Stormwater Utility Development and Implementation

Prepared for the

Athens-Clarke County Government
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1. INTRODUCTION

1.1 Background

Athens-Clarke County (A-CC) is a unified city/county government formed in 1991. A-CC serves an area of approximately 120 square miles, with a population of approximately 100,000. The county's population is growing at a average annual rate of around 1.2 percent.

In November of 2001 the Unified Government of Athens-Clarke County completed a Stormwater Master Plan. The object of the Master Plan was to develop recommendations to:

- Minimize Property Damage,
- Protect Existing Watersheds,
- Help Manage Land Development Activities, and
- Identify and Plan Needed Drainage Improvements.

The Plan identified 228 flooding/drainage problems scattered throughout the county. Staff submitted a prioritized list of problems and associated recommended solutions to the Mayor and Commission in the spring of 2002. The estimated cost for just the 64 Priority-1 projects was over $10,000,000.

In March 2003, the Unified Government of Athens-Clarke County came under the regulations of the NPDES stormwater Phase II permit. The permit requires the County to reduce pollutants discharged to waters of the state to the maximum extent practicable. This is to be done through the development and implementation of six minimum controls:

- Public Education and Outreach
- Public Participation
- Illicit Discharge Elimination
- Construction Site Erosion Control
- Post-Construction (long-term) Stormwater Controls
- Good House Keeping Practices for Municipal Practices/Programs

The multi-year program that has been developed for the first five years of the permit is estimated to add over $1,500,000 to the annual cost of the county's stormwater program.

A-CC concluded in its *Funding Action Strategy Plan* (September 2003) that the General Fund could no longer keep up with the increasing program costs identified by the County's *Stormwater Master Plan* and regulatory requirements of the County's NPDES Stormwater Phase II Permit. Annual expenditures for stormwater are projected to increase from an existing level of around $1.4 million to over $3.0 million. Capital improvements identified in the Master Plan would require an additional $2,600,000 annually to the cost of the program.

1.2 Funding Challenge

The challenge for A-CC is to devise a way to adequately fund the expanded stormwater management programs. The County Commission adopted the recommendations of the *Funding Action Strategy Plan* (2003) and the Stormwater Advisory Committee in October 2003 to adopt a comprehensive financing approach that utilizes SPLOST, developer

fees and stormwater services fees. The primary objective of this project is the development and implementation of the stormwater services fee.

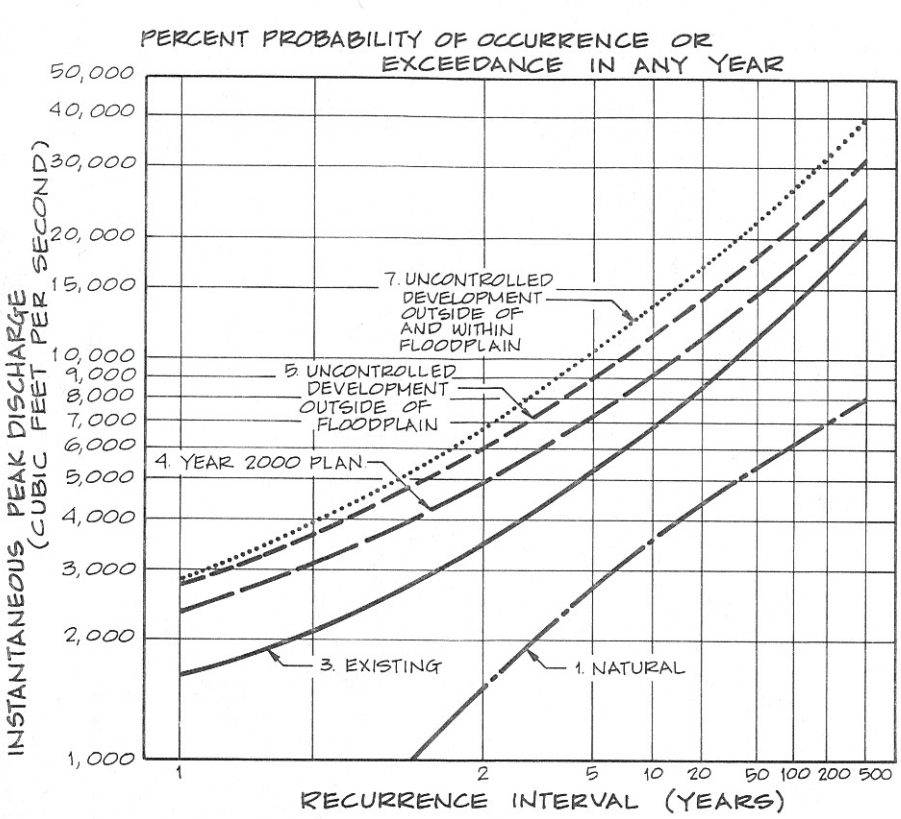
1.3 The Problem With Stormwater

Whether we realize it or not, we all contribute to the problems of stormwater runoff.

Changing the natural landscape with the addition of each home, building, factory and roadway, increases the volume of runoff as well as the rate that stormwater runs off the land. Leopold (1968) estimated that the runoff volume from a moderately developed watershed would increase 50 percent over "natural" conditions for the same amount of rainfall. Development also decreases that time for stormwater runoff to reach the stream by as much as 50 percent, which in combination with greater runoff volumes increase the peak runoff rate by 200 to 500 percent.

Increased impervious area reduces the amount of rainfall soaking into the ground to replenish the groundwater. Therefore, many small streams fed by groundwater begin to "dry up" as their watershed becomes developed (Schueler, 1987). This results in streams becoming more "flashy" (i.e. little flow during dry periods but rushing torrents during rain events).

Even if peaks are controlled to predevelopment rates, the frequency at which a particular discharge will occur also increases. Figure 1-1 shows the increased frequency at which flood events will occur in a watershed as it becomes developed (Walesh and Videkovich 1978). In this example, a peak discharge that under "natural " conditions occurred on average every two year is now occurring annually and a flood event that use to occur on average rainfall every 100-years now has a recurrence interval of somewhere between five to ten years.



Further, pollutants generated by urban development are washed off with every rainfall degrading water quality and reducing the number and diversity of organisms in the stream. The US-EPA estimates that nonpoint source (NPS) pollution is responsible for approximately 40 percent of the Nation's water quality problems. Of the roughly 320 miles of streams in A-CC, approximately 55 miles are reported as having impaired water quality. This costs water rate payers in A-CC more to remove the pollutants that stormwater washes into the streams and places greater limits on the County's waste treatments facilities.

Without proper management, stormwater will limit the availability of clean water that will be needed for future growth within A-CC. The problems created by not properly managing stormwater detracts from the quality of life in our communities and creates problems that will carry over to future generations.

1.4 Stormwater User Fee

A stormwater utility would be a fee for services that are being provided by A-CC. The objective of the rate structure is the fair and equitable distribution of the cost of stormwater management to those who are creating the demand for the services provided by the County. There are two parts to any rate structure. The first determines how costs are allocated to a customer (rate structure). The second is what costs (services) should be charged to each customer (service nexus). Since stormwater is not metered, like electricity or water, other methods must be developed to determine ones impact and use of the system and services that are being provided.

There are hundreds of communities without the United States that have stormwater utilities. Currently there are six stormwater utilities in the Sate of Georgia:

- Columbia County
- City of Conyers
- City of Griffin
- City of Decatur
- DeKalb County
- City of Fayetteville

2. STORMWATER ISSUES

2.1 Stormwater Management Master Plan

In May 1992, the Unified Government of Athens-Clarke County implemented a stormwater management ordinance to limit the impact of new development on the flooding of area waterways.

In November of 2001 the Unified Government of Athens-Clarke County completed a Stormwater Master Plan. County leaders realized that a comprehensive approach to stormwater management was needed to ensure that there would be adequate infrastructure to support continued growth in the county.

There are 17 major watersheds within the county covering over 110 miles of streams. The object of the Master Plan was to develop recommendations to:

- Minimize Property Damage,
- Protect Existing Watersheds,
- Level-1 Help Manage Land Development Activities, and
- Identify and Plan Needed Drainage Improvements.

The Plan identified 228 flooding/drainage problems scattered throughout the county (Table 2-1). The problems and associated recommended solutions were categorized into four categories, Level 1, Level 2, Level 3 and Drainage Concerns. Level I hazards, nuisances, and flooding problems on public or private property that had been reported/observed and verified through analyses that were within A-CC's rights-of-way or county owned easements. Level II problems were identified from the analyses of modeled conditions, but had not been previously reported/observed. Level III problems required solutions above the system design frequency/level of services criteria because of unusual impacts to public or private properties or emergency ingress/egress. Drainage Concerns included minor local drainage issues that were outside of the ACC jurisdiction or current administrative policy or that are on private property. These included problems associated with the Georgia Department of Transportation (DOT), University of Georgia property. The location of each problem is shown on the Problem Location Map (Figure 2-1). Cost estimates were developed for each of the corrective alternatives for each of the Level I and Level II problems identified. The estimated cost for just the 64 highest priority projects was over $13,200,000. Another $10,854,000 was estimated to correct the 91 Level II problems.

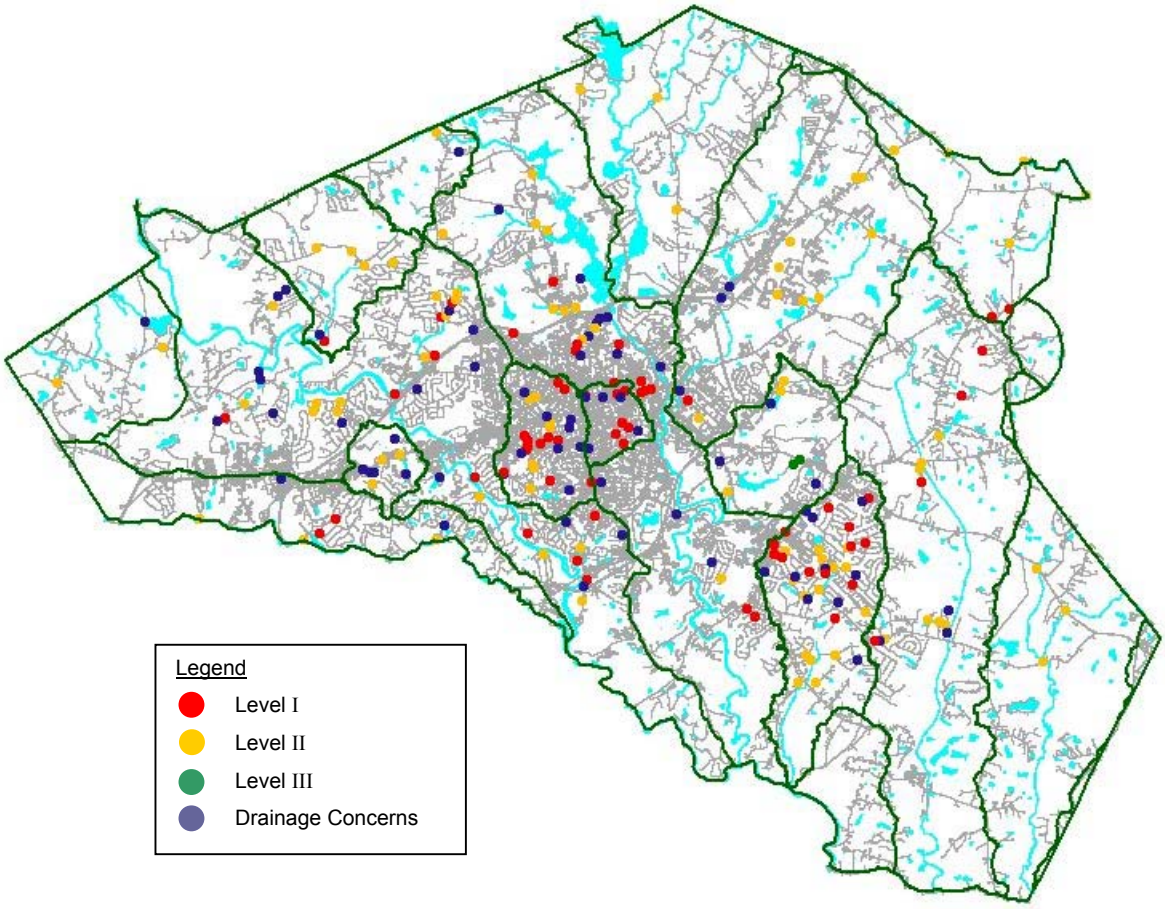
TABLE 2-1

PRIORITY OF STORMWATER PROBLEMS
ATHENS-CLARKE COUNTY STORMWATER MASTER PLAN

Problem Priority	Number
Level-1	64
Level-2	91
Level-3	2
Drainage Concerns	71
Total	**228**

FIGURE 2-1

PRIORITY OF STORMWATER PROBLEMS



2.2 NPDES Stormwater Permit

In March 2003, the Unified Government of Athens-Clarke County came under the regulations of the NPDES stormwater Phase II permit. The permit requires the County to reduce pollutants discharged to waters of the state to the maximum extent practicable. This is to be done through the development and implementation of six minimum controls:

- Public Education and Outreach
- Public Participation
- Illicit Discharge Elimination
- Construction Site Erosion Control
- Post-Construction (long-term) Stormwater Controls
- Good House Keeping Practices for Municipal Practices/Programs

The Mayor and Commission approved A-CC's program in February 2003. The multi-year program that has been developed for the first five years of the permit (Appendix A) is estimated to add over $1,500,000 to the annual cost of the county's stormwater program.

