Master Plan is:

- To describe the rate structure and sources of revenue to the Utility;
- To elucidate the projects, programs, and personnel which have been funded since the inception of the Utility; and
- To understand the current status of required programs and capital improvement priorities that are the responsibility of the EPW Department.

6.1 Stormwater Fund Rate Structure

The Utility rates are based on the Equivalent Residential Unit (ERU). ERU concept is the most frequently used system for stormwater utility fee determination in the United States. The ERU system aims for fees to be assessed based on impervious area to reflect the impact of the impervious area on the overall system, and to recognize that parcels with more impervious area have a larger impact on the stormwater system than parcels with less impervious area.

During the preparation period for the Utility, impervious area billing customer classes were developed. Residential properties were categorized into one of four billing classes (Tier 1, 2, 3, & 4). A fifth customer class (Tier 5) was developed for non-residential properties. Fees are based on tiers.

6.1.1 Customer Class Information

Customer classes were designated based on impervious area according to the approved rate structure. There are a total of 25,809 customer accounts billed by the Utility. Figure 6-1 shows the breakdown by customer class as a segment of all customers in the Utility based on 2018 billing data.

Figure 6-1 Stormwater Utility Accounts by Customer Class

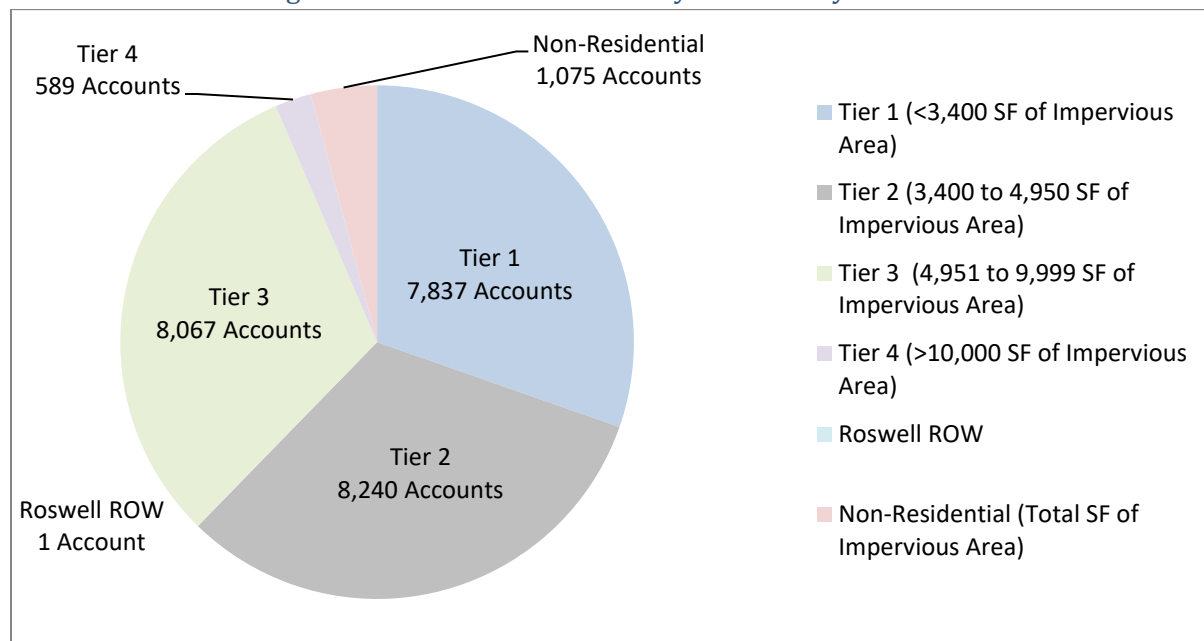
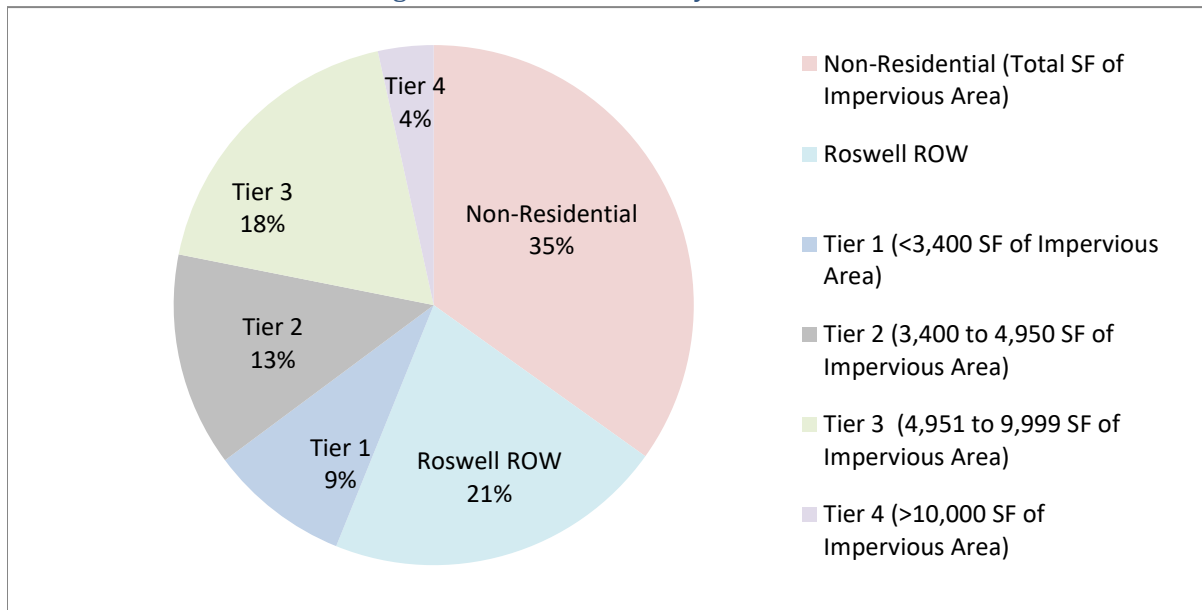


Figure 6-2 shows the breakdown of revenue generated by each customer class based on 2018 billing data. 94% of the Utility accounts are Tiers 1, 2 or 3 residential properties. The average rate paid among residential customers with less than 10,000 sf of impervious area is \$4.16 per month. The City of Roswell is the largest single rate payer to the Utility, reflecting the amount of impervious road surfaces within the City right-of-way.

