



Knox County Stormwater Advisory Board Stormwater Program and Funding Recommendations

October 2007





Stormwater Advisory Board Program and Funding Recommendations Executive Summary

1.0 Background

The Knox County Stormwater Advisory Board (the Board) was appointed by Knox County Mayor Mike Ragsdale in September 2006 to undertake a Stormwater Management Program Assessment Study. The Board is a broad-based citizen's group that is tasked with examining and recommending changes to the existing Knox County stormwater management program. The objective of the Board, as presented by Mayor Ragsdale, is to review, discuss and recommend to the Mayor, program strategies and policies related to the expansion and enhancement of existing stormwater management services that will help reduce flooding and drainage problems, protect streams and channels, and decrease water pollution. Members of the Board are identified in section 1.0 of this report.

Following a specific process provided to the Board by the consultant team supporting the project, the Board reviewed the current program of services provided by Knox County to operate and maintain the drainage system within the unincorporated area of the County. Recognizing that there are increasing demands for comprehensive stormwater management, the Board prepared a Vision Statement for the County stormwater management program as part of the overall process of program evaluation. A statement of mission and goals was also created, along with seven priorities that are recommended to the Mayor. The mission, goals and priorities can be found in sections 3.0 and 4.0 of this report. The Vision Statement reads:

The Knox County Stormwater Management program shall protect, enhance and restore water quality and resources of our community for future generations.

After identifying the challenges, needs, and issues that the County stormwater program must address, the Board reviewed options and developed recommendations for program enhancement, which are provided in section 2.0 of this Executive Summary (below). The recommendations developed are designed to shift the current level of service in stormwater management to a more comprehensive, proactive approach in infrastructure management and environmental protection. Each recommendation has an assigned level of effort, defined as "minimal", "moderate" or "aggressive" based on its initial program enhancement and/or estimate of cost impacts. Further, the Board recommended that these changes be implemented over the next five years and that they managed and implemented through stormwater utility. The Board also recommended that funding of the utility be primarily generated through a stormwater user fee.

2.0 Program Recommendations (found in Full Report Section 5):

Stormwater Program Administration:

A-1: Secure program funding and resources *(Impact level - Moderate)*

Fair and equitable funding to carry out the program was identified in the #1 priority by the Stormwater Advisory Board, and therefore, securing of funding will likely be an immediate action item. Additional recommendations on the appropriate method(s) of funding and more specific action item(s) are provided in section 6.0 of the report and section 5.0 of this executive summary.

A-2: Stormwater Advisory Board/Roundtable *(Impact level - Minimal)*

A citizen-based stormwater advisory group, whether appointed by the Mayor (as a Board) or generated through interested citizens, will continue to provide broad policy recommendations to ensure that the vision and mission are carried-out. This will allow the public to play a key role in ensuring that the services and activities of the stormwater management program carry-out the vision and mission of the program.

A-3: Hire an Administrative Assistant *(Impact level - Minimal)*

Addition of an administrative assistant which would occur in Year 1 of the Planned Program is recommended to provide necessary services for internal operations of the recommended Planned Program.

Special Supporting Programs:

SSP-1: Increase stormwater education activities *(Impact Level – Moderate)*

No new staff is included in this functional area. A number of public education and outreach needs and potential audiences were identified by the County staff and Stormwater Advisory Board. To address the need for increased education, resources are included for the development and implementation of a communications plan for the County stormwater program. The development and implementation of a communications plan will allow a coordinated effort in the communication of stormwater concepts, activities and requirements, and in communicating the comprehensive vision of the program. Anticipated components of the plan are listed in section 5.3.2 of the report. It should be noted that a number of these initiatives could be coordinated with the City of Knoxville or Town of Farragut.

Stormwater Quality Management:

SWQ-1: Illicit Discharge Program Improvements *(Impact Level – Minimal)*

TDEC is requiring that the County develop and implement more formalized plans and procedures for the Illicit Discharge program. Standard operating procedures will be formulated, specifically for outfall monitoring, hotspot identification and monitoring, and complaint response and enforcement. Resources will be directed over the five-year planning period to implement all elements of the Illicit Discharge program.

SWQ-2: Good Housekeeping Program Improvements *(Impact Level – Moderate)*

TDEC is requiring that the County provide better documentation of pollution prevention training for staff. Enhancements in data management will address this.

SWQ-3: Hire two Stormwater Quality Management staff (*Impact Level – Moderate*)

The second permit cycle for NPDES Phase II is anticipated to expand the permit requirements as well as address additional TMDL conditions on area streams. Two additional staff positions are recommended, a Water Quality Specialist and a Compliance Coordinator who will oversee TMDL and NPDES compliance activities that are performed throughout the County organization (i.e., not just those carried out by the Department of Engineering and Public Works) and provide hands-on management of the Illicit Detection Program, the pollution prevention program for county facilities/activities and the TMDL monitoring program.

Engineering and Planning:

EP-1: Public System and Private Facilities Inventory (*Impact Level – Aggressive*)

This program activity recommendation expands the outfall map being developed as part of the current program to include the entire public stormwater system as well as private stormwater facilities (e.g., detention ponds). An understanding of the location and condition of the system of pipes, ditches, catchbasins and other components of the public stormwater system is key to ensuring proactive maintenance and capital improvement programs. Such data is also key to development of watershed master plans and compliance with water quality regulatory mandates.

EP-2: Watershed Master Planning (*Impact Level – Aggressive*)

Watershed master planning is included in the Planned Program as a useful tool to help the County move to a proactive maintenance and capital improvement program to address system needs. Already two of Knox County's watersheds have master plans for flood protection purposes. Additionally, environmental master planning generated by TMDL requirements is underway in three watersheds in Knox County through County partnerships with the Tennessee Valley Authority and the University of Tennessee. It is currently planned that this approach will be used as the basis for master planning in additional priority watersheds in Knox County.

It is the Board's recommendation that all County watersheds be master planned. Initial efforts in this task will determine what information is needed from watershed master planning efforts, determine master planning methods and standards, prioritize County watersheds planning needs and develop a long-term master planning schedule. Master planning will then begin on priority watersheds and will gradually cover all County watersheds in accordance with the plan and as funding allows.

EP-3: LID/BMP Concepts Oversight (*Impact Level – Moderate*)

The proposed Knox County stormwater management ordinance and manual require the use of water quality BMPs to treat stormwater runoff, and provide incentives for the use of Low Impact Development (LID) approaches to reduce runoff volumes and peak discharges. This program element provides for planning, coordination and regulatory oversight of LID practices and water quality BMPs that are used by developers to comply with County regulations. A number of activities will be needed to ensure that these concepts are implemented in an effective manner, including:

- resolution of conflicts between desired LID practices and the current subdivision, zoning and other regulations;

- data management of buffer and water quality “credit” areas (as defined in the Knox County Stormwater Management Manual); and,
- long-term planning of resources, tools and additional incentives that promote or ease the use of LID approaches.

EP-4: Data Management Improvements (*Impact Level – Aggressive*)

The County will maintain effective data management tools that support the long-term goals of the stormwater program including system data, mapping of outfalls, tracking of regulatory compliance actions and maintenance activities on the drainage system. A detailed examination of existing data, needs and uses, existing data management systems and processes, and County computer capabilities/needs is a necessary first step. This will result in the development of a Data Management Action Plan that makes recommendations regarding data management improvements, and provides estimated costs for equipment, software, training and other data management needs. Implementation of the plan will follow soon afterward.

The effectiveness of many high priority actions can be impacted by a lack of data management planning. Knox County staff cited data management as one of their greatest needs. This need will increase significantly as stormwater inventory and master planning efforts begin. To bridge the gap between current needs and the Planned Program, data management planning is proposed at the beginning of the third year, with implementation to follow as soon as recommendations are approved by the County. Hiring a Stormwater Data Manager is proposed for the first year of the Planned Program in order to manage existing data management needs. The Data Manager will be responsible for guiding the County’s data management efforts through implementation of the data management plan.

