CHAPTER III

PROPOSED LEVEL OF SERVICE

A. CHAPTER SUMMARY

The following sections include a discussion of the options that the County has related to the continued level of service that their stormwater program will provide and outlines a proposed increased level of service to meet the current and future needs of Fairfax County.

Three levels of service options were considered in the evaluation of the stormwater management program in Fairfax County. These options include maintaining the status quo, implementing a comprehensive program through expanded resources over the next 10 years, and increasing capital improvements construction with minimal increases in maintenance and planning to support the new improvements program. Based on the review of the current services, with input from staff and through comparison of Fairfax County to other communities, it is recommended that Fairfax County initiate the process of developing a comprehensive stormwater program, phased in over time in a logical, building block approach. This will put Fairfax County on a path to achieve regulatory mandates for water quality protection, to achieve goals identified in the 2003 Strategic Plan, to sustain the viability of the existing investment in infrastructure, and to achieve the goals established through the Watershed Plan initiative underway.

Development of a comprehensive stormwater program includes initiatives in program management, planning, infrastructure maintenance, enforcement of performance standards, capital construction and regulatory controls. Highlights of Key Level of Service Initiatives:

- Implement capital improvement projects (backlog estimated between $340 million to $800 million) over the next 20 to 40 years. These projects will position the County for regulatory compliance and facilitate restoration of the County's streams, 70% of which are in fair to very poor condition.
- Upgrade, within the next 10 years, all public stormwater management facilities so that they function properly. This includes management of the program for major pond rehabilitation projects.
- Implement an enhanced enforcement capability to ensure private facilities are operating as designed.
- Increase public education activity to meet regulatory compliance and to increase public understanding of the goals and activities within the overall program, as well as engage them in participating in stormwater program activities.
- Update and maintain watershed plans on a regular basis to manage capital improvement prioritization.
- Organize the Watershed Planning process by dividing the planning area into quadrants to improve efficiency and effectiveness in overall planning capability. This will support implementation of each Plan's recommendations and meet the schedule to have all studies complete by 2010.

The cost of change has been evaluated under two scenarios. The first is to build an optimal program as quickly as possible and the second is a more moderate growth in new resources, targeting capital improvements and maintenance enhancements. Both program cost models were projected over a five-year planning period. The second scenario, the more moderate growth profile, is recommended as the approach the County should take in expanding the level of service for stormwater. The following table provides a summary of the five-year cost estimate, combining current program costs with projected program enhancements. Full details are found in Table III-2 for the Optimal Approach and Table III-3 for the Recommended Approach. This moderate growth program would increase the level of service from $11.7 million (in FY' 04) to $28 million in FY'06.

Table III-1 Summary of Cost Projection for Recommended Level of Service

Cost Summary-Moderate	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	Total	Percent
Administration	$ 1,232,260	$ 1,266,228	$ 1,301,215	$ 1,237,251	$ 1,274,369	$ 6,311,322	3.1%
Special Programs	$ 704,000	$ 663,470	$ 674,254	$ 685,362	$ 696,803	$ 3,423,888	1.7%
Billing and Finance	$ 1,992,000	$ 1,997,760	$ 2,003,693	$ 2,009,804	$ 2,016,098	$ 10,019,354	5.0%
Planning and Engineering	$ 3,830,000	$ 4,137,250	$ 4,337,664	$ 4,631,243	$ 4,753,381	$ 21,689,538	10.8%
Operations and Maintenance	$ 4,805,000	$ 5,485,700	$ 6,466,031	$ 7,239,403	$ 7,883,136	$ 31,879,270	15.9%
Retrofits/Conveyance Rehab	$ 5,400,000	$ 9,800,000	$ 9,900,000	$ 9,900,000	$ 12,400,000	$ 47,400,000	23.6%
Plan Review and Erosion Control	$ 1,105,000	$ 1,138,150	$ 1,232,441	$ 1,269,414	$ 1,307,496	$ 6,052,500	3.0%
Capital Improvements	$ 9,040,000	$ 12,480,000	$15,480,000	$ 15,480,000	$ 21,740,000	$ 74,220,000	36.9%
Total Projected Costs	$ 28,108,260	$ 36,968,558	$41,395,297	$ 42,452,477	$ 52,071,281	$200,995,873	100.0%

B. OPTIONS

1. MAINTAINING THE STATUS QUO

Currently the County provides a basic and/or minimal level of service in several key stormwater management areas including maintenance, regulatory compliance, infrastructure inspection, watershed planning, and capital improvements. As noted in the previous section, the current level of service provides for regular inspection of stormwater facilities and the storm sewer system, maintenance of high priority – high risk problems, on-call emergency response, continued watershed planning, basic regulatory compliance, plan review, complaint response, and extremely minimal capital improvements. Continuing with the status quo will provide the community with the most basic, minimal services on a reactive schedule. Some of the indirect costs associated with the decision to continue to operate at this level of service include:

- A deteriorating infrastructure, resulting in higher annual system failures, higher yearly maintenance costs and long-term increased capital replacement costs;
- Non-functioning or inadequately functioning facilities, negatively impacting water quality and water quantity control and potentially increasing risk to public safety;

- Inability to fund the stormwater improvements currently being identified through the watershed planning studies, resulting in community disappointment after having worked with the County staff, in good faith, to identify watershed needs and establish priorities;
- Eventual non-compliance with regulatory requirements that mandate properly functioning BMPs, that specify inventory updates, system monitoring and reporting requirements, that require compliance with Total Maximum Daily Load restrictions; and that require expanded public outreach and education;
- Slower responses to citizen's calls and complaints on stormwater issues; and
- Increased liability for potential failure of dams or other facilities that could result in flood damage to property and threats to public safety.

The cost of operating the stormwater management program and drainage system will not get cheaper, less expensive, and less costly. Moving to a more preventative program will reduce operating costs over time.

2. IMPLEMENTING AN ENHANCED LEVEL OF SERVICE

Based on review of existing County documents, discussions with County staff, and comparison with other similar stormwater programs in the Eastern United States, the County will need to enhance their current stormwater program in order to achieve the goals and outcomes defined in protection strategies, both regulatory and voluntary, in the 2003 Strategic Plan, and in the County's Environmental Agenda. Without a change in program strategies the County will be unable to achieve long-term performance of the stormwater management and drainage system. The County should provide the public with a program that protects their investment in the community and in the existing stormwater infrastructure, and to minimize the liability of the County for any system failures. The minimal investment in capital improvements and maintenance rehabilitation and retrofits will result in increased infrastructure failures and more costly maintenance.

The improvements in the level of service need not happen all in one year. In fact, adding services in a planned way with the overall goal of having a comprehensive program in place within the next 5 to 10 years is a more manageable and effective way to build a solid program. By prioritizing the needs and estimating the investment needed to meet these needs on an annual basis, the County can build a stepped approach to full implementation of a stormwater program that will shift over time to a more proactive, responsive service to the community. The following section outlines what elements the enhanced program would include. This information is then placed into two proposed 5-year plans to show potential options for building the program and to show the potential costs for using this approach.

3. INCREASE IN CAPITAL IMPROVEMENTS CONSTRUCTION PROGRAM WITH MINIMAL INCREASE IN PLANNING AND MAINTENANCE SERVICES

Fairfax County's capital improvement construction program backlog is valued between $340 million (based on identified project needs) to $800 million (based on projected capital improvements identified through the current update of Watershed Plans). The backlog will increase over time due to ordinary aging of stormwater management

facilities and conveyance systems. One approach to addressing an increased level of service is to maintain the current maintenance and planning services while increasing investment in the capital improvements program through either a dedicated user fee or through increases in local real estate taxes. With this change in the level of service, some new resources will be needed in Stormwater Planning and in Maintenance to address the expanded physical system and to design and construct the new facilities or conveyance system. This will ultimately result in an overall reduced level of service because of the stress placed on already limited internal staff resources and will not contribute to solving or addressing water quality regulatory challenges or mandates that are not capital related.

This will honor the current watershed planning initiative by investing in capital improvements identified and prioritized with citizen input. This may be one approach to a long-term commitment to achieving a comprehensive stormwater program, but only if, at some time in the future, levels of service in all areas of stormwater program management receive the support necessary to achieve long-term goals defined in the Strategic Plan for the County.

C. PRELIMINARY PROGRAM RECOMMENDATIONS

In addition to continuing with the current services now provided by the County, the following additional elements have been identified as steps needed in the implementation of a long-term successful stormwater management program.

1. ADMINISTRATION

- Develop and integrate a new, robust work order system. This will include hardware, software, and training to ensure maximum efficiency of the system.
- Expand contract management capabilities by consolidating many of these services under an administrative contracts manager.
- Establish a section for administration of the stormwater utility, if this funding option is pursued.

2. SPECIAL PROGRAMS

- Increase public education activity to meet regulatory compliance and to increase public understanding of the goals and activities within the overall program, as well as engage them in participating in stormwater program activities.
- Obtain new data application software to allow tracking of multiple, integrated stormwater activities such as BMP installation, site inspection results, enforcement activities, and mitigation opportunities. Build a database management tool to increase staff efficiencies in serving the public and in improving stormwater system performance.
- Update and maintain watershed plans, hydraulic/hydrologic models, and capital improvement prioritization.
- Update and maintain the GIS impervious data layer.
- Update and maintain physical stream assessment inventory and related maintenance activities.
- Set-up a grant or cost-share program to retrofit existing private stormwater facilities and to encourage installation of innovative BMPs.

3. WATERSHED PLANNING AND ENGINEERING

- Organize the Watershed Planning process by dividing the planning area into quadrants to improve efficiency and effectiveness in overall planning capability. This will support implementation of each Plan's recommendations and meet the schedule to have all studies complete by 2010.
- Improve effectiveness in review of rezoning cases.
- Update and/or develop new BMP design standards. Once the update is complete, increase level of service to ensure standards are updated in a timely manner.
- Increase use of stream gauges to enhance data collection to support water quality protection program, sediment transport reduction and flood protection activities.
- Complete upgrades or retrofits to recently regional or State designated PL-566 dams and complete design, construction and oversight of backlog of other facility retrofits.
- Support increase in funding for capital improvement (i.e. design, inspection and contract management/project management).

4. OPERATIONS AND MAINTENANCE

- Perform mowing and routine maintenance of facilities twice per year (increase from current level of service of once per year).
- Upgrade, within the next 10 years, all public stormwater management facilities so that they function properly. This includes management of the program for major pond rehabilitation projects.
- Implement a new dam safety program, including inspection and maintenance activities. Include vegetative management services at these facilities.
- Implement an enhanced enforcement capability to ensure private facilities are operating as designed.
- Increase frequency of the inspection of the storm sewer system.
- Expand capability to perform storm sewer system upgrades and replacements.
- Expand maintenance services to include inspection of and additional work orders on both public and private facilities that will be necessary as new BMPs (LIDs, innovative techniques) are installed.
- Reduce incidence of erosion through new stream "spot" improvements program and erosion control measures.

5. CAPITAL CONSTRUCTION

- Implement capital improvement projects (backlog estimated between $340 million to $800 million) over the next 20 to 40 years. These projects will position the County for regulatory compliance and facilitate restoration of the County's streams, 70% of which are in fair to very poor condition.
- Ensure capability of construction inspection and right-of-way acquisition services needed as a result of increase in capital spending.

D. PRELIMINARY PROGRAM COSTS

The enhancements identified above have been evaluated to determine the potential cost impacts to the County to initiate effort to achieve a comprehensive stormwater program over the next 5 to 10 years. Two cost projections are provided.

Table III-2 addresses the program objectives and continues current services at the level budgeted in 2004, with most enhancements initiated in FY 2006.

The second projection, Table III-3, is a more moderate approach, building the overall program to an optimal level in Year 2010, with the expansion of services more slowly than in the first projection.

It is noted that the existing budget for current services, in each Cost Model, was projected over the five-year period by using a three (3) percent escalator. Billing costs for a utility are projected using costs for a third party billing agent to manage the process.