Figure 6-2 Revenue by Customer Class



6.1.2 Utility Fees Comparison

Stormwater Utilities – National Comparison

Many communities around the United States have established stormwater utilities as a source of revenue dedicated to fund the communities’ stormwater program. The Western Kentucky University Stormwater Utility Survey 2018 (WKU Utilities Survey, 2018, Appendix 6-1), has identified 1681 stormwater utilities in the US. Utilities employ a variety of fee structures for commercial and residential customers. The national average monthly residential fee is \$5.34.

Stormwater Utilities - State of Georgia Comparison

As of 2017, Roswell Utility is one of 66 stormwater utilities operating in Georgia (WKU Utilities Survey, 2018). The Georgia Environmental Finance Authority (GEFA) conducted a survey of utilities to gather fee and billing information and published this data in its 2016 *Georgia Stormwater Utilities Report*⁽¹⁾, last updated in March 2017 (GEFA, 2017, Appendix 6-2).

Roswell Comparison

The average monthly residential rate paid among residential customers with less than 10,000 square feet of impervious area is \$4.16 per month, 22% less than the national average residential customer monthly charge of \$5.34.

Roswell Utility fees have been inserted into the GEFA 2017 database for comparison to the utilities in Georgia who participated in the survey. As seen in the Figure 6-3 which compares residential Utility rates, Roswell's Utility rates is in the 29th percentile, with 71% of the participating utilities charging a higher Utility fee for residential customers with similar amounts of impervious area. Figure 6-4 shows similar results with Roswell's Utility rates is in the 16th percentile, with 84% of the participating utilities charging a higher Utility fee for commercial customers with similar amounts of impervious area.

6.2 Stormwater Utility Financial Data

The City of Roswell Finance department compiled Table 6-1 which presents financial information for the Stormwater Utility Fund. Revenue and revenue sources are presented by fiscal year. Expenses, grouped into categories, are presented by fiscal year. The categories of expenses include Salaries and Benefits, Operating, Capital Outlays, Interdepartmental Transfers, and Other Financing Uses.

6.3 Utility Fund Revenue

Stormwater rates have remained constant since the inception of the Utility. As new development and redevelopment occur, small increases and small decreases in Utility fund revenue have been recognized. Overall, the annual Utility fee revenue has grown by approximately 2% since the fund was initiated. Figure 6-5 and Table 6-2 summarize revenue information.

Figure 6-5 Annual Revenue FY 2012 to FY 2018

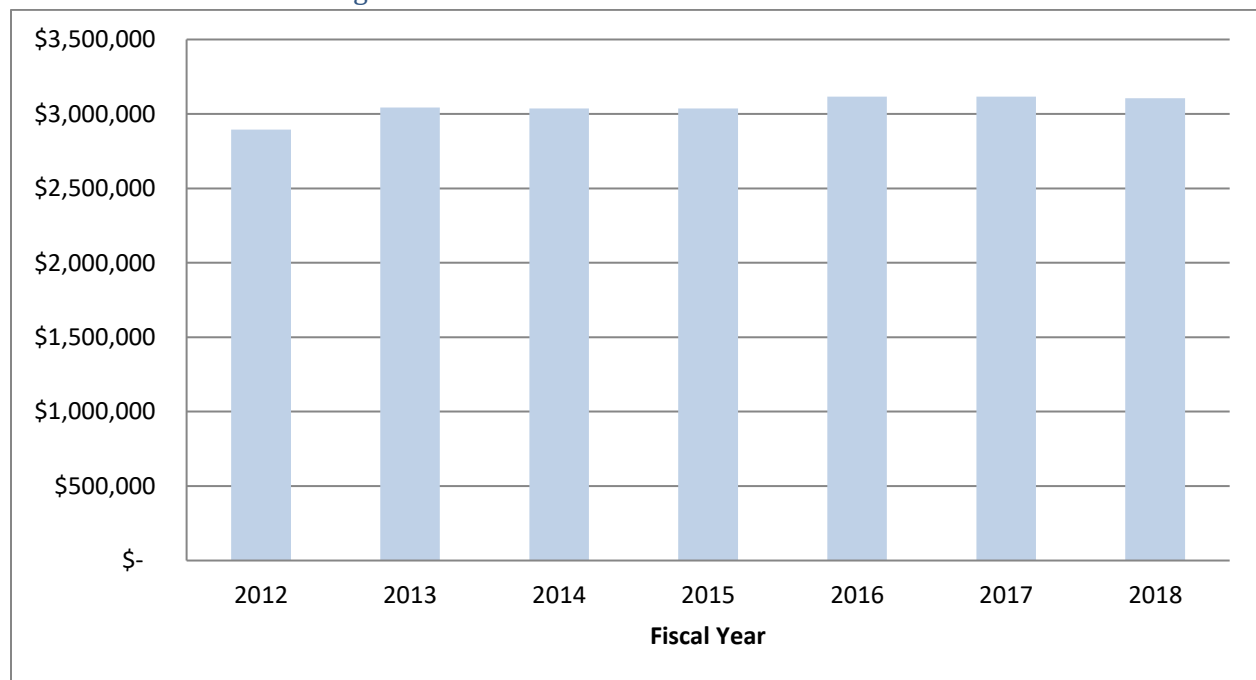


Table 6-2 Revenue per Fiscal Year

Fiscal Year	Stormwater Fee Revenue	Percent Increase Compared to FY 2013
2012	\$ 2,895,720 ¹	NA
2013	\$ 3,042,658	0.0%
2014	\$ 3,036,206	-0.2%
2015	\$ 3,062,904	0.7%
2016	\$ 3,115,457 ²	2.4%
2017	\$ 3,115,457 ²	2.4%
2018	\$ 3,105,758	2.1%

¹2012 was a partial billing year

²2016 and 2017 revenues shown were averaged to account for uneven billing periods

6.4 Utility Expenses

Figure 6-6 provides a snapshot of annual revenue and expenses. Expenditures of the Utility are divided into three broad categories of Operating Funds, Salaries and Benefits Funds and Capital Funds. Figure 6-7 presents the percent of the budget dedicated to each category since the inception of the Utility.