Regulation and Enforcement:

RE-1: Construction Site Inspection Program Improvements (*Impact Level – Aggressive*)

Improving the effectiveness of the current construction site inspection program was identified as a significant need for effective stormwater management, both by the Stormwater Advisory Board and Knox County staff. EPSC inspection/enforcement enhancements, including a number of program recommendations by TDEC, will occur with adoption of the new ordinance/manual, which provides greater clarification of grading permit and erosion control requirements, and more closely aligns the County program with the standards of the Tennessee Construction General Permit. Other changes proposed to improve the construction site inspection program are listed below.

- A. TDEC is requiring the development of **standard operating procedures (SOPs)** that provide for consistent application of County requirements/activities for EPSC plans review, construction inspection, and enforcement actions. These SOPs will include formalization of procedures for receipt of information submitted by the public (e.g., complaints) regarding construction site runoff, and development of pre-determined enforcement actions for repeat offenses and serious violations. Knox County has already developed and implemented key SOPs for inspections and enforcement.
- B. The construction site inspection program will be reorganized to provide more effective and efficient inspections and enforcement. There are four actions recommended in association with this improvement.
 1. **Restructure inspector responsibilities.** Construction site inspectors (currently called subdivision inspectors) will be responsible for inspection of the following

elements for all subdivision and individual lot (residential and non-residential) construction: stormwater drainage system (e.g., pipes, catchbasins, ditches); stormwater management facilities (e.g., water quality BMPs and detention/retention ponds); grading; and EPSC practices. These responsibilities are in addition to non-stormwater related duties they already perform for subdivisions, such as paving oversight and infrastructure inspection. Building codes inspectors will be relieved of EPSC inspection responsibilities, but will maintain EPSC inspection training so they can recognize and react properly to erosion control issues.

2. **Add grading/drainage inspections for individual lots.** Modifications to overall drainage patterns due to the actions of individual, residential lot owners is a problem voiced by County staff. This problem often occurs during construction of a single residential lot. To address this issue, construction site inspectors will be responsible for inspection of single lot grading to specifically identify modifications that are not in keeping with the original stormwater management plan for the larger subdivision. The stormwater ordinance will allow inspectors the authority to enforce the original plan.
3. **Hire new construction site inspectors to supplement current staff.** This action will allow a more manageable inspection workload for each inspector. Proper workload distribution will boost the effectiveness of the inspection/enforcement program and better ensure compliance with NPDES and TMDL requirements by allowing each inspector adequate time to inspect sites, communicate with contractors, and follow-through with enforcement actions. This will also allow cross-site coverage between inspectors when normal inspection schedules are impacted by paving activities, difficult enforcement actions, or personal issues (sick days, vacation, etc.).
4. **Hire Construction Inspection Supervisor(s)** that are dedicated to this program component and relieve the Stormwater Coordinator (who has numerous other program responsibilities) of this duty. One or more Inspection Supervisors that are dedicated solely to this program component can better provide for consistency of inspections and enforcement on an on-going, County-wide basis. For effective supervision, one Supervisor will be needed for every 10 to 15 inspectors. Responsibilities of a Supervisor will include: supervision of construction inspection staff; coordinating inspection logistics (workloads, County-wide coverage, construction schedules vs. inspection schedules); staff training and/or training oversight; oversight of inspector implementation of inspection SOPs; quality control/quality assurance reviews; assisting inspectors with technical issues; guiding difficult or special enforcement actions through the system; and maintaining County compliance with construction inspection requirements of NPDES Phase II and TMDLs.

RE-2: Post-Construction Program Implementation (*Impact Level – Moderate*)

Developing, implementing and enforcing a program to reduce pollutants in stormwater runoff after development is a significant piece of the NPDES Phase II permit. Implementation of this program will begin upon adoption of the new stormwater ordinance/manual. The basic County requirements are design, construction and maintenance in accordance with County stormwater standards and criteria. Activities will include inspector training, inspection of water quality BMPs during construction for compliance with approved design plans, long-term (e.g., annual)

inspection of BMPs after construction for compliance with BMP maintenance requirements, enforcement of the post-construction provisions of the stormwater ordinance, and documentation and tracking of BMP locations, inspections, and enforcement actions.

RE-3: Development Plans Review Improvements (*Impact Level – Minimal*)

It is anticipated that the complexity and workload of the County plans review staff will increase with the adoption of the new stormwater ordinance/manual. This is due to the increased number of potential water quality designs that are allowed, and the detailed calculations for water quality-related BMPs and developments that incorporate LID approaches as well as the complexity of anticipated future regulatory requirements from TMDLs, etc. Plans review staff should receive regular training on the latest trends in water quality BMPs and LID in order to maintain a high level of understanding of design requirements and criteria.

Operations and Maintenance:

OM-1: Proactive Routine and Remedial maintenance (*Impact Level – Minimal moving to Aggressive in later years*)

Knox County will ensure the integrity of the drainage system by moving to a proactive maintenance program County-wide. The Board's specific recommendation for the operations and maintenance cost center is three-fold:

1. For newly constructed stormwater management facilities, the County should not provide routine maintenance (e.g., mowing, debris clearing, vegetation maintenance, etc.). However, it is recommended that the County increase stormwater services for these facilities to provide remedial maintenance to ensure that the structural integrity, water quality control capabilities and flood control capacity of the facilities are maintained as designed and constructed. This recommendation does not include maintenance of stormwater system components that are solely designed for the purpose of drainage conveyance (e.g., gutters, catchbasins, channels, and pipes). This service increase shall be funded through the use of cash bonds for perpetual maintenance of stormwater facilities. (Stormwater funding recommendations are discussed in greater detail in Section 6 of this report).
2. For existing stormwater management facilities, the County should not provide remedial maintenance of private facilities, except in cases where public safety or health is compromised and access to the property is granted to the County. The County does not provide routine maintenance (e.g., mowing, debris removal). This is a continuation of current County level and extent of service policies for existing facilities.
3. The stormwater system inventory and watershed master planning described in the Engineering and Planning cost center are key to an effective proactive program, providing the data to anticipate drainage problems and to prioritize and plan maintenance activities. The policy recommendation stated in item 2 above should be re-examined once the County gains improved knowledge of the stormwater system and the remedial maintenance and capital improvement needs of existing private facilities. Consideration should then be given to an expanded role for the County in

the long-term maintenance of privately owned stormwater facilities for major remedial repairs.

OM-2: A *stormwater maintenance crew must be hired* as the inventory and master planning result in the identification of a significant number of stormwater maintenance issues, beginning the shift from “reactive” to “proactive.” Costs will include pay and benefits for the crew and supervisor, and associated vehicles and equipment. As the master planning and system inventory efforts progress, the need for a second stormwater maintenance crew will be assessed.

As proposed, the County will be responsible for providing maintenance of stormwater facilities in ROW and public land, and for oversight (e.g., inspection) and enforcement of the local regulations and the maintenance covenants. Additionally, the County will continue to provide floodplain management. The property owner will be responsible for maintenance of existing stormwater facilities on private property. New privately owned stormwater facilities will be maintained for remedial repairs by the County based on the financial support provided through a cash bond (as recommended in Section 6).

Capital Improvements:

A list of first-year capital projects can be found in Appendix C.

CIP-1: CIP assessment, prioritization, planning and implementation (*Impact Level – Moderate moving to Aggressive in later years*)

Knox County will ensure the integrity of the drainage system by moving to a proactive capital projects program to address system needs. Capital projects will be recognized, assessed and prioritized based on the currently used level-of-service process, and the stormwater system inventory and watershed master planning activities defined in the Engineering and Planning cost center. New projects will be scheduled and implemented based on priority and funding availability.