Table III – 2

Fairfax County Comprehensive Stormwater Program - Optimal Cost Projections for FY 2006 through FY 2010

Program Element	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	Total
Administration and Management						
Workorder System	$ 100,000	$ 100,000	$ 100,000			$ 300,000
Contract Process Management	$ 60,000	$ 61,800	$ 63,654	$ 65,564	$ 67,531	$ 318,548
Subtotal Enhancements	$ 160,000	$ 161,800	$ 163,654	$ 65,564	$ 67,531	$ 618,548
Existing Annualized Costs	$ 1,072,260	$ 1,104,428	$ 1,137,561	$ 1,171,687	$ 1,206,838	$ 5,692,774
Cost Center Total	$ 1,232,260	$ 1,266,228	$ 1,301,215	$ 1,237,251	$ 1,274,369	$ 6,311,322
Special Programs						
Support for Regional Initiatives	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 375,000
GIS-Database Management	$ 60,000	$ 15,000	$ 15,000	$ 15,000	$ 15,000	$ 120,000
Management of Digital Model/Database	$ 60,000	$ 61,800	$ 63,654	$ 65,564	$ 67,531	$ 318,548
Stream Assessment and Inventory Program	$ 55,000	$ 56,650	$ 58,350	$ 60,100	$ 61,903	$ 292,002
BMP Retrofit Grant Program	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 500,000
Communications Plan Implementation						
Microsite Development/Maintenance	$ 10,000	$ 4,000	$ 4,000	$ 4,000	$ 4,000	$ 26,000
Video Production and Brochures	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 500,000
Staff	$ 55,000	$ 56,650	$ 58,350	$ 60,100	$ 61,903	$ 292,002
Materials	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 50,000
Subtotal Enhancements	$ 525,000	$ 479,100	$ 484,353	$ 489,764	$ 495,336	$ 2,473,553
Existing Annualized Costs	$ 179,000	$ 184,370	$ 189,901	$ 195,598	$ 201,466	$ 950,335
Cost Center Total	$ 704,000	$ 663,470	$ 674,254	$ 685,362	$ 696,803	$ 3,423,888
Billing and Finance						
Master Account File Management	$ 60,000	$ 61,800	$ 63,654	$ 65,564	$ 67,531	$ 318,548
Bill Production/Accounting/Collection	$ 1,800,000	$ 1,800,000	$ 1,800,000	$ 1,800,000	$ 1,800,000	$ 9,000,000
Subtotal Enhancements	$ 1,860,000	$ 1,861,800	$ 1,863,654	$ 1,865,564	$ 1,867,531	$ 9,318,548
Existing Annualized Costs	$ 132,000	$ 135,960	$ 140,039	$ 144,240	$ 148,567	$ 700,806
Cost Center Total	$ 1,992,000	$ 1,997,760	$ 2,003,693	$ 2,009,804	$ 2,016,098	$ 10,019,354
Planning and Engineering (combined)						
Design and Project Management	$ 125,000	$ 250,000	$ 325,000	$ 500,000	$ 500,000	$ 1,700,000
BMP Standards Update	$ 100,000	$ 100,000	$ 40,000	$ 41,200	$ 42,436	$ 323,636
Planning and Zoning Support	$ 60,000	$ 61,800	$ 121,800	$ 125,454	$ 129,218	$ 498,272
Emergency Response/Monitoring Support	$ 30,000	$ 45,000	$ 60,000	$ 60,000	$ 60,000	$ 255,000
Dam Safety Program Management		$ 60,000	$ 61,800	$ 63,654	$ 65,564	$ 251,018
Subtotal Enhancements	$ 315,000	$ 516,800	$ 608,600	$ 790,308	$ 797,217	$ 3,027,925
Existing Annualized Costs	$ 3,515,000	$ 3,620,450	$ 3,729,064	$ 3,840,935	$ 3,956,163	$ 18,661,612
Cost Center Total	$ 3,830,000	$ 4,137,250	$ 4,337,664	$ 4,631,243	$ 4,753,381	$ 21,689,538
Operations and Maintenance						
Contract Mowing Program		$ 175,000	$ 175,000	$ 225,000	$ 225,000	$ 800,000
In-house Mowing Program			$ 240,000	$ 247,200	$ 254,616	$ 741,816
Retrofit Program Management	$ 55,000	$ 56,650	$ 58,350	$ 60,100	$ 61,903	$ 292,002
Public WQ Facilities Maintenance	$ 1,145,000	$ 1,145,000	$ 1,225,000	$ 1,345,000	$ 1,345,000	$ 6,205,000
Conveyance System Maintenance		$ 253,000	$ 510,000	$ 775,000	$ 798,250	$ 2,336,250
Inspection Program						
Facilities Inspection		$ 60,000	$ 61,800	$ 123,800	$ 127,514	$ 373,114
LID Inspection (private facilities)	$ 120,000	$ 240,000	$ 360,000	$ 480,000	$ 600,000	$ 1,800,000
Subtotal Enhancements	$ 1,320,000	$ 1,929,650	$ 2,630,150	$ 3,256,100	$ 3,412,283	$ 12,548,182
Existing Annualized Costs	$ 4,025,000	$ 4,145,750	$ 4,270,123	$ 4,398,226	$ 4,530,173	$ 21,369,272
Cost Center Total	$ 5,345,000	$ 6,075,400	$ 6,900,272	$ 7,654,326	$ 7,942,456	$ 33,917,454
Plan Review and Erosion Control						
Enhanced E&S Inspection Program	$ 60,000	$ 61,800	$ 123,800	$ 127,514	$ 131,339	$ 504,453
Subtotal Enhancements	$ 60,000	$ 61,800	$ 123,800	$ 127,514	$ 131,339	$ 504,453
Existing Annualized Costs	$ 1,045,000	$ 1,076,350	$ 1,108,641	$ 1,141,900	$ 1,176,157	$ 5,548,047
Cost Center Total	$ 1,105,000	$ 1,138,150	$ 1,232,441	$ 1,269,414	$ 1,307,496	$ 6,052,500
Capital Construction						
Maintenance Capital Improvements						
SW Management Facility Rehabilitation	$ 7,200,000	$ 2,400,000	$ 2,400,000	$ 2,400,000	$ 2,400,000	$ 16,800,000
Conveyance System Rehabilitation	$10,000,000	$10,000,000	$10,000,000	$10,000,000	$10,000,000	$ 50,000,000
Capital Improvements	$10,000,000	$10,000,000	$15,000,000	$15,000,000	$20,000,000	$ 70,000,000
Design Costs Major	$ 1,850,000	$ 1,620,000	$ 2,120,000	$ 2,120,000	$ 2,620,000	$ 10,330,000
Land Acquisition/ROW	$ 1,850,000	$ 1,620,000	$ 2,120,000	$ 2,120,000	$ 2,620,000	$ 10,330,000
Subtotal Enhancements	$30,900,000	$25,640,000	$31,640,000	$31,640,000	$37,640,000	$157,460,000
Existing Annualized Costs	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 12,500,000
Cost Center Total	$33,400,000	$28,140,000	$34,140,000	$34,140,000	$40,140,000	$169,960,000
Total Program Improvements	$35,140,000	$30,650,950	$37,514,211	$38,234,813	$44,411,237	$185,951,211
Total Existing Program Costs	$12,468,260	$12,767,308	$13,075,327	$13,392,587	$13,719,364	$ 65,422,846
Total Stormwater Program Costs	$47,608,260	$43,418,258	$50,589,538	$51,627,400	$58,130,602	$251,374,057

Note:
Existing annualized costs are rounded up from the Current Cost Allocation Table and inflated at a 3 percent rate.
Billing costs are set at $6.00 per account per year based on an estimated 300,000 accounts, assuming a third-party billing system.

Table III – 3

Fairfax County Comprehensive Stormwater Program - Recommended Approach
Cost Projections for FY 2006 through FY 2010

Program Element	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	Total
Administration and Management						
Workorder System	$ 100,000	$ 100,000	$ 100,000			$ 300,000
Contract Process Management	$ 60,000	$ 61,800	$ 63,654	$ 65,564	$ 67,531	$ 318,548
Subtotal Enhancements	$ 160,000	$ 161,800	$ 163,654	$ 65,564	$ 67,531	$ 618,548
Existing Annualized Costs	$ 1,072,260	$ 1,104,428	$ 1,137,561	$ 1,171,687	$ 1,206,838	$ 5,692,774
Cost Center Total	$ 1,232,260	$ 1,266,228	$ 1,301,215	$ 1,237,251	$ 1,274,369	$ 6,311,322
Special Programs						
Support for Regional Initiatives	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 375,000
GIS-Database Management	$ 60,000	$ 15,000	$ 15,000	$ 15,000	$ 15,000	$ 120,000
Management of Digital Model/Database	$ 60,000	$ 61,800	$ 63,654	$ 65,564	$ 67,531	$ 318,548
Stream Assessment and Inventory Program	$ 55,000	$ 56,650	$ 58,350	$ 60,100	$ 61,903	$ 292,002
BMP Retrofit Grant Program	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 500,000
Communications Plan Implementation						
Microsite Development/Maintenance	$ 10,000	$ 4,000	$ 4,000	$ 4,000	$ 4,000	$ 26,000
Video Production and Brochures	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 500,000
Staff	$ 55,000	$ 56,650	$ 58,350	$ 60,100	$ 61,903	$ 292,002
Materials	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 50,000
Subtotal Enhancements	$ 525,000	$ 479,100	$ 484,353	$ 489,764	$ 495,336	$ 2,473,553
Existing Annualized Costs	$ 179,000	$ 184,370	$ 189,901	$ 195,598	$ 201,466	$ 950,335
Cost Center Total	$ 704,000	$ 663,470	$ 674,254	$ 685,362	$ 696,803	$ 3,423,888
Billing and Finance						
Master Account File Management	$ 60,000	$ 61,800	$ 63,654	$ 65,564	$ 67,531	$ 318,548
Bill Production/Accounting/Collection	$ 1,800,000	$ 1,800,000	$ 1,800,000	$ 1,800,000	$ 1,800,000	$ 9,000,000
Subtotal Enhancements	$ 1,860,000	$ 1,861,800	$ 1,863,654	$ 1,865,564	$ 1,867,531	$ 9,318,548
Existing Annualized Costs	$ 132,000	$ 135,960	$ 140,039	$ 144,240	$ 148,567	$ 700,806
Cost Center Total	$ 1,992,000	$ 1,997,760	$ 2,003,693	$ 2,009,804	$ 2,016,098	$ 10,019,354
Planning and Engineering (combined)						
Design and Project Management	$ 125,000	$ 250,000	$ 325,000	$ 500,000	$ 500,000	$ 1,700,000
BMP Standards Update	$ 100,000	$ 100,000	$ 40,000	$ 41,200	$ 42,436	$ 323,636
Planning and Zoning Support	$ 60,000	$ 61,800	$ 121,800	$ 125,454	$ 129,218	$ 498,272
Flow/stream condition monitoriong	$ 30,000	$ 45,000	$ 60,000	$ 60,000	$ 60,000	$ 255,000
Dam Safety Program Management		$ 60,000	$ 61,800	$ 63,654	$ 65,564	$ 251,018
Subtotal Enhancements	$ 315,000	$ 516,800	$ 608,600	$ 790,308	$ 797,217	$ 3,027,925
Existing Annualized Costs	$ 3,515,000	$ 3,620,450	$ 3,729,064	$ 3,840,935	$ 3,956,163	$ 18,661,612
Cost Center Total	$ 3,830,000	$ 4,137,250	$ 4,337,664	$ 4,631,243	$ 4,753,381	$ 21,689,538
Operations and Maintenance						
Contract Mowing Program		$ 175,000	$ 175,000	$ 225,000	$ 225,000	$ 800,000
In-house Mowing Program			$ 240,000	$ 247,200	$ 254,616	$ 741,816
Retrofit Program Management	$ 65,000	$ 66,950	$ 68,959	$ 71,027	$ 73,158	$ 345,094
Public WQ Facilities Maintenance	$ 715,000	$ 715,000	$ 1,005,000	$ 1,130,000	$ 1,345,000	$ 4,910,000
Conveyance System Maintenance		$ 253,000	$ 510,000	$ 775,000	$ 798,250	$ 2,336,250
Inspection Program						
Facilities Inspection		$ 65,000	$ 66,950	$ 132,950	$ 136,939	$ 401,839
LID Inspection (private facilities)		$ 65,000	$ 130,000	$ 260,000	$ 520,000	$ 975,000
Subtotal Enhancements	$ 780,000	$ 1,339,950	$ 2,195,909	$ 2,841,177	$ 3,352,963	$ 10,509,998
Existing Annualized Costs	$ 4,025,000	$ 4,145,750	$ 4,270,123	$ 4,398,226	$ 4,530,173	$ 21,369,272
Cost Center Total	$ 4,805,000	$ 5,485,700	$ 6,466,031	$ 7,239,403	$ 7,883,136	$ 31,879,270
Plan Review and Erosion Control						
Enhanced E&S Inspection Program	$ 60,000	$ 61,800	$ 123,800	$ 127,514	$ 131,339	$ 504,453
Subtotal Enhancements	$ 60,000	$ 61,800	$ 123,800	$ 127,514	$ 131,339	$ 504,453
Existing Annualized Costs	$ 1,045,000	$ 1,076,350	$ 1,108,641	$ 1,141,900	$ 1,176,157	$ 5,548,047
Cost Center Total	$ 1,105,000	$ 1,138,150	$ 1,232,441	$ 1,269,414	$ 1,307,496	$ 6,052,500
Capital Construction						
Maintenance Capital Improvements						
SW Management Facility Rehabilitation	$ 2,400,000	$ 4,800,000	$ 2,400,000	$ 2,400,000	$ 2,400,000	$ 14,400,000
Conveyance System Rehabilitation	$ 3,000,000	$ 5,000,000	$ 7,500,000	$ 7,500,000	$ 10,000,000	$ 33,000,000
Capital Improvements	$ 5,000,000	$ 7,500,000	$ 10,000,000	$ 10,000,000	$ 15,000,000	$ 47,500,000
Design Costs Major	$ 770,000	$ 1,240,000	$ 1,490,000	$ 1,490,000	$ 2,120,000	$ 7,110,000
Land Acquisition/ROW	$ 770,000	$ 1,240,000	$ 1,490,000	$ 1,490,000	$ 2,120,000	$ 7,110,000
Subtotal Enhancements	$ 11,940,000	$ 19,780,000	$ 22,880,000	$ 22,880,000	$ 31,640,000	$ 109,120,000
Existing Annualized Costs	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 12,500,000
Cost Center Total	$ 14,440,000	$ 22,280,000	$ 25,380,000	$ 25,380,000	$ 34,140,000	$ 121,620,000
Total Program Improvements	$ 15,640,000	$ 24,201,250	$ 28,319,970	$ 29,059,890	$ 38,351,917	$ 135,573,026
Total Existing Program Costs	$ 12,468,260	$ 12,767,308	$ 13,075,327	$ 13,392,587	$ 13,719,364	$ 65,422,846
Total Stormwater Program Costs	$ 28,108,260	$ 36,968,558	$ 41,395,297	$ 42,452,477	$ 52,071,281	$ 200,995,873

Note:
Existing annualized costs are rounded up from the Current Program Cost Allocation table and inflated at 3 percent annual rate.
Billing costs are projected at $6.00 per account, per year based on the use of a third-party billing agent.