Figure 6-6 Annual Revenue & Expenses FY 2012 to FY 2018

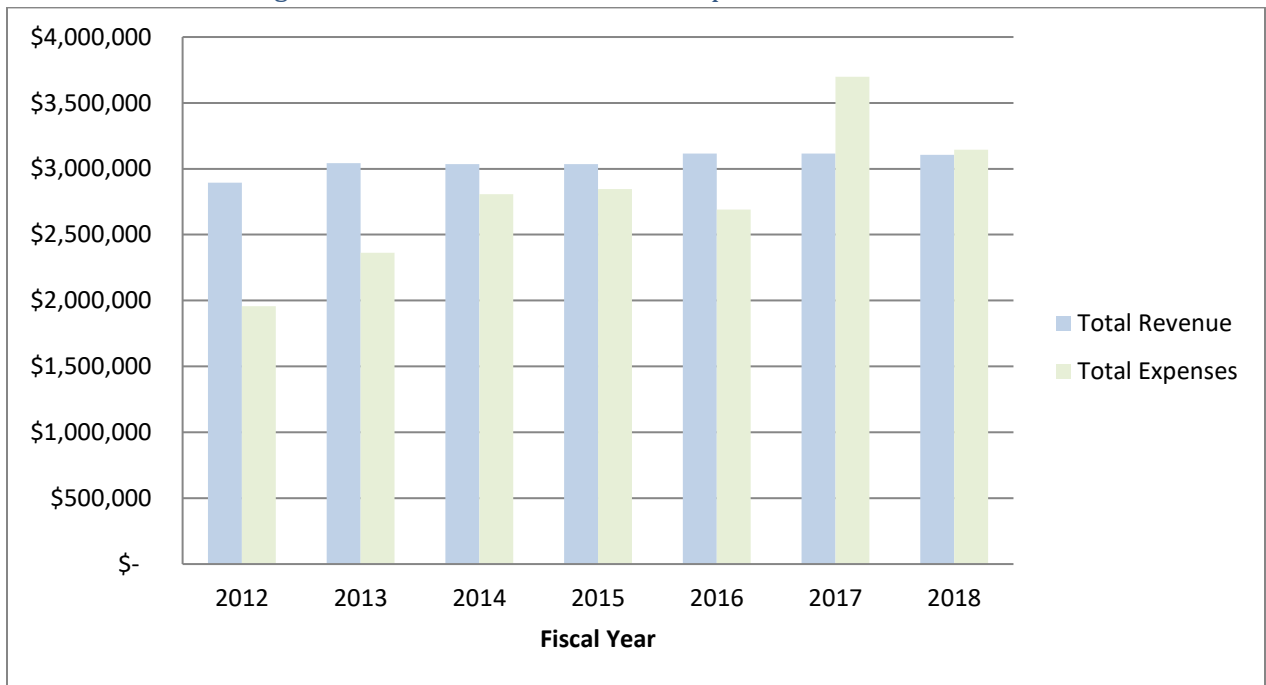


Figure 6-7 Total Expenses FY 2012 to FY 2018

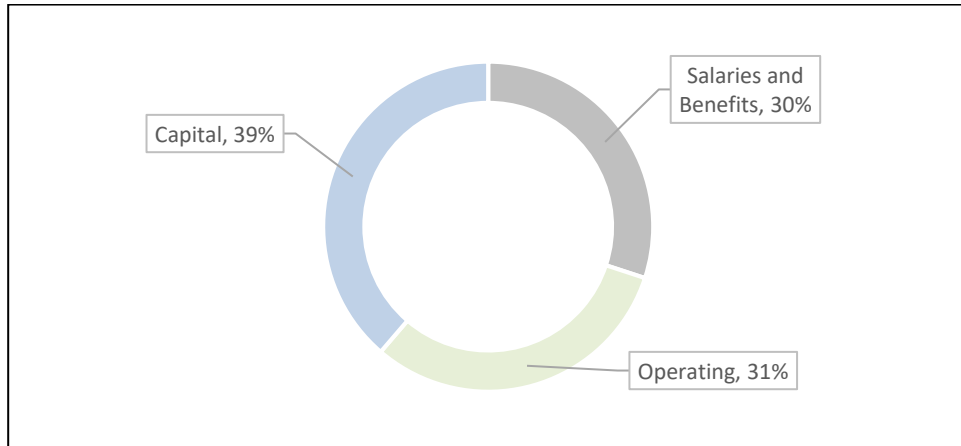
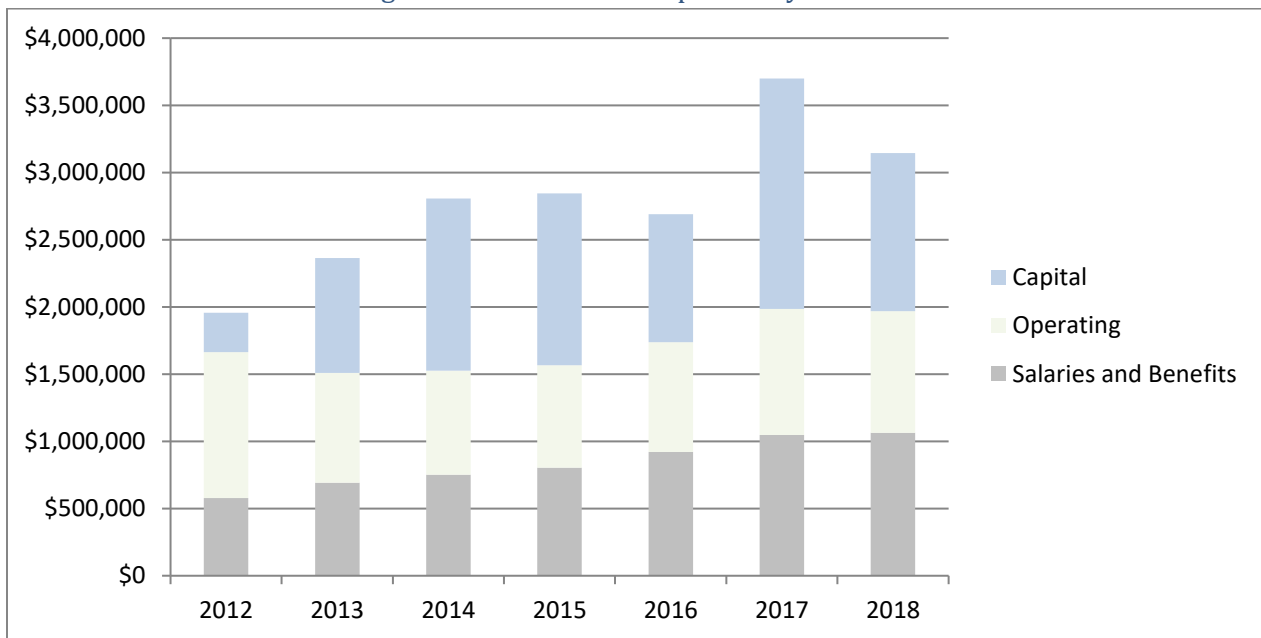