2.3 Funding Action Strategy Plan

Faced with the many stormwater problems identified by A-CC's Stormwater Master Plan and mandated stormwater NPDES water quality regulations the county recognized that the cost of stormwater management would significantly increase. The county realized that without long-term financing strategy to adequately fund the county will not be able to achieve the desired needed results.

To identify suitable funding options, the county developed a Funding Action Strategy (November 2003) for ACC's stormwater management program. A Citizen/Staff Stormwater Advisory Committee (SAC) was appointed by the ACC Manager to assist in the review of funding options. Funding options for the program included three broad categories: taxes, grants, and fees. The SAC then evaluated the various funding options based on public acceptance, legality, performance record, timing and economic efficiency.

Four financing options emerged as the preferred means of funding the program, property taxes, SPLOST, developer fees, and stormwater service fees. However, the SAC discounted property taxes as a viable funding option due to lack of public support for increased taxes. The SAC recommends a combination of SPLOST, developer fees, and stormwater service fees be used to finance the county's expanding stormwater program. These three options best met the criteria of equity, capacity, elasticity, balance, and economic efficiency.

It was felt that the stormwater service fee provided the strongest and most equitable source of funding. It was recommended that SPLOST funding be used to finance the recommended projects identified in the Stormwater Management Master Plan. The projected five-year budget of $12,975,000 could be funded with approximately 15 percent of the next $85 million SPLOST. As a final part of the financing strategy, developer fees were proposed to be increased to cover the additional review time for stormwater and construction erosion control plans, and the inspection of construction sites that will be required by the new Phase II NPDES Stormwater permit.

3. EXISTING STORMWATER MANAGEMENT PROGRAMS

3.1 Program Goals

A-CC has an extensive program and provides many services for dealing with the problems created by stormwater runoff that benefit the entire community. With a new emphasis on water quality by the new stormwater regulations, A-CC will have to provide more services to properly manage stormwater to protect the environment in compliance with the new regulations.

The County has developed a comprehensive program that provides the services needed to address all stormwater management needs, responsibilities and obligations. The vision of the county's program can be summarized by five goals that describe the overall direction, authority and responsibility of the program to manage stormwater.

- NPDES Compliance
- Source-Water Water Quality Protection
- Provide Infrastructure to Support Growth of Community
- Preserve Quality of Life
- Flood Hazard Reduction

3.2 Program Organization

Development of financing strategies for stormwater management is dependent on the services being provided and the customer receiving those services. Services for the management of stormwater can be categorized into five broad functional elements (Table 3-1). These services range from the support functions involved with the administration, organization and budgeting of the many programs and projects to the maintenance of existing and construction new facilities.

TABLE 3-1

FUNCTIONAL ELEMENTS OF A STORMWATER MANAGEMENT PROGRAM ORGANIZATION

ADMINISTRATION AND FINANCING

- General Administration
- Support Services
- Financial Management
- Billing and Customer Services
- Capital Outlay and Overhead Costs
- Public Awareness and Involvement

PLANNING AND ENGINEERING

- Design Standards and Guidance
- Field Data Collection GIS Database Management
- Stormwater Facilities Master Planning
- Watershed Planning
- Program Planning and Development
- Water Quality Planning and Monitoring

- Flood Hazard Mitigation Planning
- Design, Field and Operations Engineering
- Technical Support

REGULATION AND ENFORCEMENT

- Code Development and Enforcement
- Permit Administration
- Site Inspection
- Construction Site Erosion Control
- Drainage System Regulation
- Floodplain Management Regulations
- Water Quality Regulation

OPERATIONS AND MAINTENANCE

- Routine Maintenance Stormwater Facilities
- Remedial Repair of Facilities
- Erosion and Sediment Control
- Sediment Removal
- Emergency Response Maintenance
- Water Quality Sampling

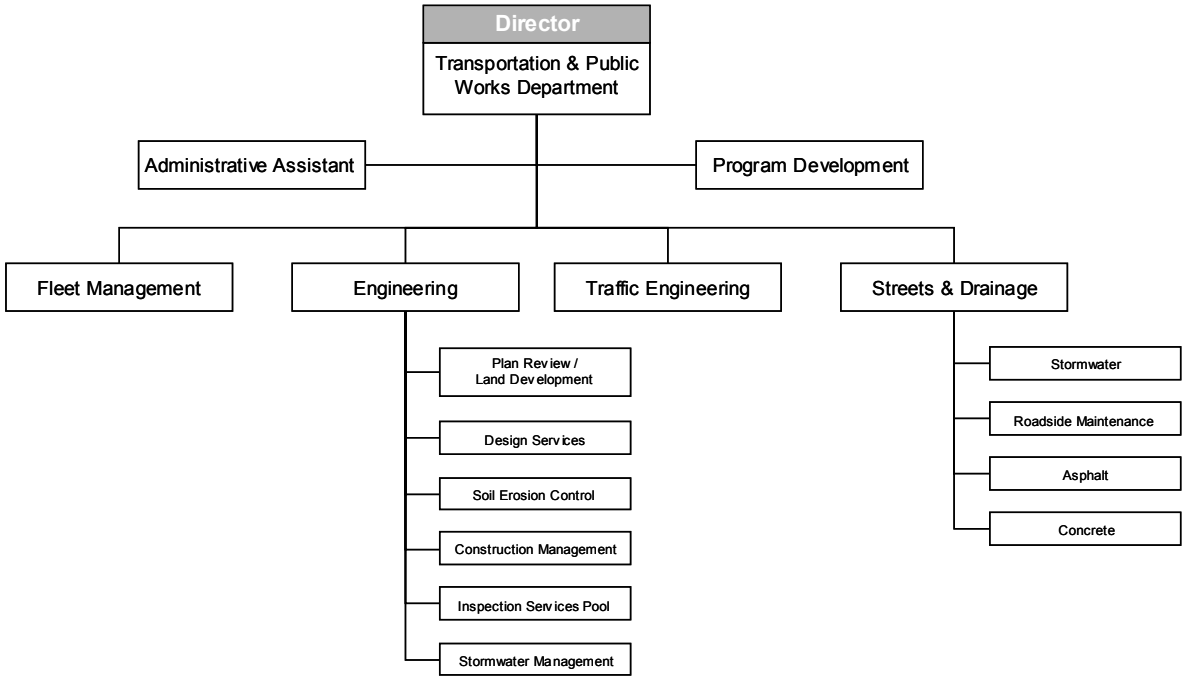
CAPITAL IMPROVEMENTS AND EXPENDITURES

- Major Capital Improvements
- Construction of BMPs and other Stormwater Facilities
- Land, Easement, and Right-of-Way Acquisition

Managing and implementing the County's stormwater program is the responsibility of the Transportation and Public Works Department (Figure 3-1). Within the Transportation and Public Works Department, the Engineering Division is responsible for four of the five functional elements: administration and financing, planning and engineering, regulation and enforcement, and capital improvements and expenditures. The Streets and Drainage Division is responsible for the operation and maintenance of all drainage facilities.

FIGURE 3-1

STORMWATER MANAGEMENT PROGRAM ORGANIZATION



3.3 Services Programs and Projects

3.3.1 Administration and Finance

This functional element represents both administrative support and program management. **Administrative Support** includes the Central County Services, which is charged to each department and enterprise fund in the county. or such as payroll, building maintenance and utilities. **Program Management** is the time, and associated costs, of the Engineer and the Director of Transportation and Public Works in administering contracts, responding to complaints, applying for administering grants, scheduling maintenance activities, and reviewing drainage plans. It was estimated that the County Engineer and the Director of Public Works spend about 10 percent of their time on stormwater related services. In addition, an estimated budget was developed that would cover the cost of handling the printing, mailing and receipt of the stormwater bill. It was assumed that billing would be quarterly and that it would take an additional full time equivalent (FTE) employee to assist existing staff to handle the additional work associated with the billing of the stormwater fee. It was estimated, that based on these assumptions that the Administration and Finance related costs would be approximately $293,347 annually.

3.3.2 Planning and Engineering

The Engineering Division of Transportation and Public Works provides the Athens-Clarke County with a full range of planning, engineering, surveying, mapping, and inspection services to implement the County's stormwater program. The Engineering Division is responsible for the engineering and planning for the stormwater management program.

The Engineering Division has a staff of 17 distributed among its six sections. Design Services and the Stormwater Management Sections are responsible for investigating drainage complaints and conducting watershed investigations to deal with quantity and quality issues. They were directly responsible for completion of the County's Stormwater Master Plan and they are currently overseeing the implementation of those recommendations. The Stormwater Management Section is specifically responsible for managing and implementing the programs that are required by the County's stormwater NPDES permit. A major part of those responsibilities are the many public outreach and public involvement activities that are required by the permit. To accomplish these activities, it was estimated that the stormwater programs requires the equivalent of 4.3 FTEs. It is estimated that the County spends approximately $403,402 per year on stormwater related projects and programs.

3.3.3 Inspection and Enforcement

The county requires that developments submit a Storm Water Management Impact Analysis/Report for any land development or redevelopment project that will impact the nature, condition, direction, and/or magnitude (rate and volume) of storm water runoff entering and/or leaving the site. The analysis/report follows the requirements of the Athens-Clarke County Storm Water Management, Flood Protection, and the Soil Erosion and Sediment Control Ordinances, and the Athens-Clarke County Design Standards. Two sections are responsible for the review of these plans the inspection of the construction and any enforcement actions that may be needed if the standards or conditions of the permits are not met. The two sections are the Land Development Section and the Engineering Section. In 2003 over 600 permits passed through these sections (Table 3-2).

The five staff of the Land Development Section is specifically responsible for the review of plans for construction, erosion and sediment control, stormwater design, and compliance with the Department of transportation and Public Works' Design Standards. They are also responsible for administering permits issued by the Department, which includes, compliance with improvement and maintenance bonds, Construction and erosion control inspection, and the enforcement of county codes. To reduce the instances that require enforcement action, the Land Development Section annually conducts six classes in proper erosion and sediment control techniques.

The Engineering Section has a staff of four. Their principal responsibilities include the review, issuing and the compliance oversight of all right-of-way permits. The Engineering Section oversees the construction of all county transportation and stormwater projects to make sure that the county's standards are followed. They also are responsible for administering Drainage Improvement Agreements between the County and other public or private individuals. The Engineering Section investigates all drainage complaints. A key responsibility of the Engineering Section is the management of the right-of-way database. Regulatory requirements hold the County responsible for knowing where and how stormwater is entering area rivers and streams. The Engineering Section is taking the lead in inventorying its drainage infrastructure and tracking it with a GIS database.

It was estimated that the review and enforcement of stormwater programs requires the equivalent of 5.9 FTEs. It is estimated that the County spends approximately $405,745 per year on stormwater related projects and programs.

TABLE 3-2

2003 PERMITS REVIEWED

	Permits			
	Driveway Permits	**Right-of-Way Permits**	**Land Disturbing Activity Applications**	**Land Disturbing Activity Permits**
Permit Fee	$30	$30	$50/acre	Fee based on actual number of sheet reviewed
Number of Permits	29	91	506	

3.3.4 Operation and Maintenance

The Streets and Drainage Division is responsible for the maintenance of A-CC's stormwater and drainage facilities that fall within the public right-of-way. The Division generally runs two drainage crews that repair inlets manholes and other drainage structures. When necessary, the crews reestablish the flow line of drainage ditches within the right-of-way. The Division has two Vac Truck crews that are used to clean inlets, manholes and storm sewers. The Division also has one crew of inmate labor, whose primary job is the cleaning of litter and debris from local streets. Division crews are capable of completing small to medium construction project that include new storm sewers, manholes and inlets. Street sweeping is contracted out to a private vender. The Central Business District (8.64 curb miles) is swept weekly while select main arterial are (totaling 88.24 curb miles) swept monthly. Table 3-3 summarizes the reoccurring maintenance activities completed by the Division annually in relation to stormwater activities. This represents about $1,700,000 in annual expenditures and includes $63,000 that represents the street sweeping that is currently being contracted. These expenses are expected to increase substantially as a direct result of increasing requirements of the county's NPDES stormwater permit.