CHAPTER IV

FUNDING METHODS AND REVENUE GENERATING CAPACITY

A. CHAPTER SUMMARY

The purpose of this discussion is to examine the funding mechanisms available to Fairfax County to support its stormwater management program. The information is intended for use by the County to help make policy decisions regarding the right mix of funding tools to achieve the County's target level of service. The Chapter helps to highlight issues of funding equity (linking revenue sources with those who place a demand on the County for the service) and funding adequacy (the ability of a potential source to produce sufficient and stable revenue). The Chapter also divides revenue into those with the capacity to fund an entire program (primary sources), and those with the capacity to fund specific program elements (secondary sources).

Primary Funding Methods	Secondary Funding Methods
• General Fund Appropriations • Stormwater Service Fees (Stormwater Utility)	• Other Service Fees • Special Assessments • Pro Rata Shares – Capital Projects Only • Watershed Improvement Districts • Federal and State Funding/Grants/Loans • In-Lieu-Of-Construction Fees • General Obligation and Revenue Bonding – Capital Projects Only

While the potential secondary sources of revenue identified above can support specific program elements within the County's stormwater program, there are only two commonly recognized primary funding mechanisms that can create sufficient revenues to support stormwater management in Fairfax. These are the General Fund, supported primarily through the real property tax, and a stormwater utility fee.

Evaluation of the funding tools identifies four levels of service that are directly driven by the funding options available to the County. As a result, after considering how secondary sources can fund specific program elements, the County's major options for stormwater funding include the following:

- Maintain the status quo, utilizing a mix of General Funds and Pro Rata Share.
- Reallocate General Funds from other County services and programs to stormwater management to address increase the level of service recommended in Chapter III.
- Raise real property taxes and dedicate a portion to stormwater management to increase the level of service recommended in Chapter III.

- Implement a dedicated stormwater utility fee, relieving the General Fund, increasing the level of service as recommended in Chapter III.

B. OVERVIEW OF STORMWATER FUNDING MECHANISMS

Fairfax County has several funding options available by Virginia statute. However, standards and limitations exist that influence the viability of these different funding mechanisms. Stormwater funding mechanisms commonly used by local governments in the United States include taxes (e.g., on property, retail sales, real property sales, income, and business gross or net profits taxes), exactions, special assessments, and service fees (sometimes also termed user fees or service charges). Each has a different underlying philosophy that guides the structure of the funding mechanism and the use of the revenues.

Funding mechanisms can also be distinguished as *ad valorem* or *non-ad valorem*. Ad valorem simply indicates that something is imposed based on a percent of value. By contrast, non-ad valorem is associated with or conditioned upon the performance of an act, the engaging in an occupation, or the enjoyment of a privilege. The following is a brief overview of the different types of funding mechanisms.

Table IV.1: Summary of Common Stormwater Funding Mechanisms

Taxes	Most general purpose local governmental functions are primarily funded through taxes that simply generate revenue. For example, an ad-valorem property tax is often imposed upon real (and sometimes personal) property based on its value. The purpose is simply to provide revenue to defray the expenses of general government, as distinguished from the expense of a specific function or service. It is not necessary for a tax to have a demonstrable association with any particular purpose or function.
Exaction	An exaction, or excise tax, is most commonly associated with franchise rights and development-related activities or impacts. Over many years the term has come to mean and include practically any tax that is not an ad-valorem tax. An example is a franchise fee on a cable utility. The franchise fee is imposed based on the privilege of running wires along public rights-of-way, rather than any assessment of the value of the information transmitted. However, like other taxes, the ultimate use of the revenue does not need to be associated with its source.
Special Assessment	The essential characteristic of a special assessment is that it must confer some direct and special benefit to the property being assessed. A special assessment is based on the premise that the property assessed is enhanced in value at least to the amount of the assessment. Like service fees, special assessments are intended for a specific purpose rather than simply as a revenue generating mechanism. Assessments may be based on property value (ad valorem) or other factors (non-ad valorem) such as frontage along a street or sidewalk improvement.
Service Fee/ Stormwater Utility	A stormwater service fee, often referred to as a stormwater utility, is funded primarily through service or user fees or charges that are related to the cost of providing the services and facilities. Funding stormwater programs through dedicated enterprise accounting provides a mechanism for receipt and allocation of multiple revenue sources dedicated to stormwater management. A service

	fee is imposed on persons or properties for the purpose of recovering the cost of providing service. A stormwater service charge rate methodology is adopted to set the appropriate fees and charges.

The stormwater funding options available to Fairfax County can also be described as "primary" and "secondary." Primary methods have the capacity to support the entire program, while secondary methods are applicable to special needs or situations, but are not capable of funding a full program. The primary funding methods discussed in this paper might be used as the sole sources of funding for a program, but are more typically used in combination with secondary sources.

Table IV-2: Primary and Secondary Stormwater Funding Mechanisms

Primary Funding Methods	Secondary Funding Methods
• General Fund Appropriations • Stormwater Service Fees (Stormwater Utility)	• Other Service Fees • Special Assessments • Pro Rata Shares • Watershed Improvement Districts • Federal and State Funding/Grants/Loans • In-Lieu-Of-Construction Fees • General Obligation and Revenue Bonding

Local governments across the United States have used all the funding mechanisms examined in this paper to some degree. Legislative and/or charter authority and the mission and priorities in each community have guided the selection of a preferred approach. There is no single funding mechanism that is best in every setting. Some funding sources are better suited to operations and maintenance, while others are used strictly for capital improvements. Adequate, consistent funding of a stormwater program is more important to the long-term success of the effort than the actual source of revenue. The following sections provide a synopsis of each of the primary and secondary funding mechanisms available in Virginia. Where applicable, each synopsis provides a description of how the revenue source has been used in Fairfax County to support the stormwater program.

1. PRIMARY FUNDING METHODS

a. GENERAL FUND APPROPRIATIONS

The majority of General Fund revenues in most Virginia localities are derived primarily from real property taxes. This is true in Fairfax County, where real property taxes comprise 60.7% of General Fund revenues. Other major sources of General Fund revenues in Fairfax County include personal property taxes (17.1% including reimbursements from Virginia as a result of the Personal Property Tax Relief Act of 1998) and other local taxes (14% including the local sales tax and Business, Professional, and Occupational Licenses). The demands on the stormwater system placed by a specific parcel have little relationship to property values or business sales activity levels. The system requirements are a function of the peak rate and total amount of stormwater runoff that must be carried safely through the community.

Typically, the revenue sources that support the General Fund are based on a "taxation" philosophy – the purpose of which is simply to raise revenue. It is not necessary that there be any association or relationship between the source of revenue and the purpose to which it is applied.

Using General Fund appropriations for stormwater management also produces a level of inequity in that some properties that place demands on the system may be exempt from property taxes. For instance, §58.1-3609 *et seq* of the Code of Virginia exempts a range of religious, charitable, patriotic, historical, benevolent, cultural, and public park and playground uses from real and personal property taxes. As a result, they do not participate in funding stormwater management through the General Fund. Similarly, some private properties, e.g. parking lots and storage warehouses that have large expanses of impervious coverage, do not pay real property taxes commensurate with the demands they impose on the stormwater system. Conversely, some properties that have little impact on stormwater runoff but pay proportionately higher property taxes are paying more for stormwater management through the General Fund than they would through funding methods based on the actual demands they place on the system.

General Fund appropriations for any specific purpose can also be highly uncertain from year to year, as revenue is not dedicated to any specific purpose. Allocations shift with real and perceived priorities. Stormwater management needs are likely to receive a higher priority in a year following severe storms and drainage problems than in a year following a drought. This makes it difficult to engage in long-term planning for the program.

One option often considered by local governments to provide a source of revenue for stormwater functions is to dedicate a portion of the real property tax. A unique example is Prince George's County, Maryland, which taxes real property at a rate of $0.135 per $100 of assessed value for stormwater management. It is important to note that the funding generated by this tax is set aside in an enterprise fund that must be used for stormwater by State law. The funding scheme is unique in that the tax was established by Maryland when the Washington Suburban Sanitation Commission (WSSC) had responsibility for stormwater in the County. This authority was then transferred to Prince George's County. There is no parallel enabling authority established in Virginia.

In Virginia, the City of Fairfax established a separate stormwater management fund in the mid-1990s that is funded through the real property tax. The portion of the real property tax going to the fund is determined each year by the City Council based on the fund balance versus the needs contained in the City's stormwater capital program. The capital program was first developed in 1991, and is periodically re-assessed. During the first few years of program implementation, the dedicated portion of the real property tax ranged from $0.01 to $0.02 per $100 of assessed value. However, there is currently an unspent balance in the fund, and no allocations have been made in the past few years. If additional project needs arise, then additional funds may be allocated. Unlike Prince George's County, the portion of the real property tax going to stormwater in the City of Fairfax is not presented as a separate tax, but is simply a part of the overall budget deliberations. Therefore, stormwater funding is still subject to competition with other budget priorities.

Application in Fairfax County Fairfax County's existing stormwater management program is largely funded through General Fund appropriations. The General

Fund could potentially support an increase in spending on stormwater programs either through a tax increase or through reallocation of current resources. Reductions in other services funded from the General Fund to avoid a tax increase may or may not be publicly acceptable. The Fairfax County Board of Supervisors adopted an FY 2005 real property tax rate of $1.13 per $100 of assessed value, which was reduced from the FY 2004 rate of $1.16. At FY 2005 real property values, each penny the tax rate is increased results in approximately $14.5 million in revenue generated.

b. STORMWATER SERVICE FEES (STORMWATER UTILITY)

Service fees are becoming an increasingly popular source of dedicated stormwater funding, with over 500 in existence throughout the United States. In Virginia, stormwater service fees must be based on some measure of a property's contribution to stormwater runoff. Table 3 presents Virginia's stormwater utility enabling legislation.

Table IV- 3: Stormwater Utility Enabling Legislation

The enabling legislation for stormwater utilities in Virginia (Code of Virginia §15.2-2114) specifically states that:

1. A utility can be established, by ordinance, to cover the following costs:
   a. Acquisition of real and personal property to construct, operate and maintain stormwater control facilities;
   b. Cost of administering programs;
   c. Engineering and design, debt retirement, construction costs for new facilities and enlargement or improvement of existing facilities;
   d. Facility maintenance;
   e. Monitoring of stormwater control devices;
   f. Pollution control and abatement, consistent with state and federal regulations;
   g. Planning, design, land acquisition, construction, operation and maintenance activities.
2. Charges shall be based on contributions to stormwater runoff.
3. Charges may be assessed to property owners or to occupants, including condominium unit owners or tenants (if tenant is the one who is being billed for water and sewer).
4. Utility shall waive charges in the following cases:
   a. From federal, state and local government agencies, when the agency owns and provides for maintenance of storm drainage and stormwater control facilities or is a unit of the locality administering the program.
   b. From roads and public street rights-of-way that are owned and maintained by state and local agencies.
5. Utility may waive charges, partially or in full in the following case:
   a. From cemeteries.
   b. From any person who owns and provides for complete private maintenance of storm drainage and stormwater facilities, provided such person has developed so that there is a permanent reduction in post-development stormwater flow and pollutant loading.
6. Locality may issue general obligation bonds or revenue bonds to finance the cost of infrastructure and equipment for a stormwater control program.
7. In case of failure to pay fees, the agency can charge interest on past due amounts and can recover by action of law or suit in equity and shall constitute a lien against the property, ranking on parity with liens for unpaid taxes.

The general standard applied to utility fees is that the rate methodology must be fair and reasonable, and resultant charges must bear a substantial relationship to the cost of providing services. However, the local government has a great deal of flexibility in

attaining these objectives in the context of local circumstances. When stormwater utility rates have been subjected to legal challenges, the courts have tended to apply "judicial deference" to the decisions of locally elected officials. Under judicial deference, the courts will not intervene unless a plaintiff can demonstrate that the decision was arrived at arbitrarily and capriciously or that the result of the decision discriminates illegally.

Stormwater service fees typically provide more stable revenue than other funding options, offer the opportunity to design a service fee rate methodology that results in an equitable allocation of the cost of services and facilities, and, in some cases, can provide an opportunity to shift a portion of the community's stormwater management burden away from the General Fund. Service fee rate structures are designed to recover costs based on the demands placed on the stormwater systems and programs.

Based on an analysis by AMEC Earth & Environmental, Inc., the average single-family stormwater utility charge nation-wide is $3.05 per month. Table 4 provides information on existing stormwater utilities in Virginia.

Table IV- 4: Fiscal Year 2003-2004 Data on Stormwater Utilities in Virginia

Locality	NPDES Phase I / Phase II	Single-Family Residential Stormwater Fee	Commercial Stormwater Fee Per Month	Total Annual Revenue Generated
City of Norfolk, VA	Phase I	$5.40/month	$0.124 per 2,000 sq. ft. of impervious area	$7.4 million
City of Virginia Beach, VA	Phase I	$4.29/month	$4.29 per 2,269 sq. ft. of impervious area	$12.7 million
City of Portsmouth, VA	Phase I	$3.50/month	$3.50 per 1,877 sq. ft. of impervious area	$2.6 million
City of Newport News, VA	Phase I	$3.10/month *See note 1.*	$3.10 per 1,777 sq. ft. of impervious area	$5.5 million
City of Hampton, VA	Phase I	$3.50/month	$3.50 per 2,429 sq. ft. of impervious area	$3.7 million
City of Chesapeake, VA	Phase I	$2.55/month	$2.55 per 2,112 sq. ft. of impervious area	$4.2 million
Prince William County, VA	Phase I	$1.73/month *See note 2.*	$0.84 per 1,000 sq. ft. of impervious area	$2.8 million

Note 1: The City of Newport News bills multifamily residences at 0.42 ERUs, or $1.30 per month.
Note 2: Prince William County bills apartments, condominiums, and townhomes at ¾ of the single family rate, or $1.2975/month. Prince William County's single-family residential ERU equals 2,059 sq. ft. of impervious area.