Figure 6-8 presents the amount dedicated to each category per fiscal year. It can be seen that salary and benefit costs have increased since the inception of the Utility. This increase is attributed to hiring additional personnel and to City-wide rises in salary and benefit costs. Operating costs have remained relatively constant. Details on capital spending follow.

Figure 6-8 Overall Expenses by Fiscal Year

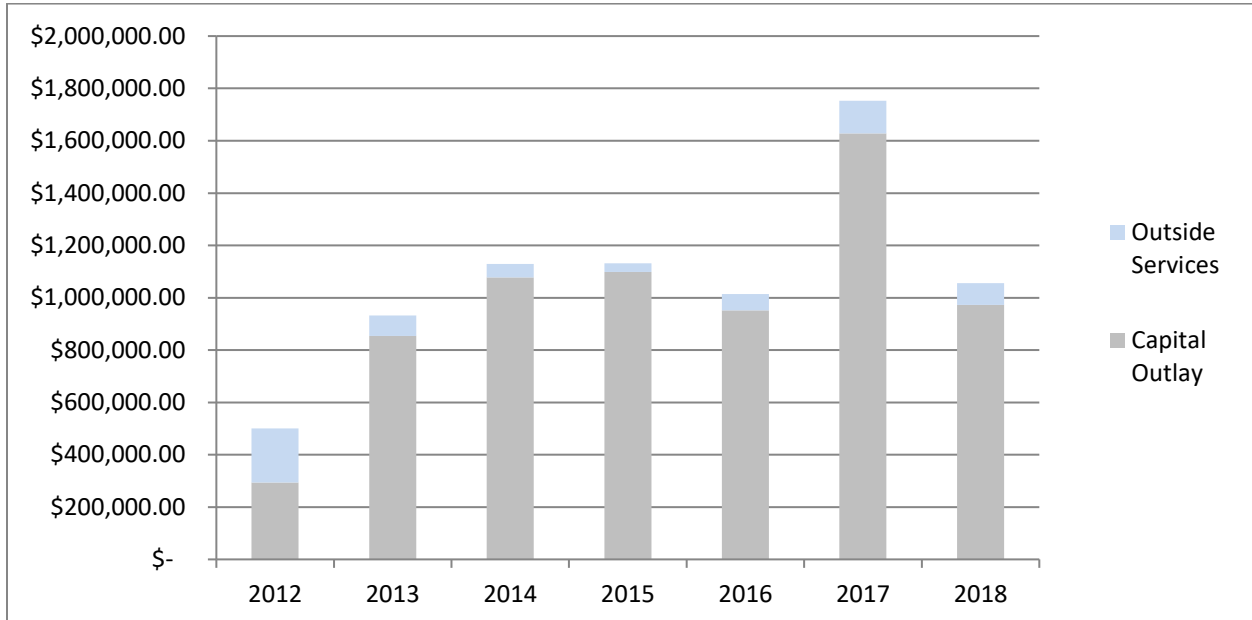


6.4.1 Capital Improvement Program

The Capital Improvement Program catalogues, prioritizes, designs and constructs major improvements and replacements to the stormwater system. Section 5 of this Plan provides detail of the type of projects on the CIP list and the system developed to prioritize projects. In addition to projects, large equipment costs are included in the capital budget. Outside Services, which can include engineering and other professional services in support of capital projects, are sometimes separated from the capital budget. Excluding FY 2012

which was the start-up year for the Utility, capital spending averaged \$1,097,232 for FY 2013 through FY 2018, as shown in Figure 6-9.

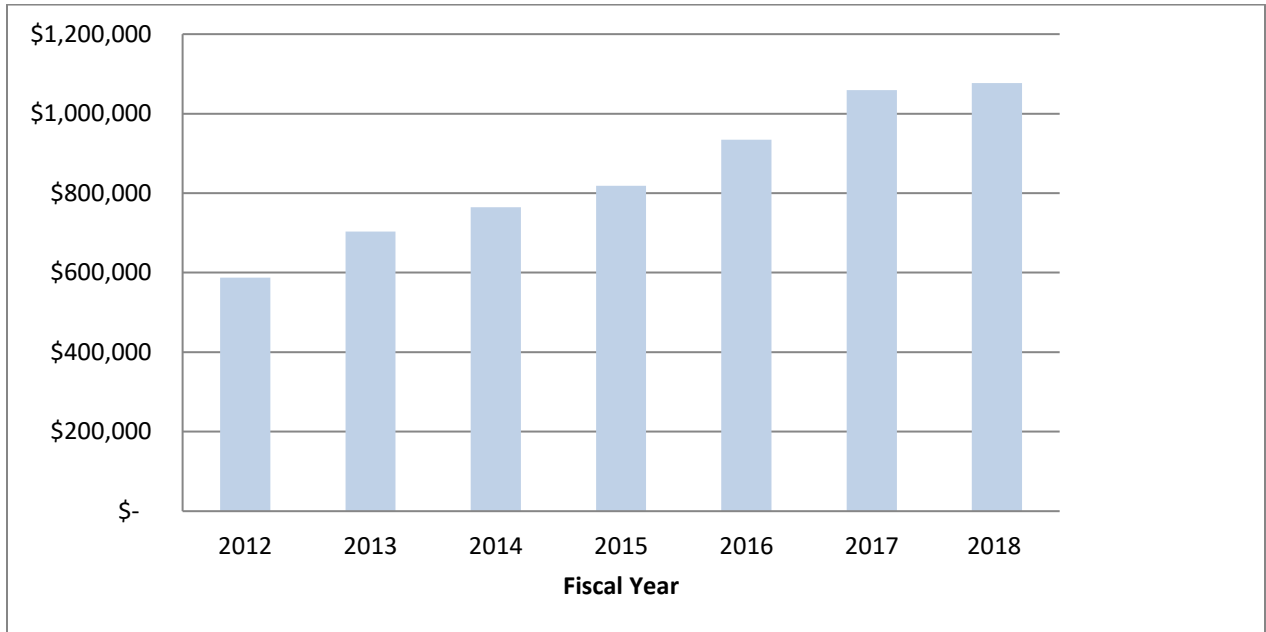
Figure 6-9 Capital Improvement Expenses by Fiscal Year