Should this process result in the identification of a significant number of new capital projects, there may be a need to hire additional CIP Project Managers and CIP Construction Inspectors. CIP Project Managers are responsible for scoping CIPs, receiving bids and establishing contracts with consultants and subcontractors, managing the design and construction project (through consultants and contractors), and ensuring design compliance with applicable regulatory requirements for new construction. CIP Construction Inspectors are responsible for ensuring that the construction project is in compliance with design plans and regulatory requirements for construction sites. Like the operations and maintenance program, the Capital Improvements program will be driven by the system inventory and by the master planning efforts under the Engineering and Master Planning functional area.

3.0 Cost Analysis of Recommended Program:

The table below provides a combined cost summary of existing and new services, categorized by functional cost center.

**Table 9. Knox County Stormwater Program Cost and Staffing Allocation
 (existing and new services)**

Line	Functional Cost Center	FY 08-09		FY 09-10		FY 10-11		FY 11-12		FY 12-13	
		Costs	FTE	Costs	FTE	Costs	FTE	Costs	FTE	Costs	FTE
1	Administration	\$431,761	3.4	\$353,680	3.4	\$359,805	3.4	\$367,645	3.4	\$372,707	3.4
2	Special Supporting Programs	\$504,466	2.6	\$516,137	2.6	\$528,217	2.6	\$540,720	2.6	\$553,660	2.6
3	SW Water Quality Management	\$644,043	4.6	\$581,291	4.6	\$596,778	4.6	\$652,806	4.6	\$667,111	4.6
4	Engineering and Master Planning	\$1,043,681	2.1	\$2,110,778	2.1	\$3,584,425	2.1	\$3,151,447	2.1	\$3,170,566	2.1
5	Operations and Maintenance	\$1,651,896	22.8	\$1,448,301	22.8	\$1,490,275	22.8	\$1,567,869	22.8	\$1,537,391	22.8
6	Plans Review and Regulatory Enforcement	\$2,218,040	26.0	\$1,949,022	27.0	\$2,346,364	31.0	\$2,728,263	32.0	\$2,583,967	34.0
7	Capital Improvements	\$4,201,785	3.4	\$6,564,883	3.4	\$8,986,293	3.4	\$11,740,531	5.4	\$16,592,630	5.4
8	Total Estimated Costs (all services)	\$10,695,671	65	\$13,524,091	66	\$17,892,157	70	\$20,749,281	73	\$25,478,032	75

The levels of funding that are presented in Table 9 were discussed at length by the Board. The compelling issues that are drivers of the total program costs over the five years of the Planned Program are:

- the stormwater inventory and watershed master planning efforts (included in costs on line 4), which lead to:
- proactive operations and maintenance costs (line 5);
- proactive capital improvements costs (line 7); and separately,
- the increase in staffing and associated equipment for regulatory oversight and compliance enforcement (line 6).

4.0 Other Recommendations:

The discussion of the first, second and third bullets above lead to a recommendation by the Board (OR-1 below) about prioritization of program activities in the first year.

OR-1: Priority Activities:

Program activities and funding for Special Supporting Programs (public education) and Engineering and Master Planning are considered priorities by the Knox County Stormwater Advisory Board. It is recommended that the projected FY08/09 funding for these cost centers be accelerated into FY07/08 provided that this acceleration of funding does not significantly impact or delay current necessary Public Works projects.

The Board also developed a detailed recommendation about improvements needed for the County's current plan review and construction inspection/enforcement process for private development.

OR-2: Development Process Improvements:

Knox County's development process should include a mandatory pre-design meeting for the concept plan to allow for a full discussion of development options on the site. This will first require the establishment of a meeting policy or procedure that is "all inclusive", ensuring the participation of other stakeholder agencies (e.g., TDEC, USACE, utilities, etc.) so that the planning process fully addresses all site elements.

A review, assessment and streamlining of Knox County's development process is recommended to determine changes that would create efficiencies and provide opportunities to encourage the use of LID practices.

The enforcement process should be examined and improved. Improvements should include tracking of developer compliance in a manner that allows for review of performance, enhanced data management to facilitate compliance tracking, and an enforcement escalation policy that would address cases of multiple and repeated violations.

5.0 Stormwater Funding Recommendations:

The Board examined the funding mechanisms available to Knox County to support its stormwater management program, with the objective of recommending the right mix of funding tools to achieve the County's target level of service. Issues examined included funding equity (linking revenue sources with revenue beneficiaries) and funding adequacy (the ability of a potential source to produce sufficient and stable revenue). The following funding-related recommendations were developed by the Board.

Funding-1: Establish a stormwater utility:

The Stormwater Advisory Board recommends the establishment of a stormwater utility, under the auspices of Knox County Department of Engineering and Public Works, to manage and implement the stormwater program.

Funding-2: Funding sources and specifics:

Utility funding should be generated from all of the following sources:

- ✓ Primary funding – a user fee;
- ✓ Secondary funding:
 - Inspection/review fees;
 - State and Federal grants;
 - Administrative penalties, fines and damages;
 - Cash bonds for perpetual maintenance of new privately owned stormwater facilities.

The utility user fee should be equitable to ensure a proportionate distribution of all costs to each user or user class, with the user's contribution (or fee) based on factors such as the amount of impervious area, water quality impacts, flow volume and/or rate of runoff, and should include incentives for encouraging low impact development.

The utility fee should be collected through the Knox County Trustee's Office. Concurrently, the Board recommends the immediate authorization of funds to initiate the master planning process.

Funding-3: Public communication/education to support the program and funding:

Public understanding of the comprehensive approach to stormwater management is recognized as critically important. Every effort should be made to communicate with the public, including the use of Advisory Board members to be "ambassadors" who can work with various citizen groups in providing background on the process and recommendations for the program enhancements. Public support can be established through clear and concise messages on the changes in service that will occur with additional resources.

- Prior to and as the implementation of the user fee is occurs, Knox County should concurrently implement a public education and communications campaign that focuses on educating citizens about the importance of stormwater management and the key elements of the planned comprehensive program.
- A communications plan should be prepared and fully funded as part of the user fee implementation process so that the Engineering and Public Works Department is empowered to reach as many citizens as possible. It is recognized that such an approach is important in communicating the purpose and equitable basis of the fee.
- In advance of County Commission review/consideration of the Advisory Board's report and recommendations, an educational message should be provided via the local newspaper or other effective means to all County citizens that conveys general knowledge of stormwater and the work of the Knox County Advisory Board.
- Communication tools such as a presentation with a script should be prepared and provided to the Advisory Board members who want to assist in community outreach. Training on the presentation and key messages should be provided as well.
- Continuation of an Advisory Board process is important during implementation of the user-fee. In addition, a Board should provide long-term, on-going advice and feedback during program implementation,



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October 2007

**This document was prepared and published on behalf of the Knox County Stormwater
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APPENDIX A - STORMWATER ADVISORY BOARD MEETING MINUTES

APPENDIX B – BOARD MEETING PREPARATORY MATERIALS

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Stormwater Advisory Board Program and Funding Recommendations

1.0 OVERVIEW

The Knox County Stormwater Advisory Board (the Board) was appointed by Knox County Mayor Mike Ragsdale in September 2006 to participate in a Stormwater Management Program Assessment Study and provide feedback and recommendations for the County's stormwater management program. The Board is a broad-based citizen's group that is tasked with examining, and recommending changes to, the existing Knox County stormwater management program. The mission of the Board, as presented by Mayor Ragsdale, is to review, discuss and recommend to the Mayor, program strategies and policies related to the expansion and enhancement of existing stormwater management services that will help reduce flooding and drainage problems, protect streams and channels, and decrease water pollution.

Board members were chosen by Mayor Ragsdale to provide representation of a wide range of perspectives on the subject of County stormwater management. Table 1 presents a list of the citizens that served on the Stormwater Advisory Board.