TABLE 3-3

REOCCURRING WORK

	Units Accomplished	Man Hours
Curb and Gutter Repair	992 ft	1,185
Curb Cleaning	764.69 miles	8,140.5
Catchbasin Cleaning	1,429	1,508.7
Catchbasin Repair	151	6,953
Pipe Cleaning	8,689 ft	496.25
Shoulder/Ditch Maintenance	1,560.05	11,137
Total Man-Hours		29,420.45

3.4 Capital Improvement Program

3.4.1 Construction Management

The Capital Improvement Project Management Section is responsible for Transportation and Public Works construction projects. This includes everything from bid preparation to construction completion. Stormwater related construction projects require around about half (2.2 FTE) of the four staff in the Section. This represents an annual budget of around $255,708.

3.4.2 Construction Projects

The county has prioritized 57 of the 64 Level I projects identified in the Stormwater Master Plan (Table 3-4). As funding becomes available, Engineering Division staff will prepare an implementation plan for each stormwater improvement project for Mayor and Commission approval. The estimated cost to complete the remaining 57 projects is approximately $11,000,000. Assuming that the 91 Level II projects (not shown in Table 3-4) are added to the County's capital improvement program, the total cost to complete the Level I and Level II projects is estimated to be approximately $22,100,000. These costs estimates do not include the cost for land acquisition, design services or construction related services.

3.5 Annual Stormwater Program Budget

Table 3-5 summarizes the annual cost of the components of the A-CC's stormwater management program. An annual budget of $2,600,000 has been set aside for capital improvement projects. The total annual cost of the program is estimated at over $5,600,000.

TABLE 3-4

PRIORITY RANKING FOR TECHNICAL RECOMMENDATIONS FOR LEVEL 1 PROBLEM PROJECTS

Rank	Problem ID	Description	Score	Order of Magnitude Cost	Cumulative Cost	Comments
1	BR-2	Flooding of Baxter St between Rocksprings and Alps Rd	11.2	$537,000	$537,000	
2	TA-1	Flooding of Lumpkin St at the Tanyard Creek crossing	11.0	$167,500	$704,500	
3	TA-6	Flooding of Lumpkin St between Broad St and Bloomfield St (Bloomfield to Baxter is under Construction)	11.0	$1,101,500	$1,806,000	
4	BR-10	Flooding of Lumpkin St / Milledge Ave intersection	10.4	$430,000	$2,236,000	
5	TA-4	Flooding of Baxter St at the Tanyard Creek crossing	9.9	$71,500	$2,307,500	
6	BR-6	Flooding of Magnolia St near Baxter St	9.4	$10,000	$2,317,500	
7	TR-11	Flooding of Branch St/Poplar St intersection	9.4	$142,700	$2,460,200	
8	BR-3	Flooding of parking lot of A-CC Regional Library	9.3	$215,000	$2,675,200	
9	NO-13	Roadway overtopping by Tributary F along Boulevard	9.3	$206,600	$2,881,800	
10	NO-1	Roadway overtopping by Tributary DD along Newton Bridge Rd	9.1	$504,500	$3,386,300	
11	BR-8	Flooding of Dobb St/Hillcrest Ave intersection	8.9	$369,000	$3,755,300	
12	MC-1	Flooding along Kings Drive in the Kingswood Subdivision	8.9	$62,200	$3,817,500	
13	NO-30	Flooding of property located at 75 Jefferson Circle	8.8	$21,000	$3,838,500	
14	NO-32	Flooding of Cleveland Ave at the railroad crossing	8.6	$76,900	$3,915,400	
15	BR-11	Flooding along Pine Valley Dr and Beechwood Dr	8.5	$415,000	$4,330,400	
16	BR-12	Flooding of property along Benning St Extension	8.4	$1,000,000	$5,330,400	
17	BR-9	Flooding of Billups St/Hill St intersection	8.4	$50,000	$5,380,400	
18	HU-2	Roadway overtopping by Hunnicutt Creek on Valleywood Dr	8.4	$107,200	$5,487,600	

Rank	Problem ID	Description	Score	Order of Magnitude Cost	Cumulative Cost	Comments
19	MC-2	Roadway overtopping by McNutt Creek on Tuxedo Place	8.4	$34,700	$5,522,300	
20	MO-02	Roadway overtopping by Tributary XX on Lumpkin St	8.3	$106,900	$5,629,200	
21	TA-3	Flooding of Cloverhurst Ave/university Ct intersection	8.1	$77,000	$5,706,200	
22	HU-10	Flooding along William Dr and Elder Dr	8.1	$65,200	$5,771,400	
23	MO-24	Flooding along Riverhill Dr	7.9	$112,300	$5,883,700	
24	CE-3	Flooding along the 300 and 400 blocks of Ponderosa Dr	7.8	$86,000	$5,969,700	
25	NO-4	Flooding of property along Sapphire Ct by Tributary LL	7.8	$57,800	$6,027,500	
26	TA-2	Flooding of Bloomfield St/Cloverhurst Ave intersection	7.8	$149,700	$6,177,200	
27	SU-6	Flooding of property located at 345 Smokey Rd	7.6	$52,500	$6,229,700	
28	CE-8	Roadway overtopping by Tributary C on Laurie Dr	7.4	$80,000	$6,309,700	
29	CD-27	Flooding of horseshoe Circle/Sandstone Dr intersection	7.3	$105,000	$6,414,700	
30	CE-5	Flooding of property along Lost Tree Trail	7.3	$100,000	$6,514,700	
31	NO-3	Flooding of property along Ansley Dr by Tributary LL	7.3	$41,700	$6,556,400	
32	SU-1	Flooding of property along McAlpin Rd and Athens Rd	7.0	$71,600	$6,628,000	
33	CE-4	Flooding of property along Midway Rd	6.9	$118,000	$6,746,000	
34	SH-7	Channel erosion along Old Lexington Road	6.9	$54,500	$6,800,500	
35	HU-1	Flooding of Sharon Circle by Tributary Q	6.8	$15,400	$6,815,900	
36	MO-28	Flooding of property located at 302 Riverview Rd	6.8	$11,500	$6,827,400	
37	CE-37	Flooding of property along the 100 block of Ponderosa Dr	6.5	$101,000	$6,928,400	
38	MO-16	Flooding along Parkway Drive	6.5	$10,000	$6,938,400	
39	MO-01	Roadway overtopping of Hanover Dr by Tributary PP	6.4	$533,700	$7,472,100	
40	BR-7	Flooding along Rockglen and Highland Ave	6.4	$68,000	$7,540,100	
41	CE-6	Roadway overtopping of East Creek Bend by Tributary F	6.4	$84,000	$7,624,100	
42	CE-10	Sinkholes developing along Brookwood Drive storm sewr	5.9	$238,000	$7,862,100	

Rank	Problem ID	Description	Score	Order of Magnitude Cost	Cumulative Cost	Comments
43	CE-9	Roadway overtopping of Horseshoe Dr by Tributary A	5.9	$29,000	$7,891,100	
44	TU-1	Flooding along Creek Plantation Dr	5.9	$219,400	$8,110,500	
45	SH-10	Flooding of property along Winterhill Dr	5.1	$97,400	$8,207,900	
	BR-1	Roadway overtopping of Baxter St by Brooklyn Creek	Completed	N/A	-	Completed
	BR-4	Flooding of property along Rose St	Completed	N/A	-	Completed
	BR-5	Flooding along Baxter St between Magnolia and Brooklyn Creek	Completed	N/A	-	Completed
	CE-1A	Flooding of Green Acres Shopping Center parking lot	Completed	N/A	-	Completed
	CE-1B	Flooding of property along Brookfwood Dr and Greencrest Dr	Completed	N/A	-	Completed
	CE-2	Flooding along Barnett Shoals Rd	Completed	N/A	-	Completed
	CE-7	Flooding of Gaines School Rd/Cedar Shoals Dr intersection	Under Construction	N/A	-	In Progress
	HU-7	Overtopping of foot bridge in Ben Burton Park	Not Ranked	N/A	-	Do nothing-limited impact
	MO-3	Roadway overtopping of Old Will hunter Rd by Tributary YY	Not Ranked	N/A	-	Completed by developer
	NO-2	Flooding along Virginia Ave	Not Ranked	N/A	-	Completed
	TA-05	Flooding along Hancock Ave between Harris St and Milledge Ave	Not Ranked	N/A	-	Completed
	SH-1	Erosion at pipe outlets along Weatherly Woods Drive	Not Ranked	N/A	-	Completed
	SH-9	Roadway overtopping of Bentwood Trail by Shoal Creek	Completed	N/A	-	Completed

TABLE 3-5

ANNUAL STORMWATER PROGRAM BUDGET

Services	Estimated Annual Budget
Program Management	$293,347
Administration	
Central County Services	
Billing/Financing	
Engineering Section - Engineering Division	$249,437
ROW Permits and Inspection	
Transportation and Stormwater Project Design	
Drainage Improvement Agreement	
Drainage Complaints	
ROW Database Management	
County SWPPP Implementation	
Stormwater Division	$153,965
NPDES Phase II Program	
Public Education	
Land Development Section - Engineering Division	$405,745
Plan Review	
Permits	
Improvement and Maintenance Bond Compliance	
Site Construction Inspection	
Erosion/Sediment Control Inspection	
Erosion/Sediment Control Education	
Code Enforcement	
Streets and Drainage Division	$1,704,874
System Inspection	
Curb and Gutter Repair	
Catchbasin Repair	
Pipe Cleaning	
Stormwater System Improvements Construction	
Emergency Repairs	
Shoulder/Ditch Maintenance	
Street Sweeping	
Curb Cleaning	
Catchbasin Cleaning	
Illicit Discharge Control Program	
Construction Management	$255,708
Capital Improvement Project Management	
Capital Improvement Projects	$2,600,000
TOTAL	**$5,663,076**

4. STORMWATER USER FEES

4.1 A-CC's Financing Strategy

The fair and equitable apportionment of costs of A-CC's stormwater program is best accomplished by utilizing more than one funding mechanisms. By doing so, customers would be subject to only those fees/charges that are unique to the drainage characteristics of the area/basin/watershed in which they live and is specific to their "demand for services".

The Funding Action Strategy Plan recommended that A-CC finance its stormwater program with SPLOST revenue, increased developer fees, and stormwater service fees. By distributing costs in this way costs are distributed in a more fair and equitable fashion. The stormwater user fee program would function as a financing umbrella that would fund the bulk of the stormwater program. Increased developer fees would cover the costs of those activities that are the direct result of development (plan review, permitting, inspection, and compliance). SPLOST revenues would be used to finance capital improvement projects. This would avoid inequities that might arise where one part of the county may be helping to pay for a project in another part of the county but get nothing in return.

4.2 User Fee Concept

For many communities the stormwater user fee concept is the most fair and equitable method of financing stormwater programs. The existing system of paying for stormwater with property tax revenue has no relationship to the actual cost of services that are being provided. However, under the user fee concept of a stormwater utility, customers are assigned an equitable share of the cost of the stormwater management program, based on their use/demand for services. The demand for services is based on their relative contribution to the stormwater problem. A stormwater user fee is a dedicated funding mechanism that is essential for the long-term commitment that is needed in order to deal with stormwater issues. As a user fee system, the rate structure is based on the following concepts:

- All users pay their "fair share",
- The fee is based on the relative cost of services received, and
- The fee reflects the relative impact of stormwater runoff (use) of each land parcel in the stormwater management service area.

4.3 Apportionment of Costs

Whether we realize it or not, we all contribute problems of stormwater management. What needs to be determined is what is a customer going to be charged and why. Answering this question is a two-step process. Step one, **cost apportionment**, asks which group of customers should pay for what services. The second step is the **"customer apportionment**" step, where the basis for allocating the cost to each customer is determined. Developers of the rate structure must be able to demonstrate that there is a nexus between the fees that are charged and the services being provided.

4.3.1 Cost Apportionment

A-CC provides a wide range of stormwater services including, flood mitigation, water quality protection, and system maintenance. Services may not necessarily be provided evenly throughout the County. Financing strategies should consider the variation in costs of services from one area to another. For instance, stormwater systems in more rural areas is comprised of a system ditches and culverts. Contrast that to more urban areas that may have a more complex network of storm sewers inlets, manholes and structural BMP such as detention ponds, infiltration systems and manufactured in-line treatment devices. In addition, some services may be more County-wide, such as administration, watershed planning, and some compliance activities of A-CC's permit requirements. Other services may be more site or watershed specific. In these cases some customers may not use all of the services that are provided or may be managing their own stormwater to some level, as in the case of on on-site BMP. Then a new question, "should the customer be charged for those services?", needs to be considered.