6.4.4 Salary and Benefits

At the inception of the Utility, the Utility employed 8 full time people and additional management and technical staff who devote part of their time to supporting the Utility for a total of 11.5 full time equivalent people. As of Sept 2018, the Utility employs a total of 11 full time people and additional management and technical staff who devote part of their time to supporting the Utility for a total of 14.5 full time equivalent people. Two Operations and Maintenance crew members and a construction project manager were added during FY 2012 and an additional inspector was added in FY 2018. Figure 6-10 indicates the funds, by fiscal year, spent over the life of the Utility to date on salaries and benefits.

Figure 6-10 Salary and Benefit Expenses by Fiscal Year



7.0 Discussion of Risks and Challenges

Fiscal and structural challenges face the Utility. In many parts of the country, aging infrastructure is a widespread problem and Roswell is no exception. Similarly, challenges that face many industries such as inflation and increased regulation are shared by Roswell and the Utility.

7.1 Aging Infrastructure

The City of Roswell has developed over two centuries and is largely residential with respect to land use. Much of Roswell’s development occurred in the 1970’s and 1980’s. It was common practice to use



uncoated corrugated metal pipe (CMP) as stormwater conveyance pipe. This material is prone to rust and degradation and has a useful life of approximately 25 years, depending on field conditions.

Much of the public stormwater infrastructure associated with this residential development has been installed for 30 or more years. Table 7-1 indicates the age of single family housing by decade. The associated public stormwater infrastructure can be inferred to be of similar age to the housing development. With the prevalence of

CMP stormwater conveyance pipe, it is expected that stormwater pipe failures will increase through time as pipes and structures age.

Table 7-1 Single Family Home Development

Year Built	Single Family Homes Added	Percent of Homes as Compared to the Number of Single Family Homes in 2011	Cumulative Percent of Homes as Compared to the Number of Single Family Homes in 2011
Prior to 1950	250	1%	1%
1950 to 1959	250	1%	2%
1960 to 1969	1000	4%	7%
1970 to 1979	4950	22%	28%
1980 to 1989	8300	36%	65%
1990 to 1999	5900	26%	91%
2000 to 2011	2100	9%	100%

Source: Strategic Economic Development Plan, City of Roswell, Georgia, April 2012, Prepared by RKG for City of Roswell.

7.2 Additional Regulations

On a 5-year cycle, Roswell’s NPDES MS-4 Permit is renewed. At renewal, and occasionally at other times within the permit cycle, additional requirements are added to the permit to which the permittee must comply. An example of additional requirements occurred during the 2014-2019 permit cycle. The

requirement to develop a Green Infrastructure/Low Impact Development (GI/LID) program along with a GI/LID inventory and inspection program became compulsory.

Anticipated changes to the MS4 Permit which will be renewed in 2019 include additional focus on public outreach activities and public involvement activities. Increased documentation requirements are also expected.

7.3 Additional Infrastructure

Each year additional public infrastructure is added to the MS4 system through development in the City. The infrastructure must be added to the appropriate inventory and inspected and maintained as required by the MS4 permit. A Transportation Special Purpose Local Option Sales Tax (TSPLOST) was approved by citizens of Roswell in 2016. These dedicated funds are used to design and construct new roads and associated infrastructure. As these improvements are made to the roads in Roswell, the long-term responsibility for maintenance, repair and replacement of this infrastructure falls onto the Utility.



7.4 Inflation

Construction and maintenance costs are subject to market drivers, and costs to construct projects often increase each year. During the period of 2012 to 2018, the Consumer Price Index for Urban Consumers, a standard measurement for understanding the impact of inflation, has published the statistics as summarized in Table 7-2 for inflation in the US over the life of the Utility. This cumulative inflation reduces the amount of projects that the Utility can construct.

Table 7-2 Annual Inflation

Year	Consumer Price Index For Urban Consumers All Items	Cumulative Consumer Price Index For Urban Consumers All Items
2012	1.76%	1.76%
2013	1.64%	3.40%
2014	2.17%	5.57%
2015	0.34%	5.92%
2016	1.70%	7.61%
2017	3.29%	10.90%
2018	2.51%	13.42%

Source: U.S. Bureau of Labor Statistics (BLS): Consumer Price Index (CPI); Moody's Analytics Estimated and Forecasted

8.0 Pro Forma Analysis

The Priority Based Budget System and 2018 actual financial data provide the basis for the Stormwater Utility pro forma analysis. The Stormwater Utility, with assistance from the Finance Department, prepared a financial pro forma that projects revenues and expenses (operational and capital) for 5 years. Financial forecasts for salary increases, health care costs, and general inflation as tracked by the Consumer Price Index were provided by the Finance Department and are consistent with all City financial forecasting methodologies.