Table 1. Knox County Stormwater Advisory Board Members

<i>Peg Beute – Education Program Coordinator, Ijams Nature Center</i>
<i>Harold Cannon, PE – President, Cannon & Cannon, Inc.</i>
<i>Laura Cole – Board member, East Knox County Community Action Committee</i>
<i>Dawn Foster – Senior Transportation Planner, Wilbur Smith & Associates, Inc.</i>
<i>Marvin Hammond – President/CEO, Hallsdale-Powell Utility District</i>
<i>Victor Jernigan – President, Blue Ribbon Homes.com Inc.</i>
<i>Kathryn J. Lewis – Executive VP, Home Builder's Association of Greater Knoxville</i>
<i>Alvin Nance – President, Knoxville's Community Development Corporation</i>
<i>Tim Neal – Founder and President, Fairfax Development Inc.</i>
<i>Ronnie Nease – Environmental Health Director, Knox County Health Department</i>
<i>Grant Rosenberg – Deputy Director, Knox County Office of Neighborhoods</i>
<i>Jamie Rowe – Board Member, Fountain City Town Hall</i>
<i>John Schoonmaker – President, Council of West Knox County Homeowners</i>
<i>Lisa Starbuck – President, Northeast Knox Preservation Association</i>
<i>Wayne Watson – General Manager, First Utility District of Knoxville</i>
<i>Darrell Wright – Executive Administrator, Grace Baptist Church</i>

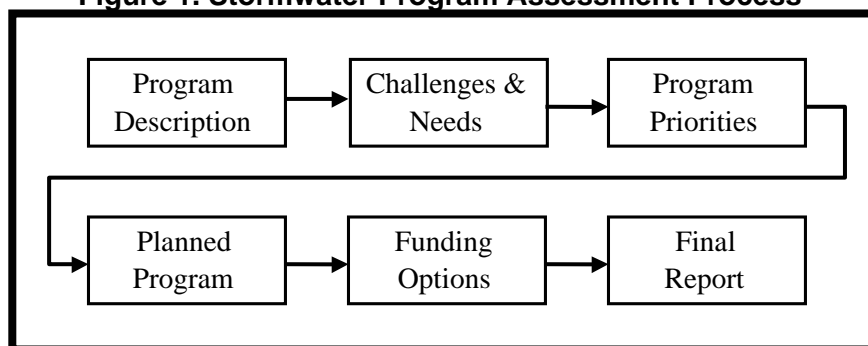
Specific responsibilities of the Board include the following:

1. Aid the County in reviewing and refining the goals of the stormwater management program, and review and comment on proposed program issues related to program expansion and enhancement, resource needs, and funding options.
2. Review existing partnering initiatives and recommend additional opportunities for resources or support from other local agencies to address stormwater runoff issues on a watershed basis, with respect to planning, improvements and maintenance.
3. Recommend funding alternatives that will be needed to fully implement an enhanced, comprehensive stormwater management program.

To carry-out these responsibilities, the Board held 11 monthly meetings from October 2006 through August 2007. The initial meeting was held at the City-County Building. All other meetings were held at Ijams Nature Center, which provided meeting facilities at no cost to Knox County. County stormwater staff, from the Knox County Department of Engineering and Public Works, attended each meeting in order to hear and understand community perspectives and provide input on Board requests. AMEC Earth & Environmental, Inc, (the consultant) an engineering consulting firm proficient in local government stormwater management, facilitated each meeting and recorded meeting minutes. The consultant also worked with County staff between meetings to gather information requested by the Board and prepare background reading material for the Board members prior to each meeting.

The majority of the meetings followed the general process shown in Figure 1. A brief explanation of the general steps shown in Figure 1 is provided below. A summary of the topics covered in each meeting is provided in Table 2.

Figure 1. Stormwater Program Assessment Process



Step 1: The process began with a **description of the existing County stormwater management program**, with focus on the functions and services performed, the level and extent of those services, staff mix and responsibilities, and state and Federal regulations/programs that impact the County's stormwater functions. **Step 2:** The **challenges, issues and needs of the existing stormwater program** were then identified, from the perspective of both the Board and County stormwater staff. **Step 3:** Once the Board had a

general understanding of the existing program, the process of developing the future Planned Program began with the Board's creation of a **vision and mission statement** for County stormwater, and identification of a number of **program priorities**. The statements and priorities are presented in Sections 2, 3 and 4 of this report. **Step 4:** Together, the mission, vision and priorities crafted by the Board provided the framework for development of a plan for the future stormwater program, herein called the "Planned Program". The Board's recommended Planned Program is presented in Section 5, along with a number of other recommendations that the Board deemed vital to the future success of the Planned Program. **Step 5:** The Board examined **options for funding the Planned Program**, as requested by Mayor Ragsdale. The Board's funding recommendation is provided in Section 6.

Table 2. Summary of Stormwater Advisory Board Meetings

Meeting # – Date	Topics Discussed
1 – Oct 2, 2006	Welcome and statement of Board objectives by Mayor Ragsdale Stormwater Advisory Board purpose, responsibilities and goals Existing Knox County stormwater management program activities Stormwater program challenges, issues and needs
2 – Nov 6, 2006	Existing policies for the extent and level of stormwater services Stormwater program goals – County staff perspective Stormwater program challenges, issues and needs
3 – Dec 4, 2006	Stormwater program vision – County staff perspective Stormwater program vision – Stormwater Advisory Board perspective Stormwater program mission Stormwater program priorities
4 – Jan 8, 2007	Stormwater program mission statement Stormwater program priorities and priority ranks
5 – Feb 5, 2007	Proposed stormwater ordinance public input process Planned stormwater program – initial discussions
6 – Mar 5, 2007	Proposed stormwater ordinance public input process Stormwater funding methods Planned stormwater program – Board's first review
7 – Apr 2, 2007	Proposed stormwater ordinance/manual
8 – May 7, 2007	Review of draft planned stormwater program Extent and level of service policies - impact on draft Planned Program
9 – Jun 4, 2007	Subdivision and site development process (<i>Board recommendations</i>) Extent and level of service policies - impact on draft Planned Program
10 – Jul 9, 2007	Development of funding recommendations 1 st Board review of draft report
11 – Aug 6, 2007	Finalization of recommendations

It is important to note that the process requested by the County Mayor and shown in Figure 1 is a deliberate and often lengthy process that is intended to examine broad stormwater objectives and issues. The desired outcome of the process is a group of recommendations (which are contained in this final report) that provide a solid, thoughtful framework that guides the overall direction and funding of the Planned Program. Within this process, some very detailed components of the program were examined by the Board. The Board gained an understanding of the status of County compliance with the State water quality permit requirements and the needed improvements for continued compliance. The components of, and necessity for, as-built drawings were discussed at length. One meeting was requested by Board members to allow review and discussion of the proposed Stormwater Management Ordinance. A portion of another meeting was used to examine the County's subdivision and site development process. Several of the Board's recommendations presented in Section 5 are a result of the Board's detailed review and discussion of these issues.

2.0 CURRENT STORMWATER PROGRAM

2.1 Current Program Overview

In the first meeting of the Stormwater Advisory Board, the consultant presented the Board with an overview of the current services provided by the County to address drainage and stormwater management. The consultant's presentation was developed based on a series of interviews and discussions with County stormwater staff. For sake of brevity, this section of the report includes only the highlights of the Board's discussion of the current program and its challenges, issues and needs. Summaries of current stormwater management policies and activities are included in Section 5 of this report, categorized by functional cost center. More detail is provided in the Appendix of this report, in the Board preparatory material for meeting 1.