4.3.2 Customer Apportionment

Customer apportionment focuses on developing an algorithm for determining each customer's (parcel) equitable share of recoverable costs. For stormwater utilities this standard unit is referred to as the ERU (Equivalent Runoff Unit). An ERU is a common index that is used measure the cost of providing services among utility customers. Properties or customers that are larger users of facilities or services should be charged an amount related to their use.

4.4 Alternative Rate Structures

Rate structures adopted by other communities have allocated costs using a number of factors including impervious area, land use, land area, and dwelling units. There are three general types of rate structure, **Equivalent Residential Unit, Intensity of Development, and Equivalent Hydraulic Area**.

Utilities based on impervious area (**Equivalent Residential Units** or ERU) charge customers based on the strong relationship between impervious area and the quantity and quality of stormwater runoff. The more impervious area on a parcel, the more the customer pays. This is by far the most common method used, not only here in Georgia but also throughout the United States. The basic rate structure can be represented by Equation (1).

Equation (1) $$\text{Billing Unit Charge (ERUs)} = \frac{\text{Impervious area of a parcel}}{\text{Square footage of an ERU}}$$

Utilities based on **Equivalent Hydraulic Area** base the fee on the calculation of stormwater runoff from the entire parcel area. Typically, all parcels within a community are charged a fee. The fee is charged at one rate on a square footage basis for impervious and at a lower rate for pervious area. In addition to charging the usual develop lands (residential and commercial), this method allows "undeveloped lands" (parks, golf courses, woodlots, agricultural lands) to be charged a fee as well. These rate structures can be simplified to Equation (2).

Equation (2) Billing Unit Charge = Impervious Parcel Area x Runoff Factor 1+ Pervious Parcel Area x Runoff Factor 2

Utilities based on the **Intensity of Development** attempt to factor in the buffering effect of pervious (grasses) areas. It also factors in the higher costs that are incurred when trying to work in congested areas with limited space, greater traffic, and greater number of conflicts with other public utilities. These rate structures adjust their ERU calculation based on the ratio of peak runoff rates or the ratio of the percent of impervious area to those factors that define an ERU. These rate structures can be simplified to Equation (3).

Equation (3) $$\text{Billing Unit Charge} = \text{ERUs of a parcel} \times \frac{\text{Percent impervious of a parcel}}{\text{Percent impervious of an ERU}}$$

4.5 Impervious Cover Model

Several factors influence the amount, rate, and quality of stormwater runoff generated by a particular parcel of land including:

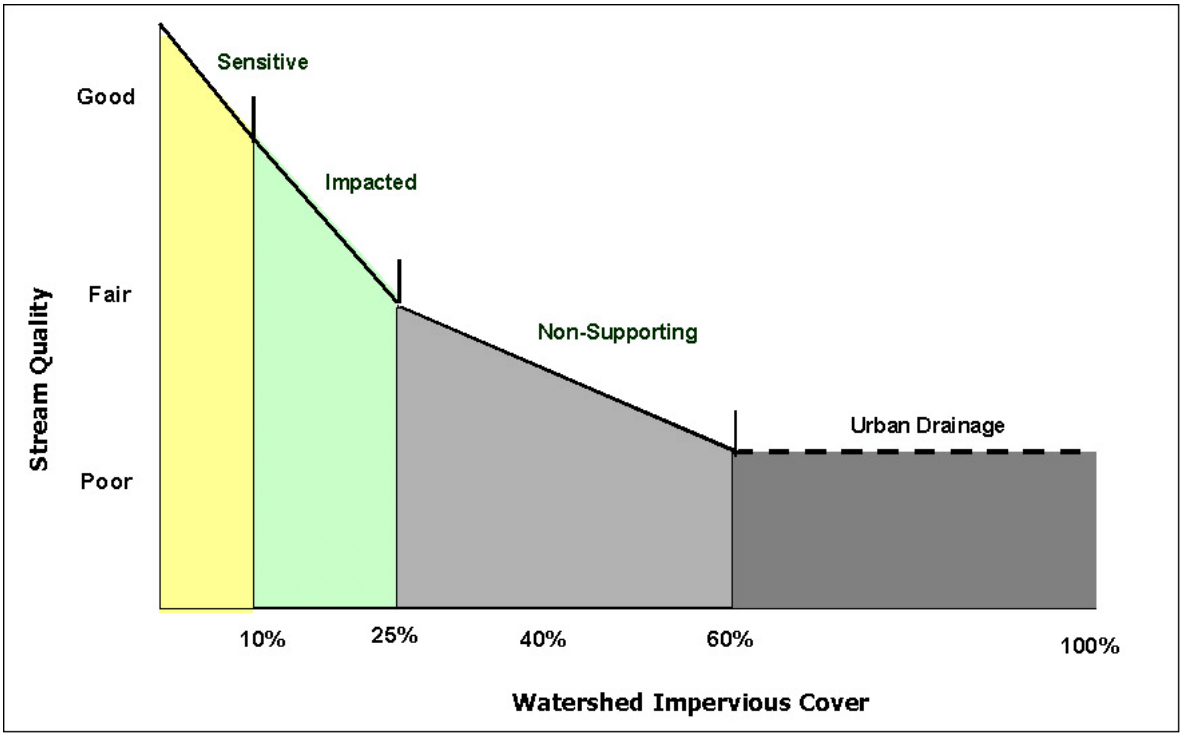
- parcel size,
- soil type,
- topography,
- position in the watershed, and
- the intensity that a parcel may be developed.

Research in flood/stormwater analysis used in stormwater planning and design has shown that the amount of impervious area is one of the most important parameters determining runoff characteristics (Leopold, 1968 and Benke, 1981). Research indicates that streams generally show the adversity of development when impervious area in the watershed reaches 10 percent (Couch, 1997 and Weaver 1991). This is equivalent to a watershed with residential development with two-acre lots. Most indicators of stream quality shift to poor once the impervious area in the watershed reaches around 25 to 30 percent, which is equivalent to medium density residential lots. The Center for Watershed Protection (2003) developed an impervious cover model (Figure 4-1), based on available research, in order to demonstrate the impacts of impervious area on stream quality.

It is the amount of imperious area that is the primary driving factor for determining the size and type stormwater facilities, such as storm sewers, ditches, and detention ponds, that are need to properly manage stormwater runoff. Therefore, the A-CC's stormwater management program has been developed around the planning, designing, building and maintenance of infrastructure for managing the runoff from impervious areas.

FIGURE 4-1

IMPERVIOUS COVER MODEL
(*Center for Watershed Protection, 2003*)



4.6 Other Rate Structures

The SAC evaluated the stormwater utility rate structures from a dozen communities listed below. Six were from Georgia and six were a diverse selection of communities from across the United States. Summaries of the rate structures for each of these communities are presented in Appendix B. Copies of the ordinances from the six Georgia communities are available in Appendix C.

- Columbia County, GA
- Cit of Griffin, GA
- Cit of Conyers, GA
- City of Decatur, GA
- DeKalb County, GA
- City of Fayetteville, GA
- City of Appleton, WI
- City of Winter Park, FL
- City of Monona, WI
- City of Fitchburg, WI
- Contra Costa County, CA
- City of Modesto, CA

All six of the Georgia communities base their rate structures on the ERU methodology or a variation of the ERU method (Columbia County and Conyers). Generally, Georgia stormwater utilities charge each residence (home apartment, duplex, etc.) a flat rate of 1-ERU and all other properties based on the amount of impervious area. Rate structures for the six non-Georgia communities were specifically selected to illustrate the full range of method that are used to develop a rate structure for a stormwater utility.

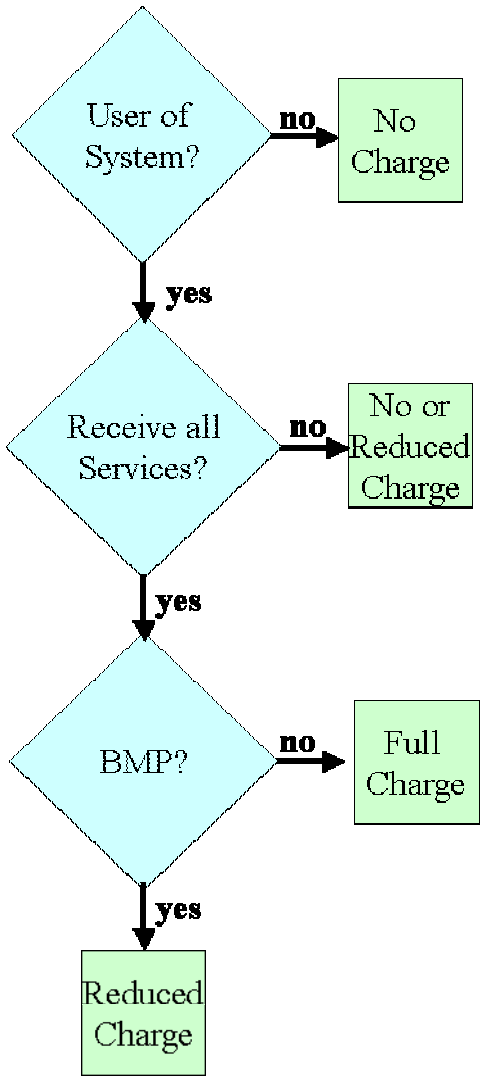
4.7 Lesson Learned from Columbia County

Stormwater utilities in Georgia have frequently been challenged in court. One of the most recent challenges was to the Columbia County stormwater management program. In 1999, four residents of Columbia County filed suit challenging the stormwater management ordinance under the Georgia and United States constitutions. At issue was the constitutionality of the ordinance based on the following:

- Validity with regard to compliance with constitutional requirements for creating a community improvement district;
- Assertion that that the stormwater utility charge is a tax upon real property and, thus, applicable to all residents; and
- in violation of the due process clauses of the constitutions of the State of Georgia and the United States of America.

In the recent superior court ruling in July 2003, the judge found in favor of the county program stating, "the Georgia constitution grants any county in the state the power to provide stormwater and sewage collection services."

In order to meet the legal criteria described in the Columbia County case, the Athens-Clark Program must factor in the cost of services that are being provided and must factor in on-site stormwater faculties.



5. RATE STRUCTURE DEVELOPMENT

5.1 Customer Base

The stormwater user fee system is a funding alternative developed to allocate the cost of stormwater management based on: 1) the relative services received, and 2) the impact of stormwater runoff of each land parcel in the stormwater management service area. The primary purpose of a program is to provide community-wide control and management of stormwater. Rate structures for stormwater utilities are tailored to reflect the characteristics of the parcels within a community. A parcel refers to any property, lot, or tract of land under a single ownership.

Whether we realize it or not, we all contribute to the problem of managing stormwater runoff. Therefore, all properties that contribute to the demand for stormwater services that are provided by A-CC would be subject to the fee. Table 5-1 summarizes an inventory of all of the parcels in A-CC and represents the potential customer base that will be served by the stormwater utility program.

TABLE 5-1

PARCEL INVENTORY – STORMWATER UTILITY CUSTOMER BASE

	NUMBER OF PARCELS	TOTAL PARCEL_AREA (sq.ft.)
Residential		
Single Family	24,745	1,985,684,076
Mobile Home	992	107,027,298
Duplex	2,001	47,823,482
Triplex	81	2,309,662
Condominium	2,613	3,235,597
Multifamily	305	49,581,921
Other Residential	653	69,865,192
Non Residential		
Commercial	2,541	211,752,587
Industrial	300	183,716,330
Tax Exempt		
Governmental	365	163,891,156
Schools	125	201,275,253
Churches	169	18,027,530
Other	60	10,287,950
Other		
Cemetery	2	1,870,359
Public Utilities	64	3,990,222
Agriculture	21	24,427,131
Unidentified	174	23,544,776
TOTAL	**35,211**	**3,108,310,521**

This information was tabulated using information in the County's GIS and Assessor's records. Single-family properties make up the largest customer category, with around 70 percent of all parcels. Residential properties, as a general group, represent almost 90 percent of all properties. Commercial and industrial customers (parcels) represent about eight percent of the customer base and tax-exempt properties represent about two percent.

5.2 Customer Apportionment

Customer apportionment focuses on developing a fair and equitable method for determining each customer's (parcel) share of recoverable costs. As discussed in Chapter 4, there are three basic methods (ERU, EHA and ID) used to develop stormwater utilities. The issue is which method most fairly and equitably allocates the cost of stormwater in Athens-Clarke County.