8.1 Revenue Look-Ahead With Existing Rates

Staff from Finance and Environmental/Public Works developed a conservative revenue forecast that includes projecting customer account growth of 0.33% per year which closely represents the historical revenue growth in the Utility. See Figure 8-1 and Table 8-1 below. The revenue forecast also assumes that the rates will be unchanged as they have been since the utility was adopted in 2012. CIP expenditure of \$750,000 per year is projected in the forecast. The Utility fund as of the end of 2019 has an Ending Unrestricted Net Position of \$691,063 after subtracting the \$1,577,981 of previously encumbered funds.

The analysis shows that expenses exceed revenues every year for the next 5 five years reducing the Ending Unrestricted Net Position each year eventually to a net negative position in year FY 2024.

This forecast also provides less money to complete CIP projects than has been spent historically. As discussed in section 6.4.1, the average capital spending equaled \$1,097,232 from FY 2013 to FY 2018. Figure 8-1 indicates a reduced CIP spending amount of approximately \$750,000 per year – a 31% reduction in capital spending from the FY 2013-FY 2018 period. As can also be seen from the forecast, even this reduced spending amount cannot be sustained into the future.

Figure 8-1 Revenue and Expense Forecast Based on Current Rate and Fee Schedule

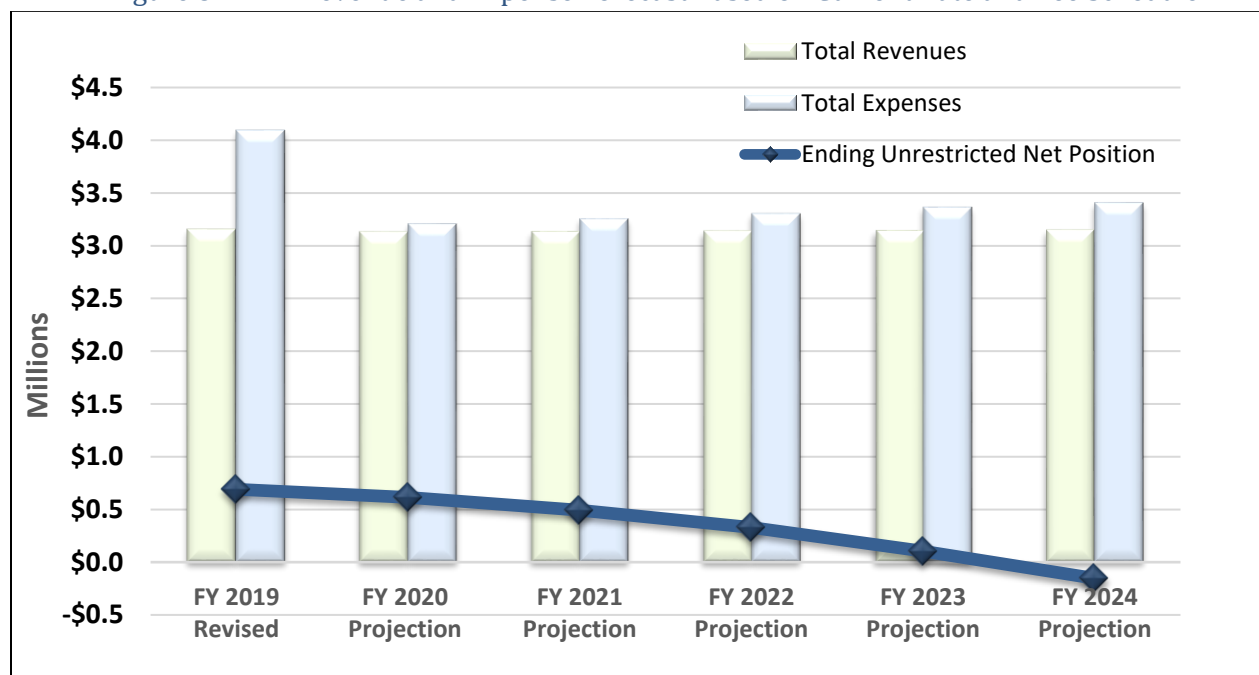


Table 8-1 Revenue and Expense Forecast Based on Current Rate and Fee Schedule

	FY 2019 Revised	FY 2020 Projection	FY 2021 Projection	FY 2022 Projection	FY 2023 Projection	FY 2024 Projection
Total Revenues	3,155,659	3,131,023	3,135,570	3,140,119	3,144,668	3,149,250
Operating Expenses	2,515,033	2,458,811	2,505,427	2,555,808	2,606,582	2,658,258
CIP Expenses	1,577,981	750,000	750,000	750,000	760,000	750,000
Ending Unrestricted Net Position	691,063	613,275	493,417	327,728	105,814	(153,608)

In addition to expenses exceeding revenues, progress on the capital improvement backlog is not being made, even though projects are being completed. It is apparent that the proposed budget of \$750,000, which is a decrease from actual average spending since 2012, will not sufficiently address the spending required to reduce the CIP backlog and maintain permit compliance.

8.2 Revenue Look-Ahead With Rate Increase Equal to Inflation

Staff Considered several future conditions to improve financial stability of the Stormwater Utility. One sustainable forecast is shown in Figure 8-2 and Table 8-2 which shows a 2.5% rate increase beginning in 2020. The rate of 2.5% is proposed because it is approximately the average inflation rate since 2012. The additional revenue would allow the Utility to:

- Restore the CIP budget approximately \$1,100,000 annually.
- Maintain an unrestricted net fund balance of approximately \$600,000 to comply with fiscal requirements and to provide funds for emergency stormwater infrastructure projects.

This increase will allow the fund to continue to make progress completing projects on the CIP list, keep pace with rising construction and permit compliance costs, provide potential flexibility in incorporating more Green Infrastructure into City projects, and maintain an appropriate reserve budget for emergency repairs.