The revenue generation capacity of a stormwater utility is similar to that of the real property tax, except that the utility fee is directly linked to impervious surface cover or another measurable characteristic, rather than assessed value. Determining a legally defensible rate needed to generate revenue sufficient to finance the County's

stormwater needs would require the County to engage in a "stormwater utility rate study." During this study, important policy decisions are made that can have significant implications for the selected rate. An important first step in the process is to determine the average impervious land cover in square feet for a single-family residential lot. Although it is common for all single-family lots to be charged a flat fee, the Equivalent Residential Unit (ERU) is applied to all other classifications of land. For example, if the ERU is 2,000 square feet of impervious surface, and the fee is $2, a commercial lot with 10,000 square feet of impervious surface cover would pay $10 (10,000/2,000 = 5 ERUs multiplied by $2).

In addition to technical determinations, the County must address a range of policy questions that ultimately impact the structure of the utility, as well as the stormwater utility rate. Major policies questions are presented in Table 5.

Table IV-5: Policy Decisions Affecting Utility Rate and Structure

Policy Decisions Affecting Utility Rate and Structure

1. **Program:** Will all, or only part of the current program/service elements identified in the program evaluation be shifted to the enterprise fund?
2. **General Fund:** Will the utility pay for services received from the General Fund such as general overhead? (Indirect Cost Allocation)
3. **Special Fees and Other Revenues:** What additional revenue sources will be used, or created, to support stormwater programs that may result in a more equitable distribution of costs (existing or future increases in fees for erosion and sediment control; fees for inspection of private BMPs; grants, etc.)?
4. **Financial Factors:** What is the fund balance test that must be maintained by the enterprise fund? Is interest earned by the cash flow from the utility credited to the enterprise fund? What is the "bad debt" factor (based on history of collecting fees)? Are fund balances appropriated in the following year?
5. **Reserves:** Will an emergency reserve be established to address catastrophic system failures? What level of operating reserve will be maintained?
6. **Bonds:** Will bonds be used to pay for the capital improvements program?
7. **Rate Allocation:** Will gross lot area be utilized along with imperviousness in the rate methodology?
8. **Exemptions:** Will exemptions be established other than those legally mandated by state statute?
9. **Credit Policy:** What will be considered for "credits" (i.e., stormwater management facilities that treat and/or detain stormwater from a specific site or sites) under the program?
10. **Billing:** What portion of the billing costs will be transferred to the stormwater enterprise fund? What portion of customer service costs will be transferred to the utility?
11. **Rate Policy:** Is it a goal that the rate be held constant for 3 years? Or 5 years? Or will the rate be adjusted annually?
12. **Bill Receipt:** Who will receive the bill, owners or current utility customers (such as renters and leasers)?

All of these policy decisions will need to be considered as part of a rate study should the County decide to pursue the implementation of a stormwater utility.

Application in Fairfax County A stormwater utility fee has not been implemented in Fairfax County. However, the potential implementation of a utility fee has been the subject of several County studies.

2. SECONDARY FUNDING METHODS

a. PLAN REVIEW, DEVELOPMENT INSPECTION, AND SPECIAL INSPECTION FEES

Most jurisdictions offset, at least in part, the cost to review plans and issues permits related to stormwater management by imposing various fees.

Application in Fairfax County In Fairfax County, the Office of Site Development Services is responsible for applying most environmental and stormwater related fees. For example, review of a Water Quality Impact Assessment under the County's Chesapeake Bay Preservation Ordinance is partially offset by a $175 application fee. Similarly, a fee of $800 must be submitted to cover the costs associated with drainage studies. Various plan review fees are contained in Section 104-1-3 of the County Code. By July 2006, Fairfax County will also begin collecting fees for Virginia Pollutant Discharge Elimination System (VPDES) stormwater construction permits. Responsibility for implementing this program will be transferred from the Virginia Department of Environmental Quality to Fairfax County under HB 1177 passed by the General Assembly in 2004. How much this new program will cost the County will depend on the fee amount, which is set through a State regulatory process.

At present, the County estimates that fees recuperate approximately 80% of the cost of providing specific services. Overall, however, these fees do not represent a major source of revenue. Although increased fees are an option, limitations in the amount of development will necessarily limit the amount of money that can be raised in this way.

b. SPECIAL ASSESSMENTS

The essential characteristic of a special assessment is that it must confer some direct and special benefit to the property, or properties, being assessed. Special assessments for stormwater are most workable in very localized applications. For example, improving a ditch or channel that directly serves a few properties or a relatively small area is an appropriate project for special assessment funding. A special assessment is based on the premise that the work being done enhanced the value of the properties assessed in an amount at least equal to the amount of the assessment. Like service fees, special assessments are intended for a specific purpose rather than simply as a revenue generating mechanism. A common requirement of assessments is that there must be a rational linkage (nexus) between the use of the revenue derived from the assessment and the benefit to the party to whom it is applied. Assessments may be based on

property value (ad valorem) or other factors (non-ad valorem) such as frontage along a street or sidewalk improvement.

In Virginia, one tool available for the creation of a special assessment for localized areas of a jurisdiction is the service district. The Code of Virginia (§15.2-2400) spells out that "Any locality may by ordinance, or any two or more localities may by concurrent ordinances, create service districts within the locality or localities… Service districts may be created to provide additional, more complete, or more timely services of government than are desired in the locality or localities as a whole." Service districts can provide a wide variety of services, and are usually used for water and sewer services, garbage removal and disposal services, and private street and road maintenance.

Service districts have not been used to fund holistic stormwater management in Virginia. While "stormwater management" services are not called out specifically, §15.2-2403(1) notes several specific services that are tangentially related to stormwater management, including the ability "to construct, maintain, and operate such facilities and equipment as may be necessary or desirable to provide additional, more complete or more timely governmental services… including but not limited to… street cleaning (and) snow removal." In addition, changes to §15.2-2403(1) enacted in the 2003 session of the General Assembly includes similar authority to "control infestations of *insects that may carry a disease that is dangerous to* humans" (HB1881) which could be tied to concerns over standing water in the storm sewer system and stormwater BMPs. These service districts also have the power to levy and collect "an annual tax upon any property in such service district subject to local taxation to pay, either in whole or in part, the expenses and charges for providing the governmental services authorized…" (§15.2-2403(6)). These funds must be segregated from General Fund dollars and be expended in the district in which they were raised.

Application in Fairfax County In Fairfax County, several service districts and special tax districts have been created for various purposes. These are presented in Table 6. However, none of these districts are for stormwater management, nor has the County ever considered the creation of a service district for stormwater.

Table IV-6: Service Districts/Special Tax Districts in Fairfax County (FY 2004)

Leaf Collection	$0.01 per $100 of assessed value on residential, commercial, and industrial properties within sanitary districts.
Refuse Collection	$210.00 annually within sanitary districts.
Gypsy Moth Control	$0.001 per $100 of the valuation of real estate within Fairfax County.
Water Service Districts	Clifton Forest Water Service District. On any lot within the district, an annual assessment of $661 for thirty years commencing July 1, 1993. The Colchester Road-Lewis Park Water Service District. On any lot within the district, an annual assessment of $959 commencing January 1, 2003 for thirty years.
Reston Community Center	This special tax district operates with a levy of $0.052 per $100 of assessed value on properties located in the district.
McLean Community Center	This special tax district operates on a levy of $0.028 per $100 assessed value on properties located in the district.

Burgundy Village Community Center	This special tax district operates on a levy of $0.02 per $100 assessed value on properties located in the district.
Route 28 Transportation Tax District	This special tax district operates on a levy of $0.20 per $100 assessed value on commercial and industrial zoned property, or property used for commercial or industrial purposes within the district. This tax levy does not apply to residential property.

c. PRO-RATA SHARES (PRS)

Under the Code of Virginia (§15.2-2243), "A locality may provide in its subdivision ordinance for payment by a subdivider or developer of land of the pro rata share of the cost of providing reasonable and necessary sewerage, water, and drainage facilities, located outside the property limits of the land owned or controlled by the subdivider or developer but necessitated or required, at least in part, by the construction or improvement of the subdivision or development;…" The enabling legislation specifically includes drainage work for the protection of water quality and the mitigation of increased stormwater flows as permissible uses of these funds. Funding is typically held in a cash escrow account until such time as the stormwater management facility or BMP is constructed. Funds must be utilized for facility or BMP construction within twelve years of the date they were posted. If not, the posted cash escrow reverts to a tax credit on the real estate taxes due on the property at the time of escrow expiration. Pro-rata accounts are typically most effective in communities experiencing significant, sustained growth.

Application in Fairfax County Fairfax County operates under a Pro-Rata Shares (PRS) program approved by the Board of Supervisors in 1991. Typical projects constructed with pro-rata share funds address flood control, stormwater drainage issues, severe streambank erosion, and impaired or reduced stormwater quality. Completion of the County's system of regional ponds is a major purpose of the program. However, County budget documents note that the program is insufficient to cover all the County's stormwater capital improvement needs. This is reflected in a statement in the County's Regional Ponds Report that funding has been available to implement only one-third of the planned 150 regional ponds envisioned for the County.

From 1992 through 2004, the PRS program has generated a total of $41.2 million in revenue for stormwater related projects. Since $7.8 million was rolled over from the former PRS program, revenue over the last 12 years has averaged $2.8 million per year. Most of that revenue has been allocated to specific projects, with only $1 million in recently received revenue not yet being allocated. $16.1 million in PRS funds were actually spent during this time period, while another $4.8 million is currently encumbered due to contracts and agreements.[1] Therefore, the County has a total of $19.3 million allocated to projects that are still awaiting construction or further design.

The $19.3 million in unencumbered PRS funding can be broken out into the following approximate dollar amounts per priority area:

[1] The average annual PRS expenditure between 1998 and 2003 was $1.5 million. In 2004 this increased to $2.4 million largely due to the implementation of regional ponds along rapidly developing Route 29 corridor and the watershed planning program.

$5 million.....Regional pond projects on hold.
$4 million.....Regional ponds to be implemented over the next two years.
$4 million.....Watershed plan projects.
$6 million.....Various stormwater projects.

Fairfax County faces two major challenges associated with the PRS program. The first challenge is that because the PRS program is driven by new development, it will eventually cease to serve as a major revenue source once the County reaches build-out. If this is estimated to occur in approximately 20 years, the County anticipates that the revenue generating capacity of the PRS program between 2004 and 2024 will be approximately $45 million, or an average of $2.2 million per year. The second challenge is that while the total life-span of the PRS program is about 20 years, many watersheds, particularly in the eastern portions of the County, are currently at or near build-out. Because PRS funds must be spent in the same watershed where they were generated, many of the County's older urbanized areas will not be able to rely of PRS funds to solve evolving stormwater issues such as stream restoration, bacteria contamination, and infrastructure repair and rehabilitation. An illustration of this point is to compare the Cameron Run watershed, which was developed primarily during the 1950s and 1960s, with the Cub Run watershed, which is now experiencing rapid growth. While both watersheds have significant stormwater issues, over the past 10 years the PRS program has generated an average of $17,852 per square mile per year in the less densely populated Cub Run watershed. By contrast, the PRS program generated an average of only $4,693 per square mile in the more densely populated Cameron Run.

d. WATERSHED IMPROVEMENT DISTRICTS

The Code of Virginia (§10.1-614 through 635) allows for the creation of watershed improvement districts (WIDs), noting that "Whenever it is found that soil and water conservation or water management within a soil and water conservation district or districts will be promoted by the construction of improvements to check erosion, provide drainage, collect sediment or stabilize the runoff of surface water, a small watershed improvement district may be established within such soil and water conservation district or districts… (§10.1-614)" Statutorily, WIDs have the power to levy and collect taxes and/or service charges to be used for the specific purposes for which the WID was created. WIDs are not widely utilized as they require a two-thirds majority vote via a referendum of landowners in the proposed district for both district creation and district tax and fee levying authority.

Application in Fairfax County Only two WIDs currently exist in Virginia, including Lake Barcroft in Fairfax County. The revenue generating capacity of a WID can be significant, since it is typically linked to real property value and included on the real property bill at a pre-established rate. For example, Lake Barcroft in FY 2005 set the assessment at $0.113 per $100/assessed value for a total of $610,000 in annual receipts. However, while the enabling legislation for WIDs is broad enough to potentially allow a WID to become a primary funding source for a community-wide stormwater management program, the practical applications and limitations of this mechanism have not led to any such use as a primary resource.

It is also important to note that the annual budget and assessment rate for a WID in Fairfax County is subject to review and approval by the Northern Virginia Soil and Water Conservation District, and then the Virginia Soil and Water Conservation Board. In

addition, a separate WID Board of Trustees must be elected to manage the fiscal affairs of the WID.

e. IN-LIEU-OF-CONSTRUCTION FEES

The major advantage of in-lieu-of-construction fees is that revenue from smaller projects can be combined to be used on a regional basis, or where measures can have the most impact. In-lieu-of-construction fees also allow a locality to gain some benefit if it is determined that a stormwater requirement should be waived or reduced due to site specific constraints. A disadvantage of in-lieu-of programs is that the revenue stream is dependent upon the pace and nature of development from year-to-year. As a result, in-lieu-of fees are usually best applied to one-time projects or programs.

Application in Fairfax County Fairfax County had an in-lieu-of-construction fee system until the adoption of the Pro-Rata Shares program in the early 1990s. At that time, the County determined that the two programs were in conflict and the in-lieu-of-construction fee system was abolished. Currently, if a stormwater requirement is waived, there is no monetary recuperation.