- **ERU** (Equivalent Runoff Unit) charges individuals based on how much impervious area is on their property, regardless of the size of the property. Impervious area is the dominant variable for determining the quantity and quality of stormwater runoff. Therefore, it is a good indicator of a property's impact to the system. The eru method is the most common method used in the development of rate structures. All of the existing stormwater utilities in Georgia use some variation of this method

- **EHA** (Equivalent Hydrology Area) charges individuals based on the total runoff from their properties. Under this method, customers receive a charge for both impervious area and pervious areas (green space). The charge for impervious areas is much higher than the charge for pervious areas. This method allows all properties (developed, undeveloped and agriculture) to be charged a fee.

- **ID** (Intensity of Development) charges individuals based on the type of development. This allows properties that have disproportionate levels of pollution or runoff volumes to be charged accordingly.

The ERU method, which is based on impervious area, was the preferred method of staff and the SAC. The reason for their section was base on three main advantages of ERU methodology.

1. There is a strong correlation between impervious area and stormwater impacts (Schueler, 2003). Impervious area, more than other parameters (soil, depth to groundwater, topography, etc.), influences the volume of stormwater runoff leaving the site. In addition, as the amount of impervious area increases and the percent of impervious area increases, the peak discharge rate of stormwater also increases. Both of these factors result in larger facilities, increased demand for maintenance, and increased (permit) monitoring requirements.

2. Typically, services that are currently provided by A-CC increase in direct response to the amount of impervious area, and

3. The relationship (nexus) between impervious area – stormwater impact – and a stormwater fee was easily understood and could be explained to the public.

5.3 Defining an ERU

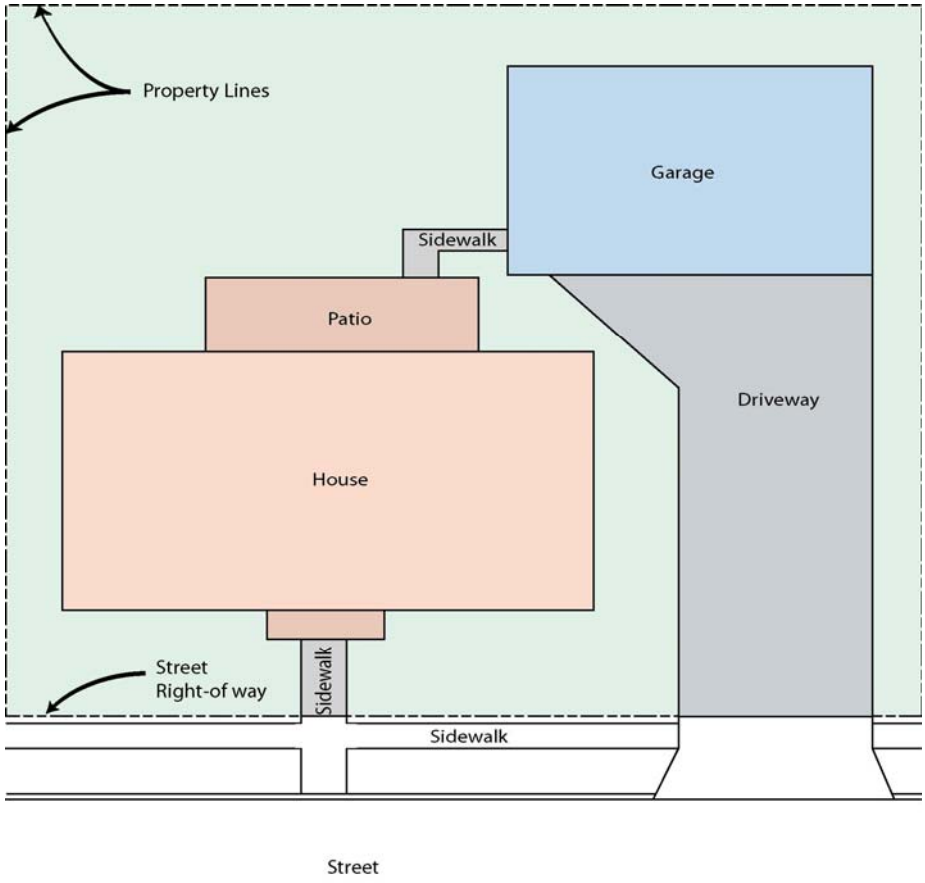
For stormwater utilities the standard unit of measurement is referred to as the ERU (Equivalent Runoff Unit). This is equivalent to a kilowatt-hour that is used by electric utilities or the 100 cubic feet/1,000 gallons which many water and sewer utilities base their charge.

An ERU is a measure that serves as a common index to compare runoff generated by each utility customer. It represents an average unit cost of the services necessary to manage stormwater runoff. Most often the cost of providing service to the average single-family customer is used to determine what the ERU will be, but may vary based on the assumptions of the rate structure.

The Single family customer is often used to define the ERU because: 1) the customer class is fairly uniform as to the magnitude of impact per customer; and 2) it is the largest single customer class and a flat rate greatly simplifies the administration of the billing system. An ERU is computed by averaging the impervious area of the single-family parcels. Impervious are includes the footprint that is covered by roof, garage patio, driveway walks, etc. (Figure 5-1).

FIGURE 5-1

COMPUTING THE SQUARE FOOTAGE OF AN ERU



Average Impervious Area per Parcel

2,908 sq. ft. = 1 ERU

Includes House, Patio, Garage, Driveway and Property Sidewalks

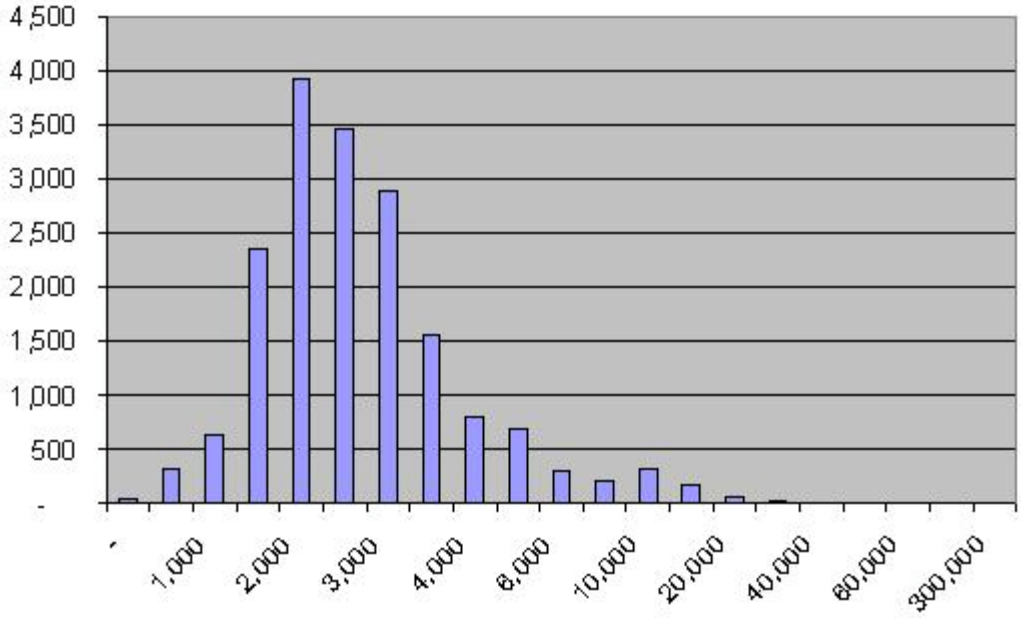
Street and Front Sidewalk not included

In A-CC the average impervious area of a single-family parcel was based on information in the County's GIS. The frequency distribution of the impervious area of 17,770 single-family parcels (out of a total of 24,745 single-family parcels) is shown in Figure 5-2. The average impervious area is 2,698 square feet, which does not include driveways. 80 percent of all single-family parcels are within 1,000 square feet of the average. This is a very tightly grouped

distribution when compared to other customer groups. When adjusted for driveways the average impervious area of a single-family parcel is 2,908 square feet.

FIGURE 5-2

FREQUENCY DISTRIBUTION OF IMPERVIOUS AREA FOR SINGLE-FAMILY PARCELS



5.4 Developing the ERU Rate Structure

There are many variations of the ERU method, as demonstrated by the 12 examples review with staff and the SOC. Three variations of the ERU methodology were presented for consideration (Table 5-2). Each example was built on data specific to A-CC to demonstrate the possible financial impact that there might be on any give customer classification. The difference among the alternatives is how they treat the residential customer. In each case the residential customers are charge a flat rate. This is done in an attempt to simplify the administration of the rate structure.

5.4.1 ERU Method 1

In Method 1, all single-family customers would be charged a flat rate of one-ERU. All other residential customers would be charged a fraction of an ERU based on the average impervious area of a dwelling unit in each residential category compared to the square footage of an ERU. The City of Griffin and the DeKalb County stormwater utilities are variations of this model. This method computes the square footage of an ERU based on the average impervious area of all single-family customers.

TABLE 5-2
ALTERNATIVE ERU RATE STRUCTURE MODELS

	NUMBER OF PARCELS	TOTAL IMPERVIOUS_AREA (sq.ft.)	DWELLING UNITS	Method 1			Method 2			Method 3			
				Flat Residential Rate	Estimated ERUs	% of Total	Flat Residential Rate	Estimated ERUs	% of Total	Flat Residential Rate	Estimated Number of Parcels	Estimated ERUs	% of Total
Residential													
Single Family	24,745	47,965,024	24,745	1.00	24,745	42.4%	1	24,745	33.7%				
Mobile Home	992	2,569,116	1,983	0.40	793	1.4%	1	1,983	2.7%				
Duplex	2,001	4,229,325	4,002	0.50	2,001	3.4%	1	4,002	5.4%	1.8	2,526	4,547	6.6%
Triplex	81	333,538	243	0.60	146	0.2%	1	243	0.3%	1.0	25,280	25,280	36.5%
Condominium	2,613	248,189	2,613	0.60	1,568	2.7%	1	2,613	3.6%	0.6	16,412	9,847	14.2%
Multifamily	305	16,405,948	10,632	0.60	6,379	10.9%	1	10,632	14.5%				
Other Residential	653	1,807,882											
Non Residential													
Commercial	2,541	36,427,399			12,561	21.5%		16,147	22.0%			16,379	23.6%
Industrial	300	5,387,007			1,858	3.2%		2,388	3.3%			2,422	3.5%
Tax Exempt													
Governmental	365	6,185,866			2,133	3.7%		2,742	3.7%			2,781	4.0%
Schools	125	11,791,868			4,066	7.0%		5,227	7.1%			5,302	7.6%
Churches	169	3,072,834			1,060	1.8%		1,362	1.9%			1,382	2.0%
Other	60	2,323,128			801	1.4%		1,030	1.4%			1,045	1.5%
Other													
Cemetery	2	22,651			8	0.0%		10	0.0%			10	0.0%
Public Utilities	64	552,382			190	0.3%		245	0.3%			248	0.4%
Agriculture	21	105,743			36	0.1%		47	0.1%			48	0.1%
Unidentified	174	81,961			28	0.0%		36	0.0%			37	0.1%
TOTAL	**35,211**	**139,509,862**	**44,218**		58,374			**73,452**				**69,328**	
ERU (sq.ft.)				**2,900**			**2,256**				**2,224**		

5.4.2 ERU Method 2

In Method 2 all residential customers (single-family, mobile homes, duplex, apartments, etc.) would be charged one ERU. The justification would be that there is very little variation in the cost of providing services to the different residential customers. This is the approach that the City of Fayetteville has adopted in their stormwater utility rate structure. The City of Decatur's stormwater utility rate structure is a variation of this approach. The square footage of an ERU is computed by based on the average impervious area of all residential customers.

5.4.3 ERU Method 3

The third method recognizes that the imperious area of each residential classification vary from development to development. Therefore, all residential customers are treated the same but are grouped based on their imperious are into one of three residential customer classifications, Large, Medium or Small. The break points used in this example to determine the Small, Medium or Large classification were: 0 to 1,500 square feet, 1,501 to 4,000 square feet and greater than 4,000 square feet. The square footage of an ERU is computed by based on the average impervious area of "medium" sized residential customers.

5.5 Preferred Rate Structure

County staff, and the County's Stormwater Advisory Committee discussed each of the methods. The discussion included a review of samples of each of the rate structures from various communities, including the six Georgia communities. The consensus of the committee and staff was to adopt a rate structure that had the following features:

1. A fee comprising of three cost components:

- Fixed Costs Component
- Stormwater Quantity Cost Component
- Water Quality Cost Component

2. A rate structure that is based on both the ERU method and a modified ID method

3, A tiered rate for single-family and mobile home customers base on the amount of impervious area.