Figure 8-2 Revenue and Expense Forecast Based on Increased CIP Spending and 2.5% Annual Rate Increase Beginning in FY 2020

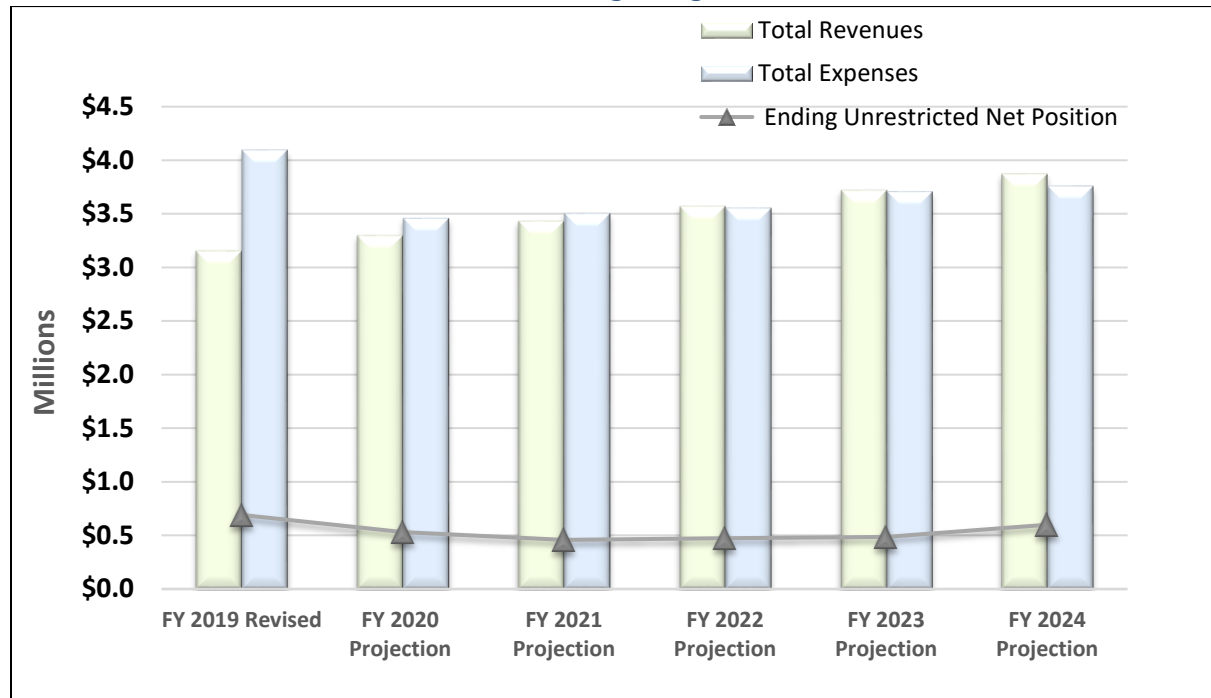


Table 8-2 Revenue and Expense Forecast Based on Increased CIP Spending and 2.5% Annual Rate Increase Beginning in FY 2020

	FY 2019 Revised	FY 2020 Projection	FY 2021 Projection	FY 2022 Projection	FY 2023 Projection	FY 2024 Projection
Total Revenues	3,155,659	3,299,020	3,432,591	3,570,874	3,719,237	3,871,863
Operating Expenses	2,515,033	2,458,811	2,505,427	2,555,808	2,606,582	2,658,672
CIP Expenses	1,577,981	1,000,000	1,000,000	1,000,000	1,100,000	1,100,000
Ending Unrestricted Net Position	691,063	531,271	458,435	473,501	486,156	599,347

Table 8-3 shows the recommended fee adjustment for each billing tier classification under this rate increase scenario.

Table 8-3 Rate Tier Adjustments with 2.5% Annual Rate Increase

Stormwater Utility Billing Classes	Impervious Surface Range	Current Monthly Rate (2019)	Monthly Rate (2020)	Monthly Rate (2021)	Monthly Rate (2022)	Monthly Rate (2023)	Monthly Rate (2024)
Residential Tier 1	Up to 3,400 sf	\$2.57	\$2.63	\$2.70	\$2.77	\$2.84	\$2.91
Residential Tier 2	3401 sf - 4,950 sf	\$3.95	\$4.05	\$4.15	\$4.25	\$4.36	\$4.47
Residential Tier 3	4,951 sf - 10,000 sf	\$5.92	\$6.07	\$6.22	\$6.38	\$6.53	\$6.70
Large Residential Tier 4*	Greater than 10,000 sf	\$3.95	\$4.05	\$4.15	\$4.25	\$4.36	\$4.47
Non Residential/ Commercial*	N/A	\$3.95	\$4.05	\$4.15	\$4.25	\$4.36	\$4.47

*Rate calculated by multiplying total amount of impervious surface times the Monthly Rate divided by 4,100 sf

9.0 Recommendations

Recommendations resulting from the work on this Master Plan have been grouped into five categories: Management, Compliance, Sustainable Infrastructure, Green Infrastructure, and Fiscal Responsibility. Recommendations are further described by applicable timeframe, type of goal, and alignment with adopted City Strategies as outlined in the 2019 Approved Budget. Recommendations are outlined in Table 9-1 and briefly described below.

9.1 Management

9.1.1 Review and Update Construction Standards Every 5 Years

Guidelines will be developed to assign responsibility to review and update the construction standards which are applicable to stormwater development.

9.1.2 Reevaluate the CIP List Every 5 Years

Stormwater infrastructure is constantly being subjected to erosion and other natural and man-caused forces. Guidelines will be developed to outline procedures and assign responsibilities to revisit and rescore projects on the CIP list.

9.1.3 Review Master Plan Annually and Update Every 5 Years

To be most useful, the Utility Master Plan must be consulted, revised as priorities and conditions change, and updated regularly. Guidelines will be developed to define the consultation, review, and update process, and assign responsibilities for this work.

9.1.4 Coordinate CIP Projects with Other Department's Activities

Coordinating projects which are co-located can save money and reduce overall public inconvenience as compared to undertaking two projects separately. Guidelines will be developed to outline a process for interdepartmental coordination to aid in identifying projects which occur in locations where the Utility has an existing CIP project.

9.1.5 Maintain the Current EOS/LOS

The approved Extents of Service and Level of Service policy provides framework for making objective and consistent decisions regarding allocation of Utility staff and capital resources. Reliance upon the existing EOS/LOS will continue.

9.1.6 Evaluate City Projects for GI Inclusion

Guidelines will be developed to define guidelines and set the process for evaluating projects that the City of Roswell is considering, for opportunities to include Green Infrastructure.