Neighboring Arlington County and the City of Alexandria have adopted fee-in-lieu-of programs under their Chesapeake Bay Preservation Ordinances. Under these programs, land disturbers may, under specific circumstances, pay into a fund (Watershed Management Fund in Arlington/Water Quality Improvement Fund in Alexandria) in lieu of constructing an on-site stormwater management facility. Payment into the fund is based on a dollar amount per square foot of impervious surface cover that would need to have otherwise been treated. In Arlington, the current fee of $2.50 per square foot of impervious surface cover was set in February 2003. Alexandria has not yet set a rate under its newly revised ordinance. In Arlington County, it is estimated that the Watershed Management Fund has a short-range annual revenue generation capacity of approximately $300,000.

f. FEDERAL AND STATE FUNDING OPPORTUNITIES

There are very limited federal and state funding mechanisms available to provide ongoing support for local stormwater management programs. Federal involvement in stormwater management (other than regulatory programs) is typically limited to advisory assistance, cooperative programs such as those provided by the United States Geological Survey and the United States Army Corps of Engineers, and emergency response. The Commonwealth of Virginia has stormwater initiatives in both the Department of Environmental Quality and the Department of Conservation and Recreation.

One way that many communities have succeeded in acquiring limited funding for stormwater management projects is through grants. Federal and state governments, as well as select foundations, have provided project funding for communities that are willing to propose and implement innovative projects to control stormwater runoff or restore streambeds to a more natural condition. In Virginia, the Water Quality Improvement Act (WQIA) was established in the 1990s to support Tributary Strategy implementation through the creation of the Virginia Water Quality Improvement Fund (WQIF). However, the WQIF allocation formula for state funding leaves it vulnerable to the ebb and flow of

Virginia's economic climate, and thus has been an inconsistent funding source. Another major source of grant funding is the Chesapeake Bay Program's Small Watershed Grants Program. In 2003, the Chesapeake Bay Program disbursed approximately $2.75 million to 75 recipients, with a typical range of $20,000 to $40,000 per recipient. However, both the WQIF and the Small Grants Program exclude projects involving direct regulatory compliance, thus rendering them unusable for direct funding of mandated permit compliance activities.

A common requirement of grant funding is local cost-share. One advantage of having a dedicated source of revenue for stormwater is a greater ability to take advantage of state and federal cost-share programs. For instance, Prince George's County, Maryland, which has a dedicated source of stormwater funding, takes advantage of over 90% of federal flood control cost-share opportunities.

Application in Fairfax County Recent examples of state and federal funding received by Fairfax County include (approximately):

- $6 million in federal funding earmarked for rehabilitation of dams associated with four PL 566 flood control facilities in the Pohick Creek watershed.
- $250,000 provided by the Federal Emergency Management Agency in response to Hurricane Isabel to re-map floodplains in the New Alexandria area; and,
- $2.1 million provided by the U.S. Army Corps of Engineers (in addition to $211,000 in cost share provided by Fairfax County and Prince William County) to dredge the Occoquan River.

g. GENERAL OBLIGATION AND REVENUE BONDING

Virginia statutes (Code of Virginia §15.2-2114) authorize the use of bonds by local governments to finance capital improvements to infrastructure and equipment for stormwater control programs. Bonds are not a revenue source, but a method of borrowing. They are most commonly used to pay for major capital improvements and acquisition of other costly capital assets such as land and major equipment. Capital improvements can also be funded through annual budget appropriations, but annual revenues are often not sufficient to pay for major capital investments.

The chief advantage of bonding is that it allows construction of major improvements to be expedited in advance of what can be funded from annual budget resources by spreading the cost over time. In the case of stormwater management, expediting a capital project by several years through bonding may result in significant public and private savings if flooding, other damaging impacts, and inflation of land acquisition and construction costs are avoided. The major disadvantage of bonding is that it is essentially a loan that incurs an interest expense, which increases the overall cost of capital projects, land acquisition, etc.

The two most prevalent types of bonding available are general obligation (GO) bonding and revenue bonding. GO bonding incurs a debt that has "first standing" with regard to public assets and is backed by the "full faith and credit" of the issuing agency. Because of this, public approval through referendum is required for initial issuance of GO bonds. All revenues, including various taxes, may be used to service GO debt. Revenue

bonding is supported and ensured solely by revenues that are typically linked to the capital expenditure and recovered through some type of fee or specific tax. Creation of a separate source of revenue that is earmarked specifically for stormwater management (e.g., a stormwater service fee) would allow the County to sell revenue bonds if market acceptance was attained. However, revenue bonding would not be backed by the County's full faith and credit, and would typically incur a slightly higher interest rate.

Generally speaking, bonds are not intended for use as a funding mechanism for day-to-day operations. However, some costs can be viewed either as a capital or operating expense. The lack of a clear distinction between remedial repairs and new construction, for example, results in bonding sometimes being used for major repairs that might also be considered an operating expense.

Application in Fairfax County The last GO bond for stormwater infrastructure approved by Fairfax County voters was the 1988 Storm Drainage Bond Referendum. The bond was in the amount of $12 million. The last bonds were recently sold, and all money is obligated and will be spent in the next few years. It is worth noting that not all bonds pass the scrutiny of the voters. A 1990 stormwater bond presented to Fairfax County voters was defeated. There have been no additional stormwater bond attempts since that time.

h. OTHER INNOVATIVE FUNDING ARRANGEMENTS

While the above represent the most typical sources of revenue for stormwater, Fairfax County has had success in creating innovative funding arrangements to meet specific needs. For example, the County has just recently started to require maintenance escrow accounts for innovative BMPs and Low Impact Development techniques such as rain gardens. While the arrangement doesn't represent a new source of funding for new projects, it does create an insurance policy so that County funds will not need to be spent correcting for maintenance deficiencies on private property. While these agreements are currently done on an ad hoc basis depending on the facility, this practice may grow if it is successful.

The County is also implementing an innovative program with respect to state and federal wetland mitigation banking requirements. Until recently, mitigation could take place anywhere within two large watersheds (Upper Potomac and Occoquan) – and not necessarily within Fairfax County. As a result of conversations with the Army Corps of Engineers, developers pay the Nature Conservancy, which keeps the funding in escrow until there is a local project. There is no estimate yet on the revenue generating capacity of this mechanism.

C. SUMMARY OF GENERAL APPLICABILITY OF REVENUE SOURCES

The following is a comparative summary of the generating capacity, equitability, and stability of the primary and secondary revenue sources discussed in this paper, charting the funding strategy by whether it provides a "high," "medium," or "low," ability to meet the needs of the stormwater program. General comments are provided to provide context for the rating.

AREA OF APPLICABILITY									
Revenue Source	**Generating Capacity**			**Ability of Source to Finance Stormwater Equitably**			**Stability of the Source**		
Real Property Tax (General Fund)	**High**	Medium	Low	High	Medium	**Low**	High	**Medium**	Low
	General Fund revenues can provide for the full cost of service to the community.			Owners of real property pay regardless of contribution to stormwater infrastructure.			Stability for stormwater dependent on other annual budget priorities.		
Stormwater Utility Fee	**High**	Medium	Low	**High**	Medium	Low	**High**	Medium	Low
	Stormwater user fees can provide for the full cost of service to the community.			Owners of real property based on contribution to stormwater infrastructure.			Based on assessment of stormwater needs.		
Inspection/ Review Fees	High	**Medium**	Low	High	Medium	Low	High	**Medium**	Low
	Relatively minor, but can fund substantial amounts of specific program functions.			Strong link between the source and the regulated activity.			Based on rate of development.		
Special Assessments	High	**Medium**	Low	**High**	Medium	Low	**High**	Medium	Low
	Assessment is determined by cost of improvements needed. Generation capacity significant for localized projects.			Used for a small area where a specific improvement is required and specific properties directly benefit.			Stable source of revenue once established.		
Pro-Rata Shares	**High**	**Medium**	Low	High	**Medium**	Low	High	**Medium**	Low
	Medium to high depending on the watershed. Used to make regional improvements over time. Typically not sufficient to cover the cost of all improvements.			Funding provided by those that impact the drainage basin. In newly developing areas, this can be highly equitable.			Based on rate of development.		
In-Lieu-of-Construction Fee	High	**Medium**	Low	High	**Medium**	**Low**	High	**Medium**	Low
	Used to combine revenue for use in larger projects, or where greater water quality benefits can be realized.			Same issue as pro-rata shares. Depending on what the fee is in lieu of, there may need to be a nexus between how the funding is spent and water quality improvements.			Based on rate of development.		
Watershed Improvement District	**High**	**Medium**	**Low**	**High**	Medium	Low	**High**	Medium	Low
	Medium to high based on area of the WID and the assessment rate. Difficult to establish.			Must be a direct link between the source and beneficiaries.			Based on assessment of stormwater needs.		
State/Federal Grants	High	Medium	**Low**	**High**	Medium	Low	High	Medium	**Low**
	Typically less than $100,000. $30,000 to $50,000 common.			Use is dictated by the grant source.			Used for specific demonstration projects, not a stable source of revenue.		

AREA OF APPLICABILITY									
Revenue Source	Generating Capacity			Ability of Source to Finance Stormwater Equitably			Stability of the Source		
Bonding	High	Medium	Low	High	Medium	Low	High	Medium	Low
	Capacity can be significant.			Bond debt paid only by all taxable property owners regardless of contribution to stormwater infrastructure. No non-taxable properties contribute to reducing the debt.			Applicable for one-time capital expenses. Not meant as a source of revenue for ongoing expenses.		

CHAPTER V

STORMWATER USER FEES AND FUNDING OPTIONS

A. CHAPTER SUMMARY

Following this Chapter Summary is a detailed discussion of the rate structure options that were reviewed by the consultant team and staff during the development of the recommendations for cost allocation policy identified in this opening summary. The rate structure recommendation was based on an evaluation of the methodologies available today that can create a legally defendable allocation of costs to the community, or rational nexus between the services provided and the cost of those services to any individual property. The options were evaluated using the following criteria:

- Equity in the apportionment of costs
- Flexibility of methodology to address level of service
- Consistency with other County financing policies
- Compatibility of cost allocation tool with existing data processing systems
- Data requirements to support allocation of costs to each property
- Cost of implementation and upkeep of the billing database
- Revenue stability and sensitivity to change

The methodologies reviewed included *imperviousness*, *imperviousness and percent imperviousness*, *imperviousness and gross parcel area*, and *gross area with modifying factors.* Each methodology was evaluated against the criteria listed above and the findings are provided following this summary.

Preliminary Recommendation for Rate Methodology: The primary methodology for allocation of costs recommended is “imperviousness” on the property with a secondary factor of the gross parcel area. Imperviousness has been evaluated and identified as the key contributor to demand for services in stormwater, whether it is for routine drainage, flood controls, public safety, or water quality. There exists a strong body of research detailing the correlation between the development of a parcel and the impacts of that development on the drainage system and the overall services to be provided by local governments throughout the nation. It is recommended that gross area be included as a secondary rate factor to address those services that must be provided regardless of the presence of imperviousness and that should be fairly borne by all properties within the County. This increases the equity of the rate methodology, not limiting it to only land that has been disturbed and by taking into account the total lot size along with the amount of imperviousness.

Modifying Factors: Many modifying factors were considered in the development of the rate structure preliminary recommendation. These includes such items as *water quality impact factor*, *service charge credits*, *watershed surcharges*, *base rate for fixed costs*, and *varying approaches to single family residential properties*. Upon completion of the

evaluation for Fairfax County, the modifying factors of service charge credits and a tiered single family detached-housing rate structure are recommended. Service charge credits provide an opportunity for the County to recognize contributions made by private investment in the drainage system and in water quality protection that reduce the demand for service. A tiered single family residential rate structure also increases the equity by recognizing the varying amount of imperviousness present within this relatively homogenous land use activity. The County should consider whether it wants to place a limit on the number of billing units to be charged single family detached residential, which often occurs in the initial establishment of stormwater utility rates.

Preliminary Recommendation on Rate Modifiers: Combining a primary methodology of imperviousness and gross parcel area with the modifying factors of a multi-tiered residential rate with service charge credits will provide the County will an equitable basis of cost allocation that is legally defendable, that can be understood by the general public through a targeted education program, and that will be administratively manageable. Over time the County may choose to refine the rate structure to include additional elements of watershed surcharges, water quality impact factors, and a base rate for fixed costs. These additional factors can refine the equity of cost allocation but are not critical in the short term to effectively establish a stormwater user-fee funding strategy. These additional factors often require more detailed program cost tracking and administrative overhead to ensure fair allocation of costs occur.

Estimated Rate Based on Imperviousness ONLY: Upon completion of the program evaluation and analysis of the projected service enhancements to begin to build a proactive stormwater program, an analysis of potential rates was undertaken. The approach to estimating a rate was to use Imperviousness only as the rate methodology. This was done due to constraints on time, data availability and critical policy decisions that must be made to finalize a rate. Basic assumptions regarding fund balance, level of other incomes such as the use of Pro Rata Share and fees for regulatory inspections, debt service and credit initiatives were made as well to ensure that these issues were not overlooked in the preliminary analysis. If the Board moves forward with this effort, these key policies will be established and factored into a detailed Rate Study.

It is estimated that an initial rate of $55.00 a year, increasing to $84.00 a year for every 2000 square feet of imperviousness could provide sufficient revenue to support the first steps to build a comprehensive stormwater program, over the five year planning period. If the County chooses to move ahead with finalization of the recommendations on program enhancements and funding implementation, a very detailed cost of service and rate analysis will be completed and a refined rate structure with the final recommended rate will be provided.