The Board learned that the County stormwater program addresses the impacts of stormwater runoff from developed land and human activities. These impacts include increased runoff discharges, volumes, velocity, and pollutants that have an impact on the overall environment. The current program of services was presented in the context of activities aligned in functional cost centers, as shown in Table 3 based on the fiscal year (FY) 06-07 budget. The current program is funded primarily from resources in the Highway Fund. The full-time-equivalent (FTE) personnel count is also presented in Table 3. In actuality, stormwater responsibilities are carried out by a large number of staff, some of whom have full-time stormwater responsibilities (e.g., the Stormwater Management Coordinator) and many of whom do not perform stormwater duties on a full-time basis (e.g., the district maintenance crews). When stormwater responsibilities for all staff are added-up, this staff time results in an FTE of 35.8.

Table 3. Summary of Existing (FY 2006-07) Stormwater Cost Allocations

Functional Cost Center	Budget Costs	Personnel FTE
Administration	\$169,101	2.40
Special Programs	\$333,466	2.60
Billing and Finance	-----	0.00
SW Quality Management	\$427,513	2.55
Engineering & Planning	\$531,341	1.05
Regulation & Enforcement	\$628,630	16.80
Operations & Maintenance	\$1,158,714	9.00
Capital Improvements	\$1,460,645	1.40
TOTAL	\$4,709,410	35.8

The Board also reviewed the County's current policies for **level and extent of stormwater service**. The **level of service** is determined by the types and quantity of services provided to support the different parts of the drainage system. The **extent of service** is based on the stormwater structures for which the County provides services and the boundary limits set for the delivery of those services. Currently, the County operates and maintains drainage and stormwater management structures within County-owned public right-of-way only in the unincorporated area with the exception that if a life, safety or public health issue is found on private property, it will be dealt with as a priority. The County also handles projects outside of the public right-of-way on a limited basis through the Environmental Stewardship Program (ESP). ESP is a cost-sharing program for remediation of stormwater problems on private property in a way that is environmentally friendly. The County has the regulatory responsibility for private drainage system development, regulatory controls for erosion and sediment management strategies, and other land development activities such as plan review and inspection for drainage/stormwater management within the unincorporated area.

2.2 Challenges, Issues and Needs

In meetings 1 and 2, the Board was presented with the broad issues that were defined by County staff as drivers of the need for an assessment of the County stormwater program and funding options. These include:

- Flooding has historically been the primary driver of the program. However, the County is now faced with the growing complexity of controlling the **quality** of stormwater runoff in order to comply with Federal and State permits and regulations. Stormwater quality and erosion control now rival flooding as program drivers from the perspective of resource need and staff effort. This has already, and will continue to present, significant challenges in the area of regulation and enforcement, and will require greater staff resources and regulatory tools than are currently allocated;

- State water quality permits and regulations are having an impact on how the stormwater program is perceived by the community and on the community’s expectations for stormwater system operation;
- An aging storm system infrastructure must be rehabilitated in much the same way as the aging sanitary sewer system and water distribution network have been. As with water and sewer, increased demand due to community growth, along with the aging of the system, will result in the need for significant storm system repairs and upgrades.
- The County has limited resources to respond to increasing needs. This makes the program susceptible to the stress that external influences place on it. These influences, such as community growth, are becoming driving forces that cross political boundaries.

In these meetings, the Board was also asked to provide their input on the challenges, issues and needs of the current stormwater program. Table 4 provides a list of the challenges, issues and needs identified by Board members.

Table 4. Board Identified Stormwater Challenges, Issues and Needs

A demand for services that is growing faster than resources.
A need to adopt the new ordinance/stormwater manual.
A map of the stormwater system outfalls is needed by June 2008 to comply with NPDES Phase II regulations.
There are new water quality monitoring requirements being imposed on the County by the issuance of Total Daily Maximum Loads (TMDLs).
There is a need for maintenance of data that is collected and that is currently in the County system.
Current inspection services are stressed with continued development activity.
Private property drainage issues are increasing.
There is a need to educate the public about stormwater issues.
Maintenance is reactive to complaints and not proactive.
Current capital funding is limited.
Who will maintain and repair older stormwater facilities?
Public understanding of stormwater-related easements is needed.
Strengthen proposed as-built certification requirements is needed.
Regulations should prevent stormwater issues – work proactively.
Provide adequate tools to development community for as-builts (benchmarks).
Identification and repair of existing stormwater issues needs to be addressed.
Public understanding of stormwater facilities is minimal.
Data management improvements are needed.
Maximize County stormwater information through submittals from the public.
Stormwater funding must be provided.
Prioritizing stormwater issues with NPDES compliance needed.

Establishing sufficient funding to maintain compliance with NPDES and TMDLs.
Need a consistent legal process for construction enforcement.
Need sufficient manpower.

- The Board discussed the **current level of service policy** and whether it was reasonable to expect property owners of stormwater facilities to take responsibility for repairs of problem facilities. It was stated that stormwater maintenance responsibilities are unclear to property owners. This issue was discussed in detail in other meetings as well.
- A concern was raised that the proposed Knox County stormwater management ordinance will need to be strengthened with regards to **as-built certifications** for newly constructed developments. Uncertainty was expressed as to the accuracy of as-built certifications provided by developers to the County in the future due to the lack of a comprehensive benchmark system existing throughout the County, and the potential cost of establishing such a benchmark network was identified as a concern.
- The use of **Low Impact Development (LID) development practices** was discussed. LID practices are site design techniques and/or best management practices that reduce the environmental impact of a developed site. For purposes of stormwater, LID practices include limiting impervious surfaces (e.g., rooftops, pavement) and providing open spaces for stormwater recharge. Such techniques reduce or eliminate stormwater runoff volumes and, therefore, reduce potential for flooding and increased pollution impacts. Knox County staff and a number of Board members expressed general support for the use of LID practices, which are included in, and strongly encouraged by, the proposed Knox County stormwater management manual. However, concern was expressed that existing County regulations may conflict with LID practices and therefore require modification before LID techniques can be fully utilized. An additional concern expressed was that LID practices would drive up development costs, therefore increasing the cost of housing and limiting the availability of starter homes.
- **Community education** on stormwater was discussed with emphasis on educating owners of stormwater facilities, the real estate community, public officials and the general public.
- The Board discussed the County's need to inventory the stormwater system outfalls, per the requirements of a State water quality permit. It was agreed that an **inventory of the stormwater system** as a whole would provide greater information for planning, maintenance and remediation purposes. It was also discussed that obtaining a system inventory would also require improvements in the County's **data management systems/processes** that impact stormwater.
- The Board expressed concern for the County's **compliance with State water quality permits and regulations**, and deficiencies in current compliance activities that have been cited by the Tennessee Department of Environment and Conservation (TDEC). Improvements recommended by a recent TDEC audit include better data collection and management systems/processes and the need for increased resources and improved regulations, processes and procedures for the inspection and oversight of construction sites.

3.0 VISION AND MISSION STATEMENTS

Having gained a working knowledge of local stormwater issues in the first two meetings, the objective of the Board in meeting 3 was to focus on long-range planning of, and direction for, the Knox County stormwater program. An effective stormwater program development process begins with a vision statement that leads to a mission statement of goals, establishment of priorities to achieve those goals, and finally development of the actions that must be taken to reach the desired stormwater program. To stimulate Board discussion through this process, the Board was presented with the goals for the County stormwater program, as defined by County stormwater staff. These goals are:

- public safety;
- public health;
- protection of the roadway network;
- environmental protection and enhancement;
- regulatory compliance; and,
- regional cooperation.

The Board discussed the need for public participation and education, with emphasis placed on informing the general public about what comprises a stormwater system, the importance of its effective operation and maintenance, and the financial impacts to the community. It was also suggested that the County's elected officials be included in the education process. There was discussion about the content of an effective vision statement and after a thorough dialog by the Board, the following vision statement was developed.

Vision Statement for the Knox County Stormwater Management Program

The Knox County Stormwater Management program shall protect, enhance and restore water quality and resources of our community for future generations.

The crafting of a vision statement leads to developing a mission to carry out that vision, generally stated in terms of program priorities. It is expected that the mission statement will be used by County stormwater staff and elected officials to make decisions in the future regarding the stormwater program. As the program progresses and improves, the mission and priorities will change over time.