9.1.7 Evaluate All Cross Drains

A project will be completed to locate, inspect, and classify by condition all cross drains in the City ROW.

9.1.8 Update Impervious Surfaces GIS Data and Evaluate Billing Annually

Guidelines will be developed to capture changes on an annual basis to the impervious surfaces GIS data, as a result of public and private development. The SOP will also outline a procedure for annually evaluating billing data, which may be revised as a result of additional impervious surfaces.

9.1.9 Continue to Provide Leadership for the Green Infrastructure Livability Team

The interdepartmental Green Infrastructure Livability Team champions the inclusion of green infrastructure in Roswell by educating City staff, introducing innovative solutions, evaluating projects, proposing new projects, and by sponsoring projects. Utility staff is dedicated to continuing this important work.

9.1.10 Develop Procedures for Connecting to the Public Storm System

Establishing a physical connection between the public storm system and a private system is sometimes unavoidable. In conjunction with other City Department, guidelines will be developed to describe situations in which connections are allowed, outline process and documentation required for allowing connections, and provide technical guidance and minimum standards for making these connections.

9.1.11 Support Digital Data Submission

In conjunction with other departments, the Utility supports the requirement for digital submission of proposed plans and as-built plans for projects going forward.

9.1.12 Develop and Update Standard Operating Procedures

The Utility will develop new SOP's as needed to address specific procedures. All SOP's will be updated every 5 years.

9.1.13 Update the Stormwater Utility Credit Manual

The Utility will revisit the stormwater utility credit manual to evaluate the ability to expand or modify the process of allowing and encouraging stormwater utility credits for lower impact developments.

9.2 Compliance

9.2.1 Pet Waste Outreach Program

Roswell has several segments of streams which exhibit below standards water quality. The most frequently encountered pollutant is caused from dog waste. The Utility will develop a program to combat this pollutant which could include public information, giveaways, and structural practices.

9.2.2 Provide Training to Mobilize Interested Citizens to Positively Impact Streams

Most streams in Roswell flow along private property. Homeowners are often interested in improving the health of streams and stability of stream banks. The Utility will develop a program to mobilize interested citizens in improving stream health. This program could include organizing stream walks to collect stream health information and holding homeowner-specific streambank stability workshops.

9.2.3 Request Modified MS4 Reporting Frequency/Streamlined Annual Report

The Utility spends a considerable amount time compiling and proving data for the MS4 Annual Report. Utility Staff will continue to take opportunities to request a streamlined reporting process for the MS4 Program Annual Report to allow staff to direct efforts to compliance activities which more directly improve our environment.

9.2.4 Develop MS4 Compliance Guidelines

The Utility compiles the MS4 Annual Report between April 30 and June 15 each year. Data from various city departments and activities is necessary to complete the report. Guidelines will be developed to define requirements, assign responsibilities, and to streamline reporting where possible.

9.3 Sustainable Infrastructure Recommendations

9.3.1 Expand the Ability of the Utility to Install Reinforced Concrete Pipe

Reinforced concrete pipe (RCP) has a useful life several times longer than metal pipe, and is much stronger than plastic pipe. Utility staff has set the goal of expanding its ability to install RCP. This goal will be met by purchasing larger equipment and expanding staff training which will enable the O&M team to complete larger projects in house, thereby reducing the cost to build projects and increase lifespan the installed infrastructure.

9.3.2 Expand the Ability to Perform and Manage CIP Projects

The Utility has set the goal of expanding the ability to complete CIP projects using existing staff. Additional training will be provided to staff and resources will be reallocated by leveraging outside resources as appropriate, to increase the number and scope of CIP projects that the Utility completes each year. Project design will be managed with the goal of maintaining a six month backlog of designed and permitted projects.

9.4 Green Infrastructure

9.4.1 Prepare Overall Maintenance Plan For City-Owned GI Infrastructure

GI infrastructure includes structural installations as well as management practices. A comprehensive maintenance plan will be developed to categorize facilities and practices, establish maintenance practices and timelines, and to assign responsibilities for completing the work. Included in the Overall maintenance plan will be a GI installation and maintenance training program for EPW staff and for staff in other City departments.

9.4.2 Encourage Participation in the Shared Stormwater Project Account

Roswell's elected officials have approved a shared stormwater facility policy whereby the City and interested parties can agree to use a City-owned stormwater facility for treatment or detention of stormwater by another party. The Utility will continue to pursue opportunities to participate in shared stormwater facility agreements.

9.4.3 Monitor the Hydraulic Performance of Pavers on Myrtle/Zion

A short term monitoring project will be completed with the goal of obtaining a clearer understanding the hydraulic performance of the paver system at Myrtle Street and Zion Circle.

9.4.4 Conduct Education/Outreach to the Development Community

In cooperation with other City departments, An education program will be developed to provide stormwater related training for contractors, engineers and other interested parties. The goals of this program will be to increase awareness, achieve better installations, and encourage better management and maintenance practices.

9.5 Fiscal Responsibility

9.5.1 Restore CIP Budget to \$1.1M

The ability for the Utility to design, manage, and construct CIP projects is highly dependent on funding. The current forecast reduces CIP funding from an average of \$1.1M to \$750,000 and indicates that further reduction in CIP spending will be necessary to offset rises in other parts of the Utility program.

9.5.2 Maintain \$0.5M CIP Fund Balanced Earmarked for Stormwater Infrastructure Emergencies

In addition to required fund balances, the Utility has an ongoing goal of maintaining a fund balance to be used in the case that stormwater infrastructure emergency projects occur.

9.5.3 Prepare Cost Estimates for 5-Year CIP Backlog

This short term project will prepare cost estimates for the CIP projects envisioned to be constructed during the next 5 fiscal years. The Utility has a long term project of developing an SOP to outline procedures and assign responsibilities for updating CIP cost estimates at the end of each fiscal year.

9.5.4 Adopt Inflation Based Increases in Utility Fee

The Environmental/Public Works Department will request a policy that the Utility fee be increased by the amount equal to inflation of the prior year to better allow for long term fiscal soundness and to allow the Utility to continue to meet its obligations.