The following background discussion provides, in detail, the results of the evaluation of each methodology and modifying factor.

B. BACKGROUND

1. PURPOSE

Several ways of structuring and calculating stormwater service fees (or "user fee charges") are employed by cities and counties throughout the United States. This discussion paper summarizes several rate options available to Fairfax County. The basic parameters employed for rate structures, plus modifying factors that can be applied are described. Other funding methods that can be blended with fees are identified and discussed in the paper on funding methodologies.

The initially preferred rate structure identified in the Executive Summary above along with the mix of funding sources may have to be adjusted as needs change over time. Information will flow from the future watershed master planning that may suggest that substantial capital investment is needed in the drainage system, greater than anticipated today, and that these cost should be borne by the properties located within each watershed. More remedial repair and capital improvement needs may be identified as capital improvement plans are implemented and as existing systems continue to age. Stormwater quality management may become an even more demanding part of the program as the regulatory structure to address the Chesapeake Bay evolves along with Total Daily Maximum Load programs from the State. Fortunately, the stormwater utility approach provides excellent flexibility to adjust as the needs evolve, including allowing changes in the program, funding demands, and rate concepts.

2. EVALUATION CRITERIA

The consultant team's experience implementing a variety of stormwater funding methods elsewhere suggest that the most important factors in selecting a practical approach are the local circumstances, practices, and politics within Fairfax County. Every community is different and needs a solution that fits its specific situation. Beyond circumstances unique to Fairfax and the enabling legislation of the State, the following criteria were used in defining the rate structure recommendations for funding stormwater:

- attainment of equity in the apportionment of costs;
- the balance of rates with level of service;
- data requirements to support cost allocation methods;
- cost of implementation and upkeep;
- compatibility with existing data processing systems;
- consistency with other local financing and rate policies;
- financial sufficiency;
- revenue stability and sensitivity; and
- flexibility to address unique conditions.

None of the service charge rate structures or secondary funding methods examined during the policy review for this initial evaluation for the utility is "perfect" under such a broad range of criteria. The listed order of the criteria above does not imply a priority, and no single consideration should outweigh the others to the extent that a rate methodology or secondary funding method is selected or rejected for any one reason.

3. FRAMEWORK OF RATE STRUCTURE COMPONENTS

The stormwater rate methodologies, rate modifiers, and other funding methods identified in this discussion paper provide a menu of options to Fairfax County. Basic rate structure concepts are the foundation of a service fee. Modifying factors (such as how rate decisions will impact single-family residences and use of base rates for fixed costs per account) enable a basic rate methodology to be fine-tuned. Also, several other funding methods can be used in coordination with a service fee rate methodology to optimize funding for the entire program, such as grants and loans. The relationship between service fee rates and the cost of providing services and facilities should be evident in the rate design.

4. SERVICE FEE RATE STRUCTURE OPTIONS

The proposed program strategy is designed to address the problems that result from increased volumes and rates of runoff and pollution of receiving waters found in Fairfax. Thus, the costs incurred in providing the program services can be traced back to the cumulative impacts of many individual properties. The various parameters and calculation methodologies commonly used in stormwater management rate structures are intended to quantify the relationship between conditions on individual properties and the demands they impose on the municipal stormwater program and systems. Many factors influence the amount, peak rate, and pollution loading of stormwater runoff from properties, ranging from the nature of the land surfaces to vegetation and soil characteristics. Other services must be provided regardless of a property's impact on the drainage system, such as public education, inspection of the system, watershed planning and Federal water quality permit requirements.

Four rate structure options are examined in this report. After review, it was determined that two factors are better suited for Fairfax and are included in the initial recommendation for implementation of the utility as described in the Executive Summary above. Seven modification factors are also examined. Several secondary funding methods are also integrated in the funding strategy.

The basic rate methodologies examined were:

- impervious area;
- impervious area and the percentage of imperviousness;
- a combination of impervious area and gross area; and
- gross property area and the intensity of development.

Modifying factors could be used to alter the basic rate methodologies, including the following:

- a simplified single-family residential rate;
- a tiered rate for single-family residential with a cap on the billing units;
- a base rate for certain fixed costs of service;
- watershed or other surcharges for localized costs;
- service charge credits;
- a water quality impact factor;
- a development and land use factor; and

- a level of service factor.

In addition to utility service charges, other funding methods or sources of funding were examined during the development of the funding methods discussion paper. Most would be used only in special situations or be applied to limited clientele groups. Secondary funding methods or sources previously evaluated were:

- General Fund appropriations;
- Special assessments;
- Bonding for capital improvements;
- In-lieu of construction fees;
- Other Service Fees;
- Pro Rata Share;
- Watershed Improvement Districts; and
- Federal and state funding opportunities.

Except for General Fund appropriations along with Pro Rata Share and bonding for infrastructure capitalization, these supplementary funding methods would generate only a minor portion of the total funding that is needed to support the proposed program. The primary purposes of most would be to enhance equity, improve public acceptance of the utility concept, and expedite special components of the stormwater management program. A full discussion of each of these methodologies can be found in the Chapter IV.

5. EVALUATION OF BASIC RATE METHODOLOGIES

a. IMPERVIOUS AREA RATE METHODOLOGY

Stormwater rate methodologies based solely on impervious area have been widely used. They are simple, easily understood by the general public, and impervious area data is relatively inexpensive to measure or obtain. The perceived equity of an impervious area rate methodology is high. Most people understand the hydrologic impact of covering natural ground with pavement and rooftops. Large expanses of roofs and pavement in shopping centers and other commercial and industrial business areas are highly visible.

Numerous technical studies, references, and citations in engineering literature technically validate the general perception of the equity of an impervious area rate methodology. The coefficient of runoff decimal value in hydrologic engineering tables closely approximates the percentage of impervious cover. Empirical evidence gathered in the field by monitoring changes in peak runoff before and after development verifies that impervious coverage is the key factor influencing peak stormwater runoff. Stormwater quality data gathered during the National Urban Runoff Program (NURP) and subsequent research also indicate that impervious area is the single most dominant factor in pollutant loadings in stormwater.

Many impervious area rate structures include simplified single-family residential service fees, often as flat-rate charges applied to all such properties. Charges to non-residential properties may be structured in a variety of ways under an impervious area methodology. In some cases the average amount of impervious area on single-family residential properties is used as an “equivalent unit” value for determining service

charges to non-residential properties. In other instances 1000 square foot ranges of impervious area are used. These are commonly referred to as a "range" value or "billing unit. "

Service fees are usually calculated by dividing the amount of impervious area on each parcel by the equivalent unit value or the range value and multiplying the result times a charge per unit. Very few stormwater service fee rate algorithms use the exact amount of impervious area on each property because the accuracy of the impervious area data typically available does not support such a precise calculation. Comparing charges to dissimilar properties is easy when an equivalent unit value is used.

An impervious area service fee rate methodology introduces a potential "timing" problem in the allocation of the cost of capital improvements because the service fees would be applicable only to developed properties. Stormwater capital improvements are typically designed to accommodate future growth by over-sizing systems relative to current conditions and needs. Other funding mechanisms, such as system development charges, can be used in concert with an impervious area rate methodology to ensure that undeveloped properties ultimately participate equitably in the cost of capital improvements designed to serve them or inclusion of the gross parcel area, as evaluated below, can also provide increased equity.

The data requirements associated with implementing and maintaining a stormwater service fee depend more on the subtleties of the rate methodology and the use of modifying factors than on the basic parameters selected. For example, if an impervious area method were to be applied to all properties individually, Fairfax would have to generate impervious area information for residential as well as non-residential parcels. However, if a simplified residential service fee is utilized, data requirements and costs might be reduced by the percentage represented by the single family residential lots of the total parcels in the County.

The cost of implementing an impervious area rate structure is a function of the number of properties that must be measured, the accuracy standards adopted for data, and the measurement technique employed. Accuracy standards influence the cost of both initial implementation and subsequent data maintenance.

An impervious area rate methodology is highly stable and insensitive to property alterations by ratepayers for the purpose of reducing service fees. Reductions in impervious coverage are rarely justified merely to reduce stormwater fees. Alterations to properties that would reduce stormwater fees are essentially infeasible under all the rate structure options examined in this study.

The rate of revenue growth using an impervious area methodology would more or less correspond to the pace of development. Economic downturns would tend to diminish the addition of new impervious area to the rate base and thus the stormwater revenue growth under this methodology.

An impervious area rate methodology is not as flexible as some other options. It is based on a single parameter that can be accurately measured. The primary means of introducing flexibility into an impervious area methodology is through modifying factors and by allocating certain costs to other rate mechanisms or funding methods.

b. IMPERVIOUS AREA AND PERCENTAGE OF IMPERVIOUS COVERAGE

Under this methodology the amount of impervious area and the impervious percentage are both used in the calculation of service fees, dictating that data on both impervious and gross area be assembled. Typically, under this type of methodology the impervious area of each property is charged at varying rates depending on the percentage of imperviousness of the property. Each square foot of impervious area is charged more as the percentage of imperviousness increases. Gross area is not relevant to the service fee calculation, except that it is needed to determine the percentage of imperviousness. Undeveloped lands would not be charged because this rate methodology would be based on impervious area.

Some anomalies may occur in service fees under this type of rate methodology. Smaller properties are often charged more than larger properties that have the same amount of impervious area because the percentage of imperviousness on the smaller property is higher. The typical approach divides properties into several classes based on their percentage of imperviousness (referred to as "ratio groups" or "imperviousness classes") and applies a varying rate per impervious area unit to each class. For example, properties having ten (10) percent imperviousness or less might be charged $.04 per year for each 100 square feet of impervious coverage, while properties with eleven to twenty (11 – 20) percent imperviousness might be charged $.10 per year for each 100 square feet. Proportionately higher values are usually applied as the percentage of imperviousness increases.

Being based on two parameters that are accurately measurable (impervious area and gross area, from which the percentage of imperviousness is calculated), this approach gives an impression of greater accuracy than some other options. Engineering judgment is introduced to the service fee calculation in the schedule of charges for various imperviousness classes. It is questionable, however, whether this method actually generates service fees that are more accurate in relation to actual runoff discharged from individual properties and/or to the cost of services and facilities.

The community's perception of equity resulting from this rate methodology may be mixed, and may depend on the number of classes or ranges used for percentage imperviousness and the schedule of rates assigned to them. To the extent that a shift in the apportionment of costs toward more heavily developed properties benefits single-family residences, homeowners would likely see a lower bill than under other rate structures. They might view the balance of services and charges favorably. As originally applied in Denver, Colorado, for example, this methodology resulted in much higher charges for intensely developed properties than would be the case under other stormwater rate structures. While that approach benefits single family residential properties, intensely developed commercial properties bear a much higher proportion of the cost of service.

It must be recognized that this methodology can create anomalies in the service fees relative to those that result from other rate methodologies. For example, a smaller property (gross area) with the same amount of impervious coverage as a larger property would pay more under this methodology. Comparing a half-acre property (21,780 square feet) with a 30,000 square foot property when both have 20,000 square feet impervious coverage, the example schedule of rates would yield service fees of $240 per year for the smaller property and $152 for the larger one. The smaller property

would be charged almost sixty (60) percent more. Clearly, these calculations are a function of the specific schedule of rates used in this example and could be changed by simply adjusting the schedule. However, the potential weakness of this approach in terms of equity problems is evident. The general problem of rate and service level balance cited for other rate structures applies more or less equally to this approach. Whether Fairfax could demonstrate a 60 percent variance in level of service to the smaller property is unknown.

This rate concept would require that both gross area and impervious area data be gathered. Future maintenance of the data for developing properties could be accomplished by requiring that gross area and impervious area data be supplied to the County by each developer's engineer or architect as part of the project plans.

The stability and sensitivity of this rate methodology is consistent with the other options considered in this report. Even using a highly progressive schedule of rates, the level of service fees would probably not induce property owners to remove impervious area from their properties. It simply is not cost effective for most property owners to reduce the impervious area (and thus impervious percentage) just to reduce a stormwater service fee.

c. IMPERVIOUS AREA AND GROSS AREA

Both the total property area (gross area) and impervious coverage of properties influence the amount, peak rate, and make up of stormwater discharged to the public drainage systems. A combined impervious area and gross area rate methodology can be a relatively simple and effective means of accounting for the two primary parameters that influence stormwater runoff. However, most stormwater rate methodologies utilize one or the other parameter in the calculation of fees rather than both. Those who use both recognize the need to include undeveloped parcels in the overall rate base as well as the need to allocate costs on the basis of community-wide services, regardless of drainage system demands for service as measured by imperviousness.

This type of rate methodology requires that the mix of impervious and gross area in the service fee calculation be “tuned” to properly reflect the significance accorded to each parameter. This is achieved by applying weighting factors to gross and impervious area or by allocating certain costs of service to each parameter. The relative weights assigned to gross and impervious area should be consistent with the local hydrologic conditions, patterns of development, program requirements (e.g., operating versus capital needs), the balance of stormwater quantity and stormwater quality in the program costs, and/or the community's perceptions. When costs are allocated to the two parameters, practices elsewhere have tended to assign seventy-five (75) percent or more of the costs to the impervious area component of the rate.

The concept underlying this type of rate methodology is relatively easy to explain and grasp. It is consistent with the public's general understanding of hydrology and the impact that gross area and impervious coverage has on stormwater runoff. This type of rate methodology shifts a portion of the cost burden to lightly developed and undeveloped properties than other methodologies do that are based strictly on impervious area. Depending on the weighting factors used and/or the cost allocations, however, smaller properties that are almost entirely covered with impervious surfaces

could conceivably be charged more than larger properties that are undeveloped or very lightly developed with little impervious coverage.