In development of the mission statement, the Board discussed the importance of including the County's stormwater goals (listed previously) in the mission statement, as well as the need to have language pertaining to long-range planning and adequate funding. Thoughts developed by the Board concerning the mission of the stormwater program were:

- maintain public safety and health;
- maintain the roadway network;
- minimize flooding;
- education;
- long-range planning; and
- funding.

Further discussion by the Board regarding how to carry out this mission led to the Board discussing the need to state overall initiatives such as:

- the minimization of flooding;
- public participation, engagement and cooperation (involvement);
- public education;
- long range planning;
- floodplain management;
- responsible stewardship (budget);
- program review and assessment at regular intervals, and
- the protection of property and County resources.

The mission statement developed by the Stormwater Advisory Board is as follows:

Mission Statement for the Knox County Stormwater Management Program

It is the mission of the Knox County Stormwater Management Program to protect the public's safety, health and property by improving and/or maintaining water quality, minimizing flooding, and providing effective infrastructure to protect the roadway network from the impacts of stormwater runoff.

In carrying out the mission, the Program will engage the community through public participation, outreach and education, effectively plan for the future to address floodplain management and water quality protection, and ensure stable and equitable funding that will provide for responsible stewardship and predictability in meeting the goals and vision for Knox County. The Program will be reviewed and assessed on a routine basis to measure accomplishments toward goals and to update both short and long term targets.

4.0 PROGRAM PRIORITIES

Discussions with County staff and during the first two Board meetings centered on the County's existing stormwater management program and its challenges, issues and needs. Concerns for future activities, compliance, funding and resources were voiced in many different ways. Based on these discussions, the list of needs and concerns were condensed and combined into a preliminary list of priorities for County stormwater management for consideration by the Board. These priorities are broadly stated to provide the guidance for review of existing resources and identification of changes in service, staffing and policy that would support accomplishment of the long-term vision and mission as defined by the Board.

Over the course of two meetings, the Board discussed the content and wording of the preliminary priority statements. The Board made modifications to priority statement wording and combined priority statements where similarities in wording existed. Discussion ranged from the identification of priorities that supported County compliance with water quality permit requirements, to flooding issues handled by stormwater system maintenance and capital improvements. The Board asked County staff to educate them on the composition of the County stormwater system, and to explain how system, permitting, inspection and enforcement data is currently managed and their vision for future data management needs.

After much discussion, the Board developed final program priorities. Each Board member was asked to rank the priorities in order of importance. The final, ranked stormwater program priorities are presented in Table 5.

Table 5. Stormwater Program Priorities

Rank	Priority Statement
1	Create a comprehensive vision for stormwater management that is embraced and supported by County leadership and the community. Obtain appropriate resources through fair and equitable funding to carry out the stormwater program vision and mission.
2	The County must ensure the integrity of the drainage system by moving to a proactive maintenance program County-wide and a proactive capital improvement program to address system needs.
3	The County stormwater program will effectively comply with regulatory mandates, including specific TMDL and NPDES requirements.
4	The County will reasonably ensure the highest protection of both public and private property from the negative impacts of stormwater runoff.
5	The County will provide construction management oversight, including regulatory framework and enforcement as well as effective plans review that ensures the effective installation of stormwater infrastructure throughout the unincorporated area.
6	The County will be proactive in addressing stormwater issues, including use of low impact development techniques, water quality best management practices and mitigation methods for runoff volume and flow rates.
7	The County will maintain critical data in support of optimal system performance and in support of regulatory compliance, using tools that will be both efficient and effective as decision-making tools.

5.0 STORMWATER PROGRAM RECOMMENDATIONS

5.1 Background

The planned stormwater program that is presented in this section was developed over the course of four Board meetings. For the first of these meetings, the Board was presented a preliminary Planned Program that was designed to gradually resolve the challenges, issues and needs they identified for the stormwater program, and to achieve their long-range program

priorities. The Planned Program presented to the Board consisted of stormwater related activities (e.g., watershed master planning, capital improvement projects), resource acquisition (e.g., additional staff, equipment, outside services), and administrative cost items (facilities purchase/rental, training costs, etc.). Estimates of costs were provided for each element of the Planned Program. Estimated costs were based on Knox County cost/salary/benefits data and experience with similar activities/items occurring in other communities.

In preparation of the Planned Program, the following questions were addressed:

1. What stormwater services should be changed, enhanced, or newly initiated to address the priorities developed by the Board?
2. What is the appropriate schedule for changing, enhancing or adding stormwater services over the next five years?
3. What will it cost to implement such recommended service changes?

The preliminary Planned Program presented to the Board was discussed in detail. Much of the discussion centered on stormwater maintenance and capital improvement costs, which together comprise the largest financial drivers of the program. Specifically, the Board was asked to establish recommendations pertaining to two of the main variables in the magnitude of these costs. These variables were:

1. how aggressively the County should move toward establishing proactive operations and maintenance and capital improvements programs (relevant to the 2nd priority established by the Board); and,
2. whether the Board should recommend a change to the County's current extent of service policies to include maintenance services for privately-owned stormwater facilities (relevant to the 3rd and 4th priorities established by the Board).

Question 2 was particularly of interest to the Board because of the provision in the County's proposed stormwater management ordinance that more explicitly defines a private property owner's liability for the maintenance and proper operation of such facilities.

Privately-owned Stormwater Facility Maintenance: The Board's initial discussion on the topic of privately-owned stormwater facility maintenance resulted in the consideration of **several service level options:**

1. Increase County services to include long-term maintenance and operation of privately-owned stormwater facilities. Fund this increase in services through user fees. (Recommendations on stormwater funding are presented in Section 6).
2. Share responsibility for maintenance of facilities, with the County providing major maintenance (identified as structure improvements such as sediment removal or dam maintenance) while the property owner provides routine maintenance and operation. One Board member suggested that funding for this option be addressed by the requirement of an escrow account that is established at the beginning of a development and a fixed dollar amount deposited by the developer to provide for future maintenance. (Recommendations on stormwater funding are presented in

- Section 6). Under this option, the creation of a homeowners association would be required to maintain the facilities.
3. Increase County services to include long-term maintenance of facilities, but only once the facility is inspected and deemed to be operational based on original design standards under which it was built. An approach to fund this increase in County services was not explicitly identified. Consideration of a specific fee for the long-term maintenance of the facility for those property owners who benefit from it was part of the overall discussion.
 4. Continue the current policy. The County does not provide remedial maintenance of private facilities, except in cases where public safety or health is compromised and access to the property is granted to the County. The County does not provide routine maintenance (e.g., mowing, debris removal). Remedial maintenance activities on private facilities may be performed on those facilities that the County chooses to remediate through the Environmental Stewardship Program. Under this policy, the County increases regulation and enforcement services, providing oversight of privately owned stormwater facilities to ensure that the property owner maintains the facility in proper operating condition. Increased regulation and enforcement is a requirement of a State water quality permit. *(Note: this option is currently included in the County's proposed stormwater management ordinance.)* An approach to fund this option was a combination of continued or expanded support of the Environmental Stewardship Program and prioritization of the capital improvement funding (regardless of source).

All of the potential service options were discussed over the course of several different meetings. For new facilities, policy 2 was preferred by the Board. However, it was decided that the County should continue the current policy (policy 4 above) for existing stormwater management facilities located on private property. In making this decision, the Board recognized that future system maintenance and capital improvement needs (both public and private) are largely unknown at this time, and that a system inventory and master planning are needed to generate the future growth plan for the cost of capital investment. The Board also recognized the potential issues of fair treatment to all property owners that could be associated with differing extent of service policies for new and existing facilities. The Board agreed that the existing policy should be re-examined once improved knowledge of the system and capital improvement needs is gained.