5.5.1 Three Part Cost Components

The consensus of staff and the SAC was that a fee made up of three parts best represented A-CC's stormwater program. By organizing the services into the three cost components, (Table 5-3) it would be easier to explain what services the fee was supporting and easier to compute any adjustment to the fee or credits due to changes in services being provided. The Fixed Cost Component was made up of services that would not be changed by on-site stormwater practices or cost that had to be recovered regardless of on-site conditions. The Stormwater Quantity Cost Component included the maintenance services of the conveyance system that would be affected by the quantity of runoff or the peak rate of runoff. Finally, the Water Quality Cost Components covered maintenance activities that are related to the compliance with the County's NPDES stormwater permit.

TABLE 5-3

SERVICE COST COMPONENTS

Services	Fixed Costs	Quantity Cost	Quality Costs
Program Management			
Administration	X		
Central County Services	X		
Billing/Financing	X		
Engineering Section - Engineering Division			
ROW Permits and Inspection	X		
Transportation and Stormwater Project Design	X		
Drainage Improvement Agreement	X		
Drainage Complaints	X		
ROW Database Management	X		
County SWPPP Implementation			X
Stormwater Division			
NPDES Phase II Program	X		
Public Education	X		
Land Development Section - Engineering Division			
Plan Review	X		
Permits	X		
Improvement and Maintenance Bond Compliance	X		
Site Construction Inspection	X		
Erosion/Sediment Control Inspection	X		
Erosion/Sediment Control Education	X		
Code Enforcement	X		
Streets and Drainage Division			
System Inspection	X		
Curb and Gutter Repair		X	
Catchbasin Repair		X	
Pipe Cleaning		X	
Stormwater System Improvements Construction		X	
Emergency Repairs		X	
Shoulder/Ditch Maintenance		X	X
Street Sweeping	X		X
Curb Cleaning			X
Catchbasin Cleaning			X
Illicit Discharge Control Program			X
Construction Management			
Capital Improvement Project Management	X	X	X
Capital Improvement Projects	X	X	

Capital Improvements identified in Table 3-4 have components of each of these three costs. Based on the design objectives of each project the cost of capital improvements were distributed 20 percent to Fixed, 60 percent to Quantity and 20 percent to Quality. Table 5-4 shows the estimated distribution of costs among the three cost components.

TABLE 5-4

DISTRIBUTION OF COSTS AMONG COST COMPONENTS

Cost Component	Percent of Budget	
	With SPLOST Funding	Without SPLOST Funding
	Annual Budget = $3,063,076	Annual Budget = $5,663,076
Fixed	40%	31%
Quantity	30%	44%
Quality	30%	25%
Total	**100%**	**100%**

5.5.2 Mixing Rate Methodologies

The stormwater fee for the Fixed Costs and Stormwater Quantity Cost components are proposed to be based on the ERU method and impervious area.

Since, not all impervious areas generated pollutants at the same rate, certain land uses generate more pollutant per unit area than others, it was recommended that it would be more fair and equitable if those land uses generating more pollutant paid a higher share of the cost of water quality services. Therefore, the Water Quality Cost Component would incorporate the intensity of development factor applied to the number of the impervious area ERUs, to reflect the greater effort that will be expended to deal with the greater amounts pollutants generated. The Intensity of Development factors (Table 5-5) are proposed to be based on the estimated average annual sediment loads for various land use categories. The estimated annual loads were computed using the SLAMM model (Source Loading and Management Model), a nonpoint source pollutant loading model. Appendix D gives a more in-depth background on the SLAMM model.

TABLE 5-5

PROPOSED WATER QUALITY ID FACTOR

Land Use	Average Annual Sediment Pollutant Load (tons/ac/yr)	Ratio of Annual Loads
Single-Family & Mobile Home	0.23	1.0
Duplex	0.27	1.2
High Density Residential	0.36	1.6
Institutional	0.39	1.7
Light Industrial	0.67	3.0
Commercial CBD	0.49	2.2
Shopping Centers	0.51	2.0

5.5.3 Tiered Single-Family Customer Classification

There are over 24,000 single-family and mobile home parcels. The County issues over 1,000 building permits to homeowners each year for home repairs and additions. The administration time that would be required to track changes to the amount of impervious area on every single-family and mobile home parcel would not be recovered in the small increase in revenue that would be received by the County. More in keeping with the concept of fact that this is a fee for services is the fact that cost of services provided among single-family and mobile home customers do not vary significantly to warrant the administrative costs to tack impervious area to that level of precision. However, it was felt that the rate structure should be consistent with the general policy (that would be used to compute the stormwater fee for other customer classes) of the fees changing based on the amount of imperious area. Therefore, The rate structure was further proposed to include a tiered single-family customer class to reflect the range in the amount of impervious area with that customer class.

Under this policy, all single-family and mobile home customers would be grouped into one of three Single-Family Customer Classifications based on their imperious area. The three proposed customer classifications would be, Small, for parcel with 0 to 1,500 square feet of impervious area, Medium, for parcel with 1,501 to 4,000 square feet of impervious area or Large, for parcel with more than 4,000 square feet of impervious area. The square footage of one ERU would be computed by based on the average impervious area of ”medium” sized single-family property (2,625 square feet).

5.5.4 Rate Structure Summary

Table 5-6 summarizes the proposed rate structure described in this chapter. For ease of administration, single-family, mobile home, duplex and triplex would all be charged on a flat rate basis. All other customers (multifamily, commercial, industrial, tax exempt, etc) with impervious area would be charged based on the amount of impervious area on their property. If there is no impervious area the property is assumed to be undeveloped and the stormwater fee would be zero.

TABLE 5-6

PROPOSED ERU RATE STRUCTURE

Customer Class	**ERU Charge**
Single Family and Mobile Home - Small	0.6 ERU
Single Family and Mobile Home – Medium	1.0 ERU
Single Family and Mobile Home – Large	1.8 ERU
Duplex	0.5 ERUs per Dwelling Unit
Triplex	0.6 ERUs per Dwelling Unit
Nonresidential and multifamily	$\frac{\text{Total Impervious Area}}{2{,}625 \text{ sq.ft.}}$
Undeveloped	No charge

Table 5-7 illustrates the impact of this rate policy on the customer base. There are two parts to the proposed rate structure. Part 1 is based on the impervious area ERU method. It is estimated, given the available data at this time that there are roughly 59,267 ERUs over which to distribute the Fixed Costs and the Water Quantity Costs. Part 2 modifies the number of ERUs by applying the water quality intensity of devilment factors to the various land use customer categories. It is estimated that there are around 94,254 billing units over which the Water Quantity Costs would be distributed.

TABLE 5-7

PREFERED ALTERNATIVE RATE STRUCTURE

	NUMBER OF PARCELS	TOTAL IMPERVIOUS_AREA (sq.ft.)	DWELLING UNITS	Part - 1: Quantity			Part -2: Quality		
				Flat Residential Rate	Estimated ERUs	% of Total	Flat Residential Rate	Estimated ERUs	% of Total
Residential									
Single Family-Small	5,880	7,420,610	5,880	0.60	3,528	6.0%	1	3,528	3.7%
Single Family-Medium	19,057	50,023,838	19,057	1.00	19,057	32.2%	1	19,057	20.2%
Single Family-Large	814	6,131,832	814	1.80	1,465	2.5%	1	1,465	1.6%
Duplex	2,001	4,229,325	4,002	0.50	2,001	3.4%	1.2	2,401	2.5%
Triplex	81	333,538	243	0.60	146	0.2%	1.2	175	0.2%
Condominium	2,613	248,189	2,613	0.60	1,568	2.6%	1.65	2,587	2.7%
Multifamily	305	16,405,948	10,632	0.60	6,379	10.8%	1.65	10,526	11.2%
Other Residential	653	1,807,882							
Non Residential									
Commercial	2,541	36,427,399			13,877	23.4%	2.5	34,693	36.8%
Industrial	300	5,387,007			2,052	3.5%	2.5	5,130	5.4%
Tax Exempt									
Governmental	365	6,185,866			2,357	4.0%	1.65	3,888	4.1%
Schools	125	11,791,868			4,492	7.6%	1.65	7,412	7.9%
Churches	169	3,072,834			1,171	2.0%	1.65	1,931	2.0%
Other	60	2,323,128			885	1.5%	1.65	1,460	1.5%
Other									
Cemetery	2	22,651			9	0.0%		0	0.0%
Public Utilities	64	552,382			210	0.4%		0	0.0%
Agriculture	21	105,743			40	0.1%		0	0.0%
Unidentified	174	81,961			31	0.1%		0	0.0%
TOTAL	**35,225**	**152,552,002**	**43,241**		**59,267**			**94,254**	

5.5.5 User Fee versus Property Tax

Single-family customers, who make up around 70 percent of the customers (number of parcels), will contribute around 40 percent of the revenue for the Fixed and Water Quantity services and about 25 percent of the revenue for the Water Quality services. Commercial and Industrial customers comprise approximately eight percent of the customer base and will generate approximately 27 and 42 percent of the revenue for the Fixed/Quantity services and Quality services respectively. Tax-exempt customers would provide around 15 percent of the revenue for each of the three cost components.

5.6 Service Nexus

Two key considerations in determining the nexus of the stormwater fee are the geographic extent that services that are provided and the definition of "the system" over which the stormwater utility will be responsible.

5.6.1 Countywide Responsibilities

Figures 5-3 and 5-4 shows the locations of stormwater activities within A-CC. Figure 5-3 shows the location of 1,140 work requests for routine (reoccurring) maintenance of stormwater facilities completed by the Streets and Drainage Division between February 2002 and February 2004. These activates are distributed throughout the County and are confined to facilities within the County's right-of-ways.

FIGURE 5-3

ROUTINE MAINTENANCE OF STORMWATER FACILITIES
February 2002 – February 2004

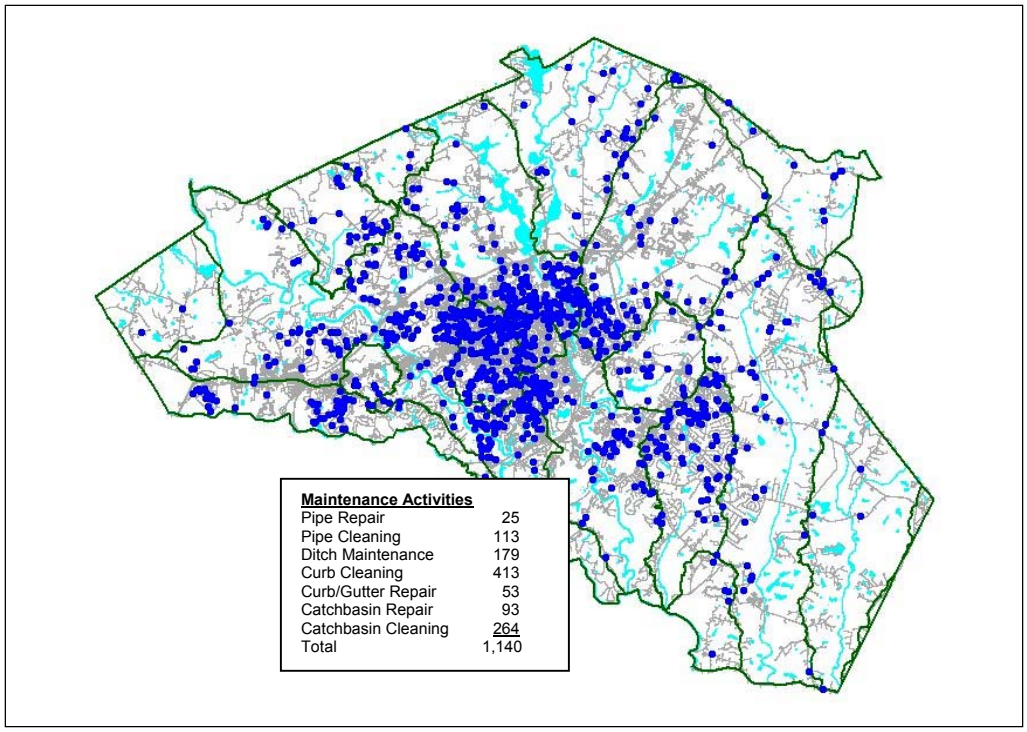
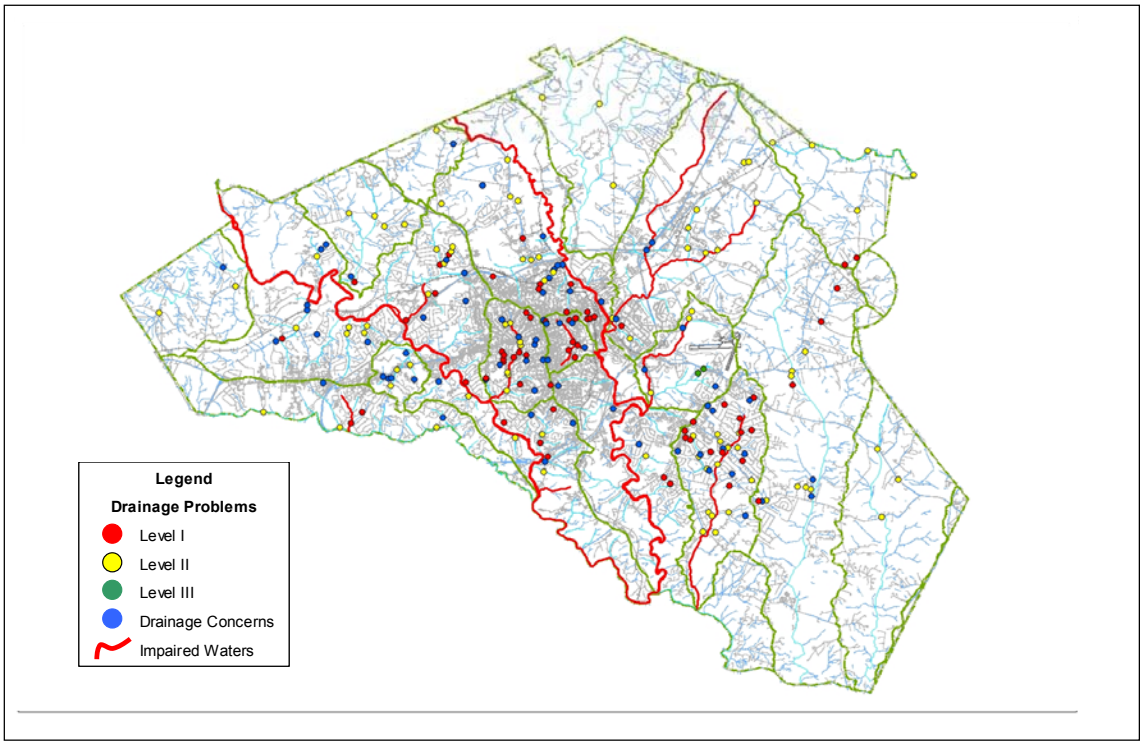