Solely for the purpose of illustrating how fees might be calculated, assume that each 100 square feet of gross area might be charged $.05 (five cents) per year. A surcharge of $1.00 per year for each 100 square feet that is covered by impervious area might be applied. This would yield an effective ratio of 1:21 between areas that are pervious and those that are impervious. That is, the area of a property covered by impervious surfaces would be charged twenty-one times as much as the area that is not impervious. Applying the example values cited above to an eight thousand (8,000) square foot property with 2,000 square feet of impervious coverage would result in a total service fee of $24 per year or $2 per month. The charge for the gross area of the property (8,000/100*$.05 = $4/year) would be added to the charge for the impervious coverage (2,000/100*$1 = $20/year).

Applying the same values to a small commercial property of 30,000 square feet (about .7 acres) having 20,000 square feet impervious (67%), the annual service fee would be $215.00 per year ($15/year for the gross area and $200/year for the impervious coverage). Thus, the stormwater service fee would be approximately nine (9) times as much as that for the example 8,000 square foot residential property even though the commercial property is only three and three quarters (3.75) times larger in gross area. The proportionately greater increase reflects the more intense development of the larger parcel in this example (67% impervious coverage versus 25% for the residential example). If it is assumed that an 870,000 square foot shopping center is completely covered with impervious rooftops and paving, the annual service fee would be $9,135 ($435 for the gross area plus $8700 for the impervious coverage), or $761.25 per month. In both of the commercial examples, the gross area/impervious area rate methodology results in lower fees for the non-residential properties than does the impervious area methodology examined previously because of the introduction of the gross area factor that distributes costs across all parcels in the County. A gross area/impervious area rate methodology might conceivably allow undeveloped properties to be charged which would have to be addressed in policy considerations.

The cost of implementation and upkeep of this type of rate methodology would be influenced by the unit cost of assembling data for the master account file and the computer programming associated with the billing/collection and billing inquiry response processes. Using a flat-rate charge for one or more classes of properties would substantially reduce costs. Maintenance of the information might also be simplified by requiring data from developers' engineers and/or architects when plans are submitted.

This approach is comparable to the other options in its stability and insensitivity to external influences. Being based on gross area and impervious area, there is little that can be done by a property owner to reduce the two parameters that determine the service fee.

Applying weighting factors or allocating costs to gross area and impervious area makes this approach especially flexible. A broad range of relative weights could be assigned to gross area and impervious area, and might even be varied to account for unusual conditions in certain areas or the presence of modifying considerations like on-site detention, non-standard service levels, or water quality impacts.

d. GROSS AREA AND INTENSITY OF DEVELOPMENT

A rate structure based on the gross area of each property and its intensity of development would be very similar to the rate structures currently used by Bellevue and Tacoma, Washington and Cincinnati, Ohio. In most cases, the term "intensity of development factors" is used rather than a "coefficient of runoff", primarily because the engineering terminology is often confusing to lay persons while the relationship of intensity of development to stormwater runoff is more easily grasped.

If applied to every parcel, this type of rate methodology would require that the gross area be determined for, and an intensity of development rating be assigned to, all residential as well as non-residential properties. Most communities have opted to apply a simplified service fee or schedule of fees to one or more categories of single-family residential parcels, but there is no uniform practice. Non-residential properties are usually categorized into groups ranging from “very lightly developed” to “very heavily developed”. If a flat-rate residential charge is not used, all residential properties are typically assigned to one or two of the intensity of development categories.

From five to eight classes or groups are typically used for classifying the intensity of development. An intensity of development factor is usually very close to the coefficient of runoff that would be assigned to a parcel if its hydrologic performance were individually determined. Discrete intensities of development have not been applied to each individual property. Typically, the intensity of development values range from a low figure such as .02 to .20 for very lightly developed properties up to .85 or even .95 for heavily developed industrial and commercial uses.

This approach groups similar properties and applies average values to all within a given classification. For example, all apartments might be classified as multi-family residential with an intensity of development factor equal to .60 instead of assigning individual ratings ranging from .50 to .75 to individual apartment developments. The gross area parameter is the controlling element of the rate calculation for all parcels in a given classification. Thus, an apartment building on 40,000 square feet of gross lot area would be billed one-half the amount charged to an apartment building on an 80,000 square foot property, assuming both were assigned the same intensity of development.

The perceived equity of this type of rate structure is normally equal to or greater than that of other approaches, but (like the others) the methodology requires a careful explanation to the community. Simplifying the terminology associated with the rate methodology is desirable.

Adjustments to individual bills or even entire classes of properties can be achieved in this type of rate structure by simply reducing or increasing the intensity of development factor for an individual parcel or for a class or other grouping. It is common for jurisdictions using this approach to adopt a policy of assigning an "effective" intensity of development to individual properties in response to service fee appeals, leaving the door open for adjustments that achieve a fair and reasonable rate when anomalous conditions exist on individual properties.

Data requirements associated with this type of rate methodology would be less than for other options. Gross area information could be generated from current databases and/or maps. The assignment of an intensity of development factor would require that

engineering judgment be used in reviewing the conditions on each parcel, possibly using aerial photographs. Some additional work would be needed in the event that undeveloped properties were to be charged.

Local development patterns may influence how residential properties are treated. A single residential intensity of development category might be sufficient in a community that has highly uniform residential zoning and development. Two, three or more intensity of development categories might be appropriate in another community that has residential lots ranging from 3,000 square feet to several acres. The County of Bellevue, Washington uses discrete gross area measures for every property, which has increased data management costs. Long-term maintenance of the account files for an intensity of development rate structure would be slightly less than what is required for options based in some manner on impervious area. Compatibility with the data processing systems should not pose a problem if an intensity of development approach is selected.

This type of rate methodology tends to push a greater proportion of the cost of service onto residential and other lightly developed properties than methodologies based on impervious area. Like the other stormwater rate structures examined in this study, the revenue capacity of the gross area/intensity of development approach is relatively stable and insensitive to external influences. Alterations to properties that would diminish revenue would rarely be economically feasible.

The flexibility of an intensity of development rate structure is equal to or somewhat better than other methods because of the latitude available in defining the intensity categories and assigning intensity of development factors to individual properties. Engineering judgment must be applied in determining the intensity of development (coefficient of runoff) of a parcel in a given situation, and the engineering literature offers rather broad ranges of development intensity values. For example, values from .25 to .45 are not unusual for single-family residential parcels. Single-family residential properties may fall anywhere within this range depending on lot size, the amount of impervious area, soil conditions, slope, property shape, vegetation, and even the location of the impervious areas on the property.

6. EVALUATION OF MODIFYING FACTORS

The reasons for using modifying factors to adjust a basic stormwater service charge rate structure include the following:

- improve the overall equity of the financing mix;
- fund special operational and regulatory programs; and
- reduce implementation and upkeep costs.

Since the modification factors examined in this study would affect only a portion of the total properties, they have relatively minor impact on total revenue capacity. They are not intended to simply generate additional revenue. Rather, their primary purpose is to improve overall funding equity. In several cases, any additional revenue generated by a modifying factor is merely incidental to the role that the stormwater management program plays as a regulatory and/or operating agency. In the case of a service fee credit for on-site detention, the modification would reduce rather than increase total

revenue capacity. The advantages gained using these factors must be weighed against the disadvantages they entail in terms of gathering and maintaining data.

a. SIMPLIFIED SINGLE-FAMILY RESIDENTIAL SERVICE FEES (FLAT RATE OR TIERED)

The vast majority of cities and counties that have stormwater service fees employ a simplified charge for single-family residences. Some use a single flat-rate charge while others have two or more flat-rate categories or classes of residential properties (usually based on the amount of gross or impervious area). A few cities use two or more tiers of flat-rate charges, segregating mobile homes, small-lot residential, large-lot residential, etc. A few communities use purely discrete charges for each residential property based on the same parameter applied to non-residential properties, calculating the billing units of imperviousness for each parcel.

The principal reason for using a simplified rate for single-family residential properties is to reduce the expense of developing and maintaining a master account file and billing system. A simplified residential rate typically reduces up to eighty (80) percent the number of properties for which data must be assembled on one or more parameters such as gross area, impervious area, etc. The cost of developing a file can be cut simply by grouping residential properties in a single class or a few tiers. However, it must be cautioned that using tiers or several “classes” requires data on each parcel that will allow the County to assign the single family home to the correct tier or class.

Although the principal motivation for using a simplified residential rate is usually to reduce costs, equity does not necessarily suffer. Detailed cost of service analyses conducted in Cincinnati, Tulsa, and Louisville all indicate that the cost of stormwater management services and facilities actually declines as the gross area of residential lots increases. The analyses suggest that an inverted residential rate structure might even be warranted. This is primarily due to the type and size of drainage facilities required for intense, small lot residential development in the core of urban cities versus large lot suburban and rural styles of subdivision. Small-lot neighborhoods typically require underground structural stormwater systems, whereas large-lot residential areas often have less expensive open ditches and natural drainage courses. However, this is not easily understood by the general public or by politicians and can cause great difficulty in communication with the rate payers on how their individual fee was generated.

Implementation of a simplified residential rate would only require that single-family residences be "tagged" in the master account file. This could probably be done from tax records. File maintenance would involve minimal upkeep costs to track the addition of new single-family residential development. Compatibility with existing or additional data processing systems should be easily assured. No problems of compatibility are foreseen even if two or more tiers of flat-rate charges are used for single-family residences.

During policy discussions with the Technical Committee there was an interest in distinguishing between smaller impervious single family residential (SFR) properties and the significant number of single family residential properties with large amounts of imperviousness.

b. BASE RATE FOR CERTAIN UNIFORM FIXED COSTS

Fairfax's stormwater management program will incur certain fixed expenses that are not related to the amount of runoff generated by individual properties or the level of service that is provided. Expenses such as administrative overhead, risk management (insurance), master planning, maintenance of a system inventory, and water quality education are difficult to allocate specifically to individual properties or classes of properties. For example, it costs the same to send a bill to a residence as to a shopping center.

In distributing fixed costs among ratepayers, a common "base rate" may be charged to every account. It is generally a more equitable allocation of such costs apportioning them based on parameters like impervious area. Other Utility rates often include two elements, a "service" charge and a "quantity" or "usage" charge. For example, the service portion of a water or electric utility fee usually covers meter reading, meter maintenance, and some administrative and overhead costs. The quantity portion of the charge recovers generation, treatment, distribution, collection, and capital costs. A stormwater base rate modification for stormwater service fees is simply an extension of the same concept to stormwater management rate design.

Relatively few stormwater service fees include base rates. Those that do tend to use base rates averaging between $.25 and $1.00 per month. Citizens and businesses alike usually view this type of modification as an equitable refinement of a rate structure. The impact on service charges is minimal, usually creating a slight increase in residential charges and a very minor reduction in charges to larger, non-residential properties.

This type of modifier is more advantageous for a large commercial property that has many billing units than for a single residence. Non-residential accounts would tend to receive a larger reduction in their differential service fee because most have more than one billing unit for imperviousness. Since they would pay the same charge for base rate costs, but less on each billing unit for imperviousness, their net change would be a comparative decrease in fees. The amount of the comparative decrease would vary with the size and/or impervious area of each property and the rate methodology used.

The impact on total revenue resulting from a base rate is negligible. Proportionately residential rates are higher than when "base rate" is used and the charges to very large and/or heavily developed properties decline minimally (depending on the rate parameters employed). The impact of such a shift needs to be carefully considered.

c. LOCALIZED SURCHARGE FOR CAPITAL IMPROVEMENTS

One of the more significant modifications that might be made in a basic rate structure would be to shift from area-wide funding of major stormwater system capital improvements to a localized surcharge. The most common approach to this is a basin-by-basin (or watershed) allocation of capital costs.

While localizing capital costs appears on the surface to be both proper and practical, potential flaws must be carefully considered. Property owners would pay for the stormwater management systems necessary to serve their area only, and would not bear the cost of facilities elsewhere in the community. However, a potential equity

problem exists in using this methodology in Fairfax County. A portion of the community's prior investment in stormwater management facilities has been made with County-wide financial support. The remainder was built by developers or other public agencies such as VDOT without similar County support.

Stormwater improvements funded by the County from general revenues have been made on a priority basis in the past without necessarily considering which watershed was involved or where the revenues were generated. The costs of many stormwater capital improvements built in the past have been distributed throughout the community. The cost of others, especially contributed capital built by developers, has been localized by incorporating the costs into the sale of residential lots or rental rates for commercial properties. Shifting to localized allocation of capital costs at this time could mean that areas now in need of system improvements would have to bear the entire cost after having shared in the previous public infrastructure investment that was made in other neighborhoods.

A few communities have enacted stormwater service fee surcharges for properties located in their floodplains, based on the rationale that those properties are receiving a greater degree of service than less flood-prone areas in the form of reduced risk exposure. Boulder, Colorado, for example, employs a modifying factor in its stormwater service fee rate structure by applying a forty (40) percent surcharge to its normal service fees for properties located in its floodplains. The justification, originally expressed in the Town's Ordinance No. 3928, is that stormwater and flood management facilities "above and beyond those needed to protect other parcels of land within the Town", will need to be constructed by the Town in the floodplain.

Boulder determined that a differential of forty (40) percent is consistent with engineering estimates of the difference in cost between lowering flood levels to the historic level versus lowering them below the historic level to protect properties within the historic floodplains. Boulder's Ordinance No. 4946 simplifies the justification, simply citing the need to compensate for additional facilities to protect and serve floodplain properties by adding the flood-prone property surcharge to the stormwater bill.

A floodplain surcharge would generate additional stormwater management revenue, but more refined data would have to be assembled on the flood-prone areas of the County and the amount of additional revenue that would be created to quantify the revenue potential. The amount of additional revenue cannot be accurately projected at this time because of the limited data that is available on floodplains and the cost of service attributable only to service requirements of properties located in floodplains.