Finally, the Board agreed that funding for known, existing capital improvements should be included in the near-term planned program in order to move forward with maintenance and capital improvement needs that are currently understood. The Board requested that the Planned Program presented in this report include a list of potential capital projects to support the first year efforts. A broad list of currently known capital projects is presented on page 23.

5.2 Description of Functional Areas

The Planned Program for Knox County stormwater that is recommended by the Stormwater Advisory Board is presented in the context of nine broad functional areas that would comprise a comprehensive city or county stormwater management program. These cost centers are

presented in Table 6, along with a listing of the type of typical activities that may be included in each cost center in a comprehensive program.

**Table 6: Comprehensive Stormwater Management Program
 Functional Elements (Cost Centers)**

<p>1. Administration General Administration Program Planning and Development</p> <p>2. Special Programs Public Awareness and Involvement GIS and Database Management Special Programs Planning and Dev</p> <p>3. Billing and Finance Billing Operations Customer Service Financial Management Capital Outlay</p> <p>4. Indirect Cost Allocation Overhead Costs Cost Control Support Services</p> <p>5. Storm water Quality Management Industrial Program NPDES Regulatory Compliance Public Education/Involvement Illicit Discharge Elimination Construction Runoff Post-construction Runoff Municipal Good Housekeeping TMDL Compliance Street Sweeping/Maintenance Stream Monitoring Spill Response and Clean-Up Water Quality Master Planning Water Quality Permitting Programs</p>	<p>6. Engineering & Planning Development Plan Review Design Criteria and Guidance Field Data Collection Quantity Master Planning Design, Field and Ops Engineering Hazard Mitigation Zoning and Sub. Regs. Support Multi-objective Planning Support</p> <p>7. Operations & Maintenance General Maintenance Management General Routine Maintenance General Remedial Maintenance Emergency Response Infrastructure Management Public Assistance</p> <p>8. Regulation and Enforcement Code Development Code Enforcement Grading/Construction Permitting Drainage Inspections/Enforcement Flood Insurance Program Multi-Obj Floodplain Management Erosion Control Enforcement</p> <p>9. Capital Improvements Major Capital Improvements Minor Capital Improvements Land, Easement, and Right-of-Way</p>
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(Source: modified from *Municipal Storm Water Management*, Debo and Reese, 1995)

It is important to note that some of the program elements listed in Table 6 may not need to be performed in Knox County, even if they are performed elsewhere. The degree to which the activities in each cost center are, or are not, implemented in a jurisdiction is dependant upon that jurisdiction's size and capability, and its stormwater issues, needs and objectives. Few cities and counties need or have all of these functions.

5.3 Planned Program Recommendation

This section outlines the planned stormwater program that is recommended by the Stormwater Advisory Board. The program is summarized by separate subsections for each functional cost center. In each subsection, the current program is described, and recommendations for change are clearly identified. For recommended items/activities, the impact on level of effort or funding required to perform the activity is presented, in terms of aggressive (high), moderate or minimal (low). The Planned Program described herein addresses the priorities established by the Board and will lead to a more comprehensive stormwater program that will work to achieve the vision, mission and goals of the program. A schedule of program activities is presented at the end of this section.

5.3.1 Administration

Current:

Current administration activities include general program administration, program budgeting and cost allocation, staff hiring and management, overall program oversight, the preparation of bids and execution of contracts with consultants and contractors, and coordination/communication with the Mayor's office and County Commission. Such activities will continue through the life of the program and likely expand based upon all recommendations of the Board.

Recommendations:

A-1: Secure program funding and resources (*Impact level - Moderate*)

Fair and equitable funding to carry out the program was identified in the #1 priority by the Stormwater Advisory Board, and therefore, securing of funding will likely be an immediate action item. Additional recommendations on the appropriate method(s) of funding and more specific action item(s) are provided in Section 6 of this report.

A-2: Stormwater Advisory Board/Roundtable (*Impact level - Minimal*)

A citizen-based stormwater advisory group, whether appointed by the Mayor (as a Board) or generated through interested citizens, will continue to provide broad policy recommendations to ensure that the vision and mission are carried-out. This will allow the public to play a key role in ensuring that the services and activities of the stormwater management program carry-out the vision and mission of the program.

A-3: Hire an Administrative Assistant (*Impact level - Minimal*)

Addition of an administrative assistant which would occur in Year 1 of the Planned Program is recommended to provide necessary services for internal operations of the recommended Planned Program.

5.3.2 Special Support Programs

Current:

Existing activities that County staff will continue to perform for NPDES Phase II compliance include:

- Providing a grading permit brochure to permit applicants;
- Support of the Adopt-a-Watershed/Adopt-a-Stream programs;

- Support of the Water Quality Forum and its website;
- Support of the Tennessee Growth Readiness program;
- Participation in various local programs such as River Rescue, Earthfest, etc.
- Support of/participation in various local watershed groups and initiatives;
- Environmental stewardship program.

Knox County currently holds two grants from EPA for water quality related planning/modeling. These grants will continue to be supported in accordance with the terms of the grant agreements.

Recommendation:

SSP-1: Increase stormwater education activities (*Impact Level – Moderate*)

No new staff is included in this functional area. A number of public education and outreach needs and potential audiences were identified by the County staff and Stormwater Advisory Board. To address the need for increased education, resources are included for the development and implementation of a communications plan for the County stormwater program. The development and implementation of a communications plan will allow a coordinated effort in the communication of stormwater concepts, activities and requirements, and in communicating the comprehensive vision of the program. Anticipated components of the plan are listed below. It should be noted that a number of these initiatives could be coordinated with the City of Knoxville or Town of Farragut.

- A. Construction site management education for the general public**, having an objective to foster a measure of developer and citizen “self-policing” of construction site pollution issues. This initiative will target two audiences. Guidance on local requirements, BMP installation and maintenance and pollution prevention will be provided to site operators that are responsible for management of erosion, sediment and construction site waste. Second, the public will be provided general guidance on common pollution problems associated with construction sites, what to look for, and who to call at Knox County if problems are noticed.
- B. TMDL education** targeted at two audiences: government (County leaders, elected officials, and department heads); and the general public (businesses, industry and government). Information on stream impairments, TMDL impacts, consequences of non-compliance, and the County response to TMDL requirements will be provided as appropriate for the audience.
- C. Workshops on the new stormwater ordinance and manual** for the local development community to advise developers and engineers of new post-construction requirements and provide guidance on water quality volume calculation, Better Site Design credits and incentives, stream buffers, and stormwater BMP selection, design and construction.
- D. Development community outreach/education** to promote water quality BMPs and LID practices by providing broad technical guidance to local developers and engineers over the long-term. The existing program has begun this initiative through its Building Out of the Box workshop series.
- E. “Stormwater 101” presentations/information** is defined as general information about the Knox County stormwater program that is provided to the general public and elected officials. The objective of this initiative is to generate a broad understanding of stormwater, its impacts on property and the environment, the need for stormwater services, and the stormwater services that are provided by Knox County. Information

provided to elected officials will be more in-depth on key issues as appropriate, such as regulatory compliance and capital improvement projects.

- F. **Stormwater maintenance info for BMP owners** to provide inspection and maintenance guidance that is specific to water quality BMPs, their function, maintenance guidance, and local inspection and maintenance requirements.

5.3.3 Stormwater Quality Management

Current:

NPDES Permit and TMDL Compliance: Activities include general oversight of NPDES permit compliance BMPs and TMDLs, coordination with TDEC and other agencies, the collection and tracking of compliance and monitoring data, and the development of permit annual reports. Compliance activities (such as outfall mapping) that are **not** explicitly considered as a separate item in the planned program are included in this functional category of the Planned Program.