Figure 5-4 summarizes the location of prioritized problem areas identified in Stormwater Master Plan. The highlighted river and streams (in red) identify waterbodies that have been determined by the State of Georgia as not meeting water quality standards for their designated uses and are on the State's 303(d) list. The State is developing watershed plans for improving the water quality in all waterbodies on their 303(d) list. Responsibility for the implementation of these watershed plans will fall partially on A-CC. The County's NPDES stormwater permit is a first step in the implementation of the State's watershed plans.

FIGURE 5-4

STORMWTER PROBLEM AREAS



5.6.2 Definition of the System

Definition of the limits of "the system" that the stormwater utility will be responsible is important in establishing the nexus between services and charges. The definition of "the system" determines where services may be provided and is the justification for the collection of fees.

Right-of-Way System
In its most limited definition "the system" could be defined as only the drainage infrastructure within the County right-of-way. Under this definition, A-CC would only provide those services necessary to maintain drainage infrastructure within the right-of-way. Most all maintenance activities are currently limited to this definition,

Last Culvert System

The next level of "the system" could be described as those facilities and streams upstream of the "last culvert." This definition is more in keeping with the goals of the County's Stormwater Master Plan. The Master Plan identifies problems and projects to limit flooding of property outside of the right-of-way. All of the problems addressed by the Master Plan were within the 17 watersheds tributary to the Middle Oconee River, the North Oconee River and McNutt Creek. Many of these problems were attributed to restrictions caused by culverts at road crossings. Therefore, the Master Plan does not make propose any corrective action necessary down stream of "the last culvert" in these watersheds. Bridges crossing the Middle Oconee River, the North Oconee River and McNutt Creek are designed to convey the 100-year flood event and are funded by the State's bridge maintenance program.

Tributary Watershed System
The trend in thinking about stormwater is that it should be managed on a watershed basis. Chief among the promoters of this philosophy is the US-EPA. The US-EPA is developing and promoting this approach by providing technical support and some limited grant programs. Under this definition the system could be defined as all watersheds tributary to the Middle Oconee River, the North Oconee River and McNutt Creek. This would cover the entire area of the17 watershed covered by the Master Plan.

County System
In the broadest definition, "the system" could include all waters of the state that are within A-CC. Federal and State water quality programs are heading in this direction through the State's TMDL (Total Maximum Daily Load) program. At some point in the future, A-CC may be asked to take corrective actions to improve the water quality in the Middle Oconee River, the North Oconee River, McNutt Creek as well as the other tributaries in A-CC that are on the State's 303(d) of impaired waterbodies. The County's NPDES stormwater permit already holds the County responsible for the water quality of the stormwater discharged to area rivers and streams. The County's floodplain and stream buffer ordinances also include all water courses in the County.

5.6.3 Nexus conclusion

To be consistent with the concept of a user fee, there must be a nexus (a relationship) between what is being charged and the services that area provided. If for an example, services were not being provided, then the fee would have to be reduced accordingly. Decisions resulting from challenges in Columbia, GA (see Chapter 4.7 Lesson Learned from Columbia County) and Wisconsin emphasis this point.

A survey was conducted of the six existing stormwater utility programs in Georgia. Questions asked of each community were designed to learn how they defined their system and what did they take responsibility for maintenance. DeKalb County had the broadest interpretation of their system.

Figures 5-3 and 5-4 shows the countywide nature of the responsibility and obligations of the County's stormwater management program. Some of the services currently being provided by A-CC are not defined by watershed, such as the County's public outreach and public participation activities, watershed planning is a county-wide activity, since its purpose is to determine how to achieve the most benefit for the County with the resources that it has. The majority of the County's resources are upstream of the "last culvert" in most watersheds. However, the County's obligation for water quality extends to all waterbodies in the County. These requirements will likely become greater with more Federal and State regulatory requirements.

One proposed alternative would be to define "the system" as all waters of the State within the County. Then define a service area for water quality and a second for quantity. The water quality service area would include the entire County. However, "the last culvert" in each watershed could define the water quantity service area. These definitions are consistent with services that are currently being provided, which is the key to establishing the nexus between

services and charges. By defining "the system" in its broadest interpretation, the County can make adjustments to the service areas as demands from the public or regulations require in the future.

5.7 Credit Policy

Credits are an essential component of the rate structure of a stormwater utility. The credit reflects a customer's decision to reduce their use of the services being provided by the installation and maintenance of properly design stormwater management facilities called Bests Management Practices (BMPs). A-CC is in the process of updating its stormwater management ordinance that defines the performance criteria of a properly design stormwater management facility. The new ordinance has four performance criteria (Table 5-9). The first criteria addresses water quality concerns and the remaining three address the quantity of stormwater runoff:

TABLE 5-9

DESIGN CRITERIA - GEORGIA STORMWATER MANAGEMENT MANUAL

Performance Criteria		Design Criteria
Water Quality	-	Runoff from the first 1.2inches
Stream Channel Protection	-	1-yr, 24 hr design storm
Overbank Flood Protection	-	25-yr, 24 hr design storm
Extreme Flooding Protection	-	100-yr, 24 hr design storm

Credits, if awarded, should be based on the avoided cost (direct cost savings) to the County's stormwater management program or granted in those cases where a customer is not receiving all/some of the services. It is recommended that the following criteria and procedures be followed:

1. The applicant must provide documentation that demonstrates that the credit is warranted.

2. Existing or proposed stormwater management systems must be properly designed, constructed, and maintained in accordance with all appropriate regulations.

3. Credit should be based on the reduction in the cost of the County's program or based on the services that are not being received by the customer.

4. Credit should be based on a periodic demonstration on the part of the applicant that the private stormwater management system is being operated and maintained properly.

Rather than a "credit" program, the City may wish to implement a rebate program to encourage the implementation of Best Management Practices, such as rain gardens and rain barrels.

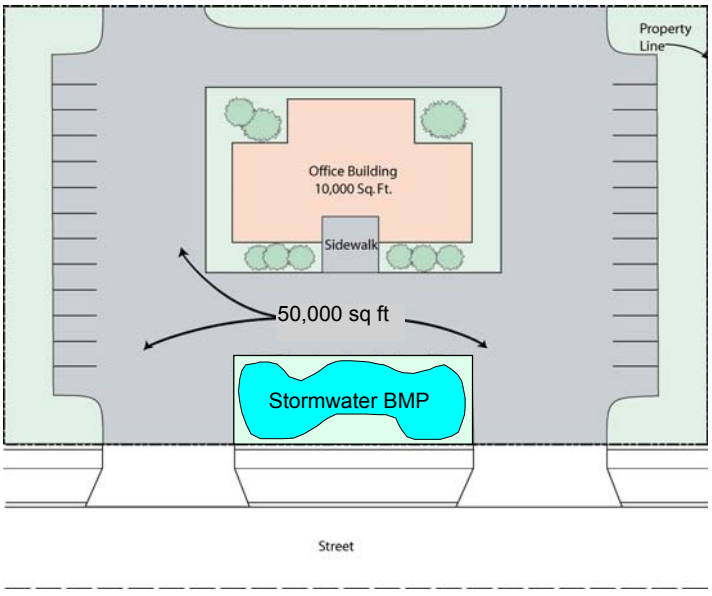
5.7.1 Calculation of the Credit

If a customer constructs and maintains facilities that meet the criteria of the County's stormwater management ordinance (Table 5-9), they would be eligible for a credit that equated to those portions of the fee that were attributed to the quantity or quality component of the budget. In the example presented in Figure 5-5 and Table 5-10 a new commercial development is constructed with 60,000 square feet of impervious area. This represents 22.9 impervious area ERUs and 50.4 water quality ERUs. Table 5-10 shows the ERUs that would be charged for the Fixed, Quantity

and Quality components of the stormwater charge. From the analysis of the current stormwater budget, 40 percent of the budget covers Fixed program costs, 30 percent covers Water Quantity costs and 30 percent covers Water Quality costs. Assuming that the stormwater BMP met all four requirements, a total credit received would be a 60% reduction in the stormwater fee.

FIGURE 5-5

EXAMPLE CREDIT CALCULATION



Site Description:

Lot Size 2 acres
Impervious Area = 50,000 + 10,000 = 60,000 sq.ft.

1 Single Family ERU = 2,625 sq.ft.

60,000 sq. ft. = 22.9 ERUs
2,625 sq. ft.

ID (commercial) = 2.2
22.9 ERUs x 2.2 = 50.4 ERUs

TABLE 5-10

RATE CALCULATION ASSUMING CIP PAID BY SPLOST FUNDS

Cost Component	ERUs	% of Fee Charged		
		Assuming No Bmps		With A Properly Designed Bmp
Fixed	22.9 ERUs	40%		40%
Quantity	22.9 ERUs	30%		0%
Quality	50.4 ERUs	30%		0%
Total		100%		40%

Partial credit could be given to customers that currently do not have a stormwater BMP if they retrofit the site with a BMP that meets one or more of the design criteria in Table 5-8. Therefore, a BMP could receive a 10 percent reduction in the fee for each of the three quantity related criteria (Stream Channel Protection, Overbank Flood Protection, and Extreme Flooding Protection) that is met. Similarly, partial credit could be received for water quality

BMPs. The water quality performance criteria assumes that the BMP will achieve an 80 percent reduction in sediments. Therefore, thresholds below 80 percent could be established for customers who only partially achieve the water quality improvement goal.

5.7.2 Other Credits or Fee Reductions

Riparian landowners could argue that their stormwater does not enter the County's system; rather it goes directly into the adjacent river or stream. Therefore, the County does not manage the their stormwater (the quantity portion). However, the County is held responsible for the reduction of pollutants from their property by the County's NPDES stormwater permit. Therefore, the County could justify a policy that exempted riparian lands from the Stormwater Quantity Cost Component but still charge a fee for the Fixed and Water Quality program costs. This policy is consistent with County's Stormwater Management ordinance. The ordinance does not require developments that are adjacent to the 100-year flood plain to provide detention for flood mitigation.