The best guide for a decision on this type of modification may be found in the local practices related to funding of water and wastewater system improvements. Similar differences in the cost of comparable service also exist in those systems, and capital costs are not allocated area by area. For example, substantially more investment has been needed to serve areas remote from the water and wastewater treatment facilities than those that are nearby, yet rarely will you find water and sewer rates that include a factor for utilization of the capital investment in distribution or collection systems.

The data requirements for this type of rate modification would be somewhat complicated. Each property would have to be located in its proper major drainage basin and/or sub-basin using topographic maps. The GIS system might enable this to be done

relatively easily. This information could be coded in a stormwater master account file, allowing the service fees to be adjusted basin-by-basin (or in some other rational manner) to generate the revenue required to meet capital improvement needs for each watershed. Impact on the data processing systems would include modifications to the file structure and the rate algorithm.

The compatibility of this concept with existing capital funding policies in Fairfax County is rather low. The long-term impact of this type of rate structure modification might be to restrict revenue capacity of a service fee methodology well below its overall potential. As localized capital costs are applied to charges in a given drainage basin, the willingness-to-pay of ratepayers in that area could be exhausted. Experience in other communities, including Louisville, Kentucky and Tulsa, Oklahoma suggests that funding stormwater capital needs on a basin approach might ultimately hinder the full build-out of the needed capital projects. The cost of stormwater improvements in many areas is simply more than can be borne by local property owners alone, yet the projects may have County-wide significance.

d. SERVICE FEE CREDITS

Perhaps the most widely practiced modification to basic stormwater management rate structures is the application of a credit adjustment. Credits are commonly provided for properties that have on-site detention or retention facilities to control the peak rate of stormwater runoff and safely store the excess stormwater temporarily or for an extended period. Such controls reduce the capacity requirements (and cost) of downstream systems to attain a given service level and may enhance water quality if properly designed and maintained.

In most cases detention or retention systems are designed to approximate pre-development conditions or the capacity of downstream facilities. Detained stormwater is released at a controlled rate after the peak runoff has receded. Retained stormwater is infiltrated into the soil or allowed to evaporate, so retention is usually practiced only in areas with excessively drained sandy soils and high temperatures such as Florida and some portions of the western United States.

Service fee credits have also been adopted in some jurisdictions for properties subject to and in compliance with NPDES permits and for public and private secondary and high schools providing approved water quality education programs. The rationale for the latter credit is that education is an emphasized program component in many NPDES stormwater discharge permits. If not provided by the local schools it would have to be performed by the stormwater management entity at additional cost to the ratepayers.

Various means are employed to provide service fee credits to properties having on-site detention.

- Boulder, Colorado's rate ordinance directs that stormwater service fees be reduced for properties providing on-site detention, but the amount of reduction is not specified. The Town's administratively adopted practice is to reduce the normal service fee twenty (20) percent for an on-site detention system that meets its standards for a 5-year storm event detention facility. Systems that meet the 100-year storm event detention requirements are eligible for an eighty (80) percent reduction in the service fee.

- Bellevue, Washington changes the intensity of development classification of properties with detention systems to that of very lightly developed land, resulting in a variety of percentage reductions, depending on the intensity of development classification normally applied to the subject property.

- Charlotte, North Carolina allows up to fifty (50) percent credit for peak runoff attenuation and up to twenty-five (25) percent credit for total flow volume reductions.

- Practices elsewhere are to reduce service fees between twenty-five (25) and seventy-five (75) percent.

The primary intent of credits for on-site detention or retention is to recognize reductions in the cost of public stormwater services and facilities that are attributable to private systems or activities. Typical detention/retention credits against monthly service fees provide a relatively modest economic incentive to developers. Rarely do they offset the loss of space such facilities occupy or the degree to which on-site systems disrupt the layout of commercial properties and subdivisions. Nor do most credits consider the water quality impacts of on-site systems, or their influence on the cost of stormwater quality management.

The structure of credits sometimes changes over time with shifting program priorities, authority, and legal limitations.

The balance of fees with the level of service required and provided is, at least in theory, improved by the use of credits. On-site control of the peak flow of stormwater runoff means that a property requires less service (in terms of downstream capacity) from the stormwater management system. Downstream reductions in peak runoff allow a higher level of service from a given size of facility or enable a community to build smaller systems in the future to attain a given level of service objective, reducing capitalization costs. A detention credit could be valid in Fairfax in terms of stormwater quantity management, as well as stormwater quality management controls for water quality protection. A reduction in pollutant discharges into the public systems should translate into lower NPDES permit compliance costs, but it is unclear whether any elements of the County's current program might possibly be reduced or eliminated by virtue of the private properties' compliance with their permits. In addition, it is appropriate public policy to consider whether all structures should be eligible for credits if they are required by the County's current engineering requirements in order for construction of impervious surface to occur. This is a key public policy that must be considered prior to initiation of any credit program.

An additional administrative cost would be incurred to assemble and maintain the data to support credits, especially with regard to existing on-site systems or activities performed by property owners. Developers' engineers can provide the information required to incorporate a credit for on-site detention and other mitigative measures on properties that are developed in the future. Credit calculations are relatively easy. An allowable runoff release rate based on pre-development conditions and required on-site storage capacity can be used to determine the effectiveness of on-site detention facilities for crediting purposes.

No substantial data processing capability would be required to enter a credit into a property's stormwater service fee billing file. The adjustment could be made to the data in the billing file addressed by the rate algorithm rather than by adjusting the parameters used in the basic service fee calculation, or a percentage reduction could be applied to the service fee. This would allow the credit for any specific property to be rescinded easily if an on-site detention facility is altered or is not maintained in proper operating condition, or if a property owner ceased adhering to the conditions of an NPDES permit.

In most communities the long-term impact on revenue resulting from this type of adjustment factor is minor compared to the basic revenue capacity of a stormwater service fee. Credits elsewhere have not diminished long-term revenue capacity more than five (5) percent. Ratepayers who do not have on-site systems (or NPDES permits if a water quality credit is adopted) would have to pay slightly more to cover the revenue reduction resulting from the credits.

e. WATER QUALITY FACTOR

The water quality impacts of stormwater discharges are becoming a much greater concern than in the past. Historically, municipalities have focused on flooding, erosion, and sedimentation problems resulting from stormwater runoff because of their direct and visible impact on people and property. As the general public's concern for the environment and interest in water quality have grown in recent years, the attention given to stormwater quality has also. As noted above, stormwater service fee credits for water quality control are now being adopted in some jurisdictions. In the same spirit, a water quality “factor” might also be applied within the basic rate methodology to allocate increased County costs associated with water quality impacts to those properties having the greatest influence on the need for pollutant control services and systems.

The key difficulty in administering this type of fee factor is that the attributes, characteristics, or conditions of properties which degrade water quality are hard to conclusively identify and may change quickly. It is difficult to assign such costs specifically to individual properties on the basis that their on-site conditions or actions might cause water pollution if they did something wrong.

Quantifying their impacts on the cost of public services and facilities at an acceptable level of accuracy for cost allocation purposes is virtually impossible at this time because of the limited data available. In addition, much of the cost of stormwater quality management is preventive or speculative, i.e. local governments must attempt to identify potential sources of pollution and regulate in various ways to prevent impacts from occurring. Many of the necessary components of an effective program are applied community wide (for example, education) rather than isolated to specific properties.

Analyses conducted during the National Urban Runoff Program (NURP) research project suggest that the single most significant factor influencing pollutant loadings in stormwater is the percentage of impervious coverage. This is logical, considering the typical development patterns and runoff characteristics of intense industrial, commercial, and transportation land uses. Such properties are frequently covered almost totally with roofs and pavement. They are also subject to truck and heavy equipment traffic, and potential pollutants are commonly used, created, or transported on such sites.

Thus, imperviousness could be used to introduce a water quality component into service charge rates, even if that parameter was not used in the basic rate methodology. The actual use of the land, or the presence or use of pollutants on individual sites might be another consideration. However, these can vary from time to time and would require a great deal of monitoring and data management. Other mitigative conditions are equally hard to track, such as the presence of a grass buffer between paved areas and storm drainage ditches or streams.

In order to minimize the initial expense and data management demands of a water quality factor, most communities seeking to incorporate water quality costs into a stormwater rate methodology opt for imperviousness as the most suitable single measure. Some simply increase their basic stormwater service fee rates to meet the additional cost of service without changing their rate methodology.

f. DEVELOPMENT AND LAND USE FACTOR

The act of developing land and the long-term land use both impact stormwater runoff. A rate modifier could be used in conjunction with one or more of the basic rate structure concepts to account for the temporary impact of development and/or the permanent effects of land use on the quantity and quality of stormwater discharged to the public systems. The objective of this type of modifier would be to improve the equity of the distribution of the cost of services and facilities, especially as it pertains to properties undergoing development and those that have unusual impacts associated with their land use.

A development and land use factor can be designed to reflect the influence of site conditions that may vary among otherwise comparable developments, especially conditions which impact stormwater quality or quantity only temporarily during the development process or when certain activities are underway. The challenge is to define such influences with reasonable accuracy and quantify their impact. The balance between charges and the level of service provided is not precisely definable at the present time. Efforts to refine basic rate structures by introducing this type of factor have to be designed with the limitations in mind.

Data requirements for a development and land use factor should be minimized to the greatest extent practicable if one is employed. The cost of this type of modifier is primarily associated with the expense of assembling data and maintaining it. The expense could be minimized by using qualitative rather than quantitative attributes and by grouping properties in similar categories. Development activities could be assigned to groups by degree of impact on stormwater systems and water quality. A rate modification value could be assigned to each group. Land use, which is an on-going condition, could be broken down into groups of uses that have similar potential impacts.

The key relationship to be reflected in this type of factor involves the impact of development activities and land use conditions on the cost of services and facilities. Ostensibly, it would include consideration of water quality as well as runoff quantity impacts. Data from planning, tax, hazardous and toxic materials inventories, and other existing sources may be sufficiently detailed to define groupings of land uses.

Virtually any approach would be compatible with the service fee calculation and billing options being considered, even if a secondary formula or reference to the another file

was required to generate this type of modifying factor. Financial sufficiency is not as critical a consideration in modifying factors as in the case of basic rate concepts. A development and land use modification to the basic rate concept would create only minor changes to the service fees for most properties, and would generate a limited amount of additional revenue. The revenue stability of this type of modifying factor is only moderately good because a portion of it is associated with the underlying pace of development. A modifier reflective of temporary development activities would generate only an interim addition to the revenue stream. One related to land use conditions could generate a permanent addition that would reflect the overall impact of certain land uses on stormwater management costs.

The flexibility associated with a development and land use factor is relatively good, since engineering judgment would normally be used in assigning modifying factors to individual properties or dividing similar properties into groups and assigning factors to the various groups. This type of modifier also is very adaptable to changing conditions as local areas are developed or redeveloped. It could create a minor shift in the distribution of stormwater costs of service related to development by assigning a greater portion of those costs to the development community.

g. LEVEL OF SERVICE FACTOR

Stormwater service levels vary across Fairfax County. Although the County's long-term objective is to provide a consistent level of stormwater services and facilities to similar areas and similar properties throughout the area, it is likely that actual service levels will continue to vary for the foreseeable future. The County may wish to consider a level of service factor that would reflect the status of services and facilities in certain areas relative to the County's service objectives in general, which could be adjusted over time as improvements in service is made. A better balance between the charges and the level of service actually provided to individual properties would improve the equity of cost allocations. However, the cost of doing so at this time through a modification factor may be higher than the additional degree of equity would warrant.

The primary objective of a level of service modifier is to improve the equity of charges when a broad range of service levels is being provided. In general, the County is providing a minimal level of day-to-day service. The County has not consciously adopted specific levels of service on a geographical basis, yet it is the nature of the problem that some low-lying or other physical areas may require higher levels of service.

The greatest obstacles to implementing a level of service modifying factor are that the County has not yet formally defined its service level objectives and does not have the data necessary to determine if specific areas are deficient, meet service objectives, or exceed them. It would be difficult to assign an economic value to incremental shortfalls in service level that now exist.

A great deal of preparatory work would have to be done to institute a level of service factor as part of the rate structure. First, detailed information about all the stormwater management systems would have to be gathered so that present conditions could be verified and a realistic service level objective could be defined. Second, the level of service actually provided to individual properties would have to be quantified in some way. Differing levels of service may be justifiable for some areas and/or for individual reaches in a watershed in terms of benefit/cost relationships and efficiency. Third, the

value of a diminished level of service below the objective would have to be quantified. The data requirements would be expensive to meet at the present time, given the limited amount of information that is presently available about the drainage systems and equally limited knowledge regarding levels of service.

Compatibility with existing databases and billing systems would not be a problem. A modification factor might be applied to areas or to individual properties based on service level information. This type of modifying factor would not significantly alter the financial sufficiency of a basic stormwater rate concept unless service fees were dramatically reduced to reflect service level deficiencies. Underlying rates might have to be increased to generate adequate revenue to meet the service level objectives. Properties receiving a fully adequate level of service might be charged substantially more in order to meet the overall stormwater revenue objective.

Overall revenue sufficiency and stability could be decreased by introducing a level of service factor into the rate structure as a modifier. It would give ratepayers another basis on which to appeal service charges, citing deficiencies in service level or differences in level of service relative to other comparable properties.

The flexibility added to a rate concept by introducing a service level factor might be substantial. Engineering judgment would have to be employed to define the various levels of service achieved in the current systems, the desired full levels of service that serve as objectives, the value of incremental deficiencies that exist, and how they should be incorporated into rates.