FIGURE 5-6

RIPARIAN CUSTOMER SERVICE AREA

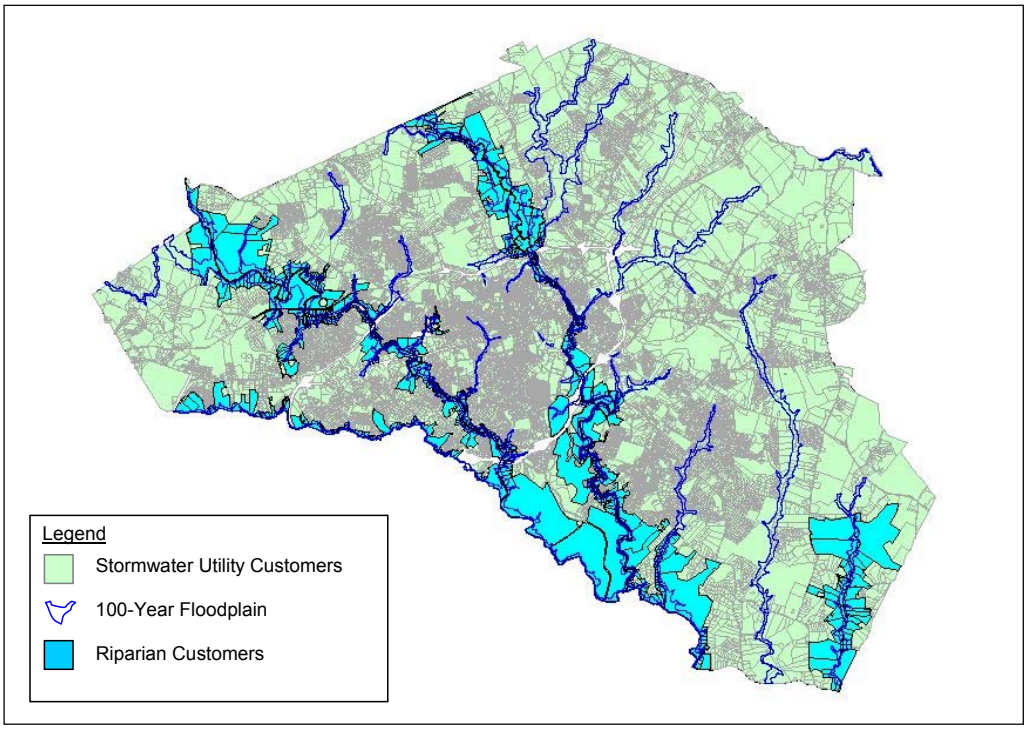


Figure 5-6 identifies parcels classified as Riparian. Riparian parcels were defined as those properties that are directly adjacent to the 100-year floodplain and are downstream of all culverts or system that is maintained by the County. There are over 900 parcels that meet these criteria and may represent around 3,000 ERUs.

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APPENDIX A. NPDES STORMWATER PHASE II BEST MANAGEMENT PRACTICES AND IMPLEMENTATION

APPENDIX B. EXAMPLE RATE STRUCTURES SUMMARY

City of APPLETON, WI

- 1 ERU

2,368 square

- Single Family

1 ERU

- Duplex

0.5 ERU/unit

- Multifamily

0.4 ERU/unit

- Non-residential

Impervious Area/ERU

- Minimum ERU

0.4 ERU

- Undeveloped

NO CHARGE

Monona, WI

- EHA
- Fee Calculation
    - $0.019533 per Impervious sq.ft.
    - $0.00000456 per Pervious sq.ft.
- •Slope Factor for Budget of $10,000
    - Lot Area x Slope Factor

Slope Factor

Average Lot Slope	Charge per sq.ft.
0 – 2%	$0.000614
2 – 4%	$0.00042
4 – 6%	$0.00054
6 – 8%	$0.00066
>8%	$0.001090

Winter Park, FL

- Modified - ERU
- Customer Classifications
  - Single Family
  - Multifamily (Aprtmt, Condo, Duplx)
  - Non-residential
  - Undeveloped
- Multi-Tiered Single Family
- Multi-Family (Aprtmt, Condo, Duplx) - Flat Rate / Unit = $5.56/unit
- Fee Structure Non-residential = Imperv/2,324 sq.ft.

Fee Structure – Single Family
$/ERU/Mo

1. <1,099	$4.45
2. 1,100-1,699	$5.56
3. 1,700-2,299	$6.67
4. 2,300-2,899	$7.80
5. 2,900-3,499	$8.91
6. 3,500-4,099	$10.02
7. 4,100-4,699	$11.14
8. 4,700-5,299	$12.25
9. 5,300-5,899	$13.36

10. 5,900-6,499	$14.61
11. 6,500-7,099	$15.60
12. 7,100-7,699	$16.71
3. 7,700-8,299	1$17.82
14. 8,300-8,899	$18.94
15. >8,900	$20.05

Fitchburg, WI

Intensity of Development

- Customer Classifications
  - Residential – Single Family
  - Residential – Duplex
  - Resesidential – Multifamily
  - Non-residential
  - Undeveloped
- •Fee Calculation
  - City-Wide Fee
  - Urban Service Area Fee
  - Area Intensity Fee

Percent Impervious	Intensity of Development Factor
0 – 9.9%	0.6
10 – 54.9%	1.0
55 – 69.9%	1.7
70 – 89.9%	2.9
>90%	4.8

Contra Costa County, CA

Intensity of Development
Group A
1.0 ERU/unit

Group B
0.7 ERU/unit

Group C
1.7 ERU/unit

Group D
0.2 ERU/acre

Group E
1.5 ERU/acre

Group F
4.5 ERU/acre

Group G
7 ERU/acre

Group H
9 ERU/acre

Group I
10 ERU/acre

Group J
12 ERU/acre

Group K
1 ERU/3,000 sq.ft. imp. Area

Group I
Exempt

Modesto, CA

Intensity of Development Factor

x

Area Range Number Based on Lot Size

=
ERU

Single Family
.25
0-3,500 sq.ft
1

Duplex
.50
3,501-7,000
2

Multi-Family High
.95
7,001-10,500
3

Multi-Family Medium
.80
10,501-14,000
4

Multi-Family Low
.40
14,001-17,500
5

Multi-Family Very Low

.25
17,501-21,000
6

Multi-Family Sr. Mobile Home
.31
Increments of3,500
etc.

Commercial
.95

Industrial
.75

Transportation/Utilities
.40

Schools
.25

Non-Profit Organization
.40

Government	.70
Hospitals	.50
Parks/Cemeteries	.10
Agriculture	.08
Undeveloped	.00

Stormwater Charge per ERU

Single Family	
0-3,500 sq.ft	$1.65
3,501-7,000 sq.ft	$3.23

7,001+ sq.ft
$4.85

Non-Single Family

ERU
$6.58

Columbia County

Minimum Threshold Level of Stormwater – General Tax revenue

ERU = 100 sq.ft.

All Developed Properties Total Impervious Area/100 sq.ft.

Charge = $0.0875/100 sq.ft./Mo

City of Conyers

•	Commercial	$200.31/ac/yr
•	Industrial	$167.36/ac/yr
•	Agricultural	$24.60/ac/yr
•	Multifamily	$134.42/ac/yr
•	Low/Medium Density Residential	$39.95/parcel/yr
•	High Density Residential	$14.10/parcel/yr
•	Institutional	$156.38/ac/yr
•	Forest/Open land	$0.0/ac/yr
•	City of Conyers	$156.38/ac/yr
•	Georgia International Horse Park	$24.60/ac/yr

City of Decatur

- ERU = 2,900 sq.ft.
- Single Family Dwelling Units 1 ERU
- Other Developed Properties Total Impervious Area/2,900 sq.ft.
- Charge = $5.00/ERU/Mo

DeKalb County

ERU = 3,000 sq.ft.

Single Detached Dwelling lots 1 ERU

Multiple Dwelling lots 0.7 ERU/Dwelling Unit

Other Developed Properties Total Impervious Area/3,000 sq.ft.

Charge = $4.00/ERU/Mo

City of Fayetteville

ERU = 3,800 sq.ft.

Residential Dwelling Properties 1 ERU /Dwelling Unit

Other Developed Properties Total Impervious Area/3,800 sq.ft.

Minimum Bill (>1,000 sq.ft and <3,799 sq.ft.) 1 ERU

Charge = $2.95/ERU/Mo

City of Griffin

CITY OF GRIFFIN The City Of Griffin

ERU = 2,200 sq.ft.

Detached Dwelling Units 1,600+ sq.ft. 1 ERU

Detached Dwelling Units <1,600 sq.ft. 0.6 ERU

Other Developed Properties Total Impervious Area/2,200 sq.ft.

APPENDIX C. GEORGIA STORMWATER UTILITY ORDINANCES

APPENDIX D. DESCRIPTION OF SLAMM MODEL

The Source Loading and Management Model (SLAMM) was developed to more efficiently evaluate stormwater control practice. SLAMM has been developed by Dr. Robert Pitt of the University of Alabama-Birmingham and John Vorhees. SLAMM is based on years of actual field research conducted by Dr. Pitt, the U.S. EPA and other researches. SLAMM simulates the buildup and wash-off process of pollutants that accumulate as a function of land use, amount and type of impervious area, and the time between rain events. Special emphasis has been placed on small storm hydrology and particulate wash-off from source areas within a land use category.

The model includes data from the early street cleaning and pollutant source identification projects sponsored by the EPA's Storm and Combined Sewer Pollution Control Program (Pitt 1979; Pitt and Bozeman 1982; Pitt 1984), the EPA's Nationwide Urban Runoff Program (NURP) (EPA 1983), as well as studies in the Alameda County, California (Pitt and Shawley 1982), Bellevue, Washington (Pitt and Bissonnette 1984), and the Milwaukee (Bannerrman, et al. 1993). SLAMM was used to conduct a long-term continuous simulation using eight years (1985 through 1992) of rain data for Atlanta, GA (Pitt 1996; Pitt and Voorhees 1995). The simulation identified the significance of rain events of various magnitudes in the overall annual loads to a receiving body.

SLAMM has been used in many areas of North America and has been shown to accurately predict stormwater flows and pollutant characteristics for a broad range of rains, development characteristics, and control practices. SLAMM is mostly used as a planning tool to better understand sources of urban runoff pollutants. The user is also able to apply a series of control devices (BMPs) to determine how effectively these devices remove pollutants. These features allow SLAMM to incorporate unique processes within a land use category to more accurately predict the sources of runoff pollutants and flows. Nonpoint source pollutant loads may be estimated for up to 17 different Parameters (Table D-1).

TABLE D-1

SLAMM POLLUTANT LOADING PARAMETERS

PARTICULATE FORMS	FILTERABLE (SOLUBLE) FORMS
Particulate Solids (kg/kg)	Filterable Solids (mg/L)
Phosphorus (mg/kg)	Phosphorus (mg/L)
Total Kjeldahl Nitrogen(mg/kg)	Total Kjeldahl Nitrogen(mg/L)
Chemical Oxygen Demand (mg/kg)	Chemical Oxygen Demand (mg/L)
Chromium (micrograms/kg)	Chromium (micrograms/L)
Copper (micrograms/kg)	Copper (micrograms/L)
Lead (micrograms/kg)	Lead (micrograms/L)
Zinc (micrograms/kg)	Zinc (micrograms/L)
Fecal Coliform Bacteria (#/100 ml) (2)	

SLAMM estimated the unit area loads using historical hourly rainfall from Athens Ben Epps Airport (090435) for the time period January 1, 1997 through December 31, 1999. Land use files representing the major urban land uses in A-CC were built from SLAMM's six basic land use files:

- Residential
- Commercial
- Industrial
- Freeways
- Institutional
- Open Space

Each of the major land use categories were characterized by source areas (Table D-2). Each source area has its own runoff and pollutant build up and wash-off characteristics based on their physical characteristics (i.e. concrete vs. asphalt, pitch vs. flat roof, etc.).

D-2

SLAMM SOURCE AREA TYPES BY LAND USE

Residential, Commercial, Industrial; Institutional, and Open Space Land Use	Freeways Land Use
• Roofs • Undeveloped Areas • Paved Parking/storage • Small Landscaped Areas • Unpaved Parking/Storage • Other Pervious Areas • Playgrounds • Other Areas • Driveways • Freeway Lanes / Shoulders • Sidewalks / Walks • Large Turf Areas • Street Areas Large • Landscaped Areas • Other directly connected impervious areas • Other partially connected impervious areas	• Undeveloped Areas • Other Pervious Areas • Paved Lanes / Shoulder Areas • Large Turf Areas • Other directly connected impervious areas • Other partially connected impervious areas

SLAMM routes both runoff and pollutants from each source area to the "outfall" of the land use area. This pollutant delivery system is further described first by the type of drainage system:

- Grass swales
- Undeveloped roadside
- Curb and gutters, `valleys', or sealed swales

Land uses with curb and gutter must designate its condition:

- Poor condition (or very flat)
- Fair condition
- Good condition (or very steep)

Street texture/condition is also defined:

- Smooth
- Intermediate
- Rough
- Very Rough (including oil and screens)

One of the strengths, and one of the original purposes, of SLAMM is its ability to evaluate the effectiveness of pollutant reduction of various stormwater BMPs (Table D-3). Along the flow path from source area to the "outfall" these BMPs may be installed.

TABLE D-3

SOURCE AREA, DRAINAGE SYSTEM AND OUTFALL CONTOL OPTIONS

- Infiltration Device
- Wet Detention
- Grass Swale
- Street Cleaning
- Catchbasin Cleaning
- Porous Pavement
- Biofiltration