Per requirements of the NPDES Phase II permit, the County must develop, implement and enforce an **illicit discharge detection and elimination program** to detect and eliminate illegal, non-stormwater discharges into the stormwater system. The past, existing and future ordinances all contain language that prohibits illicit discharges, including illegal dumping. Currently, the County operates largely in a reactive mode for illicit discharges, responding to citizen complaints and taking corrective action or enforcing the ordinance when needed. Several of the County watershed initiatives target identification of illegal discharges (e.g., septic tank overflows or residential piping into creeks).

Per requirements of the NPDES Phase II permit, the County currently has on-going implementation of a **good housekeeping and pollution prevention program** for County services, practices and actions. This includes staff training, the installation of pollution prevention measures, and implementation of pollution prevention policies at applicable County owned facilities.

Stormwater ordinance/manual public meetings and Commission adoption: The new stormwater ordinance and manual includes the regulatory, policy, and technical guidance elements of the County's construction site runoff control (i.e., erosion prevention and sediment control) and post-construction site runoff control (i.e., after development water quality) programs. Adoption of the ordinance and manual by June 30, 2008 is required for compliance with the NPDES Phase II permit.

NPDES permit renewal: The NPDES Phase II permit must be renewed every five years with the next permit cycle beginning in July 2008. Although specific modifications to the current permit requirements are not known at this time, it is likely that some permit conditions could change. It is also anticipated that the second Phase II permit cycle will bring more rigorous enforcement of the permit, given that NPDES compliance "ramp-up" was to occur during the first five year permit cycle. Over the 07-08 fiscal year, attention will be focused on the development of permit elements as staff seeks to understand new permit conditions, plan for implementation, and prepare the permit application for submittal to the State.

TMDL planning and implementation: Implementation plans that document Knox County's response to sediment and habitat alteration TMDLs were required for completion in early 2007. Implementation of these plans, if accepted by TDEC, must begin in summer 2007. It is anticipated that more TMDLs will be approved by TDEC in future years. Based on recent discussions with TDEC, compliance with the two most recently approved TMDLs will require rigorous implementation of NPDES Phase II construction site runoff requirements, stream assessments and water quality monitoring.

Recommendations:

SWQ-1: Illicit Discharge Program Improvements (*Impact Level – Minimal*)

TDEC is requiring that the County develop and implement more formalized plans and procedures for the Illicit Discharge program. Standard operating procedures will be formulated, specifically for outfall monitoring, hotspot identification and monitoring, and complaint response and enforcement. Resources will be directed over the five-year planning period to implement all elements of the Illicit Discharge program.

SWQ-2: Good Housekeeping Program Improvements (*Impact Level – Moderate*)

TDEC is requiring that the County provide better documentation of pollution prevention training for staff. Enhancements in data management will address this.

SWQ-3: Hire two Stormwater Quality Management staff (*Impact Level – Moderate*)

The second permit cycle for NPDES Phase II is anticipated to expand the permit requirements as well as address additional TMDL conditions on area streams. Two additional staff positions are recommended, a Water Quality Specialist and a Compliance Coordinator who will oversee TMDL and NPDES compliance activities that are performed throughout the County organization (i.e., not just those carried out by the Department of Engineering and Public Works) and provide hands-on management of the Illicit Detection Program, the pollution prevention program for county facilities/activities and the TMDL monitoring program.

5.3.4 Regulation and Enforcement

Current:

The **construction site inspection/enforcement** component of the program addresses both stormwater management inspections (e.g., drainage infrastructure, water quality facilities, and flood control facilities), and grading/erosion prevention and sediment control (EPSC) inspections. EPSC inspections in accordance with permit conditions are a requirement of the NPDES Phase II permit and TMDLs that have been issued for sedimentation and habitat alteration. Knox County's construction site inspection program is currently performed by County subdivision and building inspectors with oversight from the Stormwater Coordinator. These inspectors are responsible for inspection and enforcement of site grading, drainage and stormwater facilities, and EPSC measures for conformance with the stormwater management plan that was approved by Knox County for the development site. Per the requirements of the NPDES Phase II permit, County erosion control inspectors must receive TDEC EPSC training.

Development plans review is an important function of the stormwater program because it impacts so many components of the overall services delivered by the County in the long-term. Rigorous review and approval of development plans is necessary to enforce the erosion control,

post-construction, flood protection, and floodplain management provisions of the stormwater ordinance. Existing activities include review and approval of concept plans, grading plans, and development plans for compliance with Knox County stormwater management requirements, and providing assistance to developers, engineers and site contractors with regards to Knox County requirements. Plan reviewers are also required to receive TDEC erosion control training, per the NPDES Phase II permit.

Recommendations:

This functional area includes the recommendation of 17 to 25 new staff over the five year planning period. These individuals will be focused on two regulatory program areas: construction site management and post-construction site controls. In addition, new resources will be dedicated to maintaining training for all plans review, inspectors and other staff on water quality BMPs, LID design, and construction site compliance. The estimated costs include the necessary equipment support for the new personnel. Specific recommended program improvements are listed below.

RE-1: Construction Site Inspection Program Improvements (*Impact Level – Aggressive*)

Improving the effectiveness of the current construction site inspection program was identified as a significant need for effective stormwater management, both by the Stormwater Advisory Board and Knox County staff. EPSC inspection/enforcement enhancements, including a number of program recommendations by TDEC, will occur with adoption of the new ordinance/manual, which provides greater clarification of grading permit and erosion control requirements, and more closely aligns the County program with the standards of the Tennessee Construction General Permit. Other changes proposed to improve the construction site inspection program are listed below.

- A. TDEC is requiring the development of **standard operating procedures (SOPs)** that provide for consistent application of County requirements/activities for EPSC plans review, construction inspection, and enforcement actions. These SOPs will include formalization of procedures for receipt of information submitted by the public (e.g., complaints) regarding construction site runoff, and development of pre-determined enforcement actions for repeat offenses and serious violations. Knox County has already developed and implemented key SOPs for inspections and enforcement.
- B. The construction site inspection program will be reorganized to provide more effective and efficient inspections and enforcement. There are four actions recommended in association with this improvement.
 1. **Restructure inspector responsibilities.** Construction site inspectors (currently called subdivision inspectors) will be responsible for inspection of the following elements for all subdivision and individual lot (residential and non-residential) construction: stormwater drainage system (e.g., pipes, catchbasins, ditches); stormwater management facilities (e.g., water quality BMPs and detention/retention ponds); grading; and EPSC practices. These responsibilities are in addition to non-stormwater related duties they already perform for subdivisions, such as paving oversight and infrastructure inspection. Building codes inspectors will be relieved of EPSC inspection responsibilities, but will maintain EPSC inspection training so they can recognize and react properly to erosion control issues.
 2. **Add grading/drainage inspections for individual lots.** Modifications to overall drainage patterns due to the actions of individual, residential lot owners is a

problem voiced by County staff. This problem often occurs during construction of a single residential lot. To address this issue, construction site inspectors will be responsible for inspection of single lot grading to specifically identify modifications that are not in keeping with the original stormwater management plan for the larger subdivision. The stormwater ordinance will allow inspectors the authority to enforce the original plan.

3. **Hire new construction site inspectors to supplement current staff.** This action will allow a more manageable inspection workload for each inspector. Proper workload distribution will boost the effectiveness of the inspection/enforcement program and better ensure compliance with NPDES and TMDL requirements by allowing each inspector adequate time to inspect sites, communicate with contractors, and follow-through with enforcement actions. This will also allow cross-site coverage between inspectors when normal inspection schedules are impacted by paving activities, difficult enforcement actions, or personal issues (sick days, vacation, etc.).
4. **Hire Construction Inspection Supervisor(s)** that are dedicated to this program component and relieve the Stormwater Coordinator (who has numerous other program responsibilities) of this duty. One or more Inspection Supervisors that are dedicated solely to this program component can better provide for consistency of inspections and enforcement on an on-going, County-wide basis. For effective supervision, one Supervisor will be needed for every 10 to 15 inspectors. Responsibilities of a Supervisor will include: supervision of construction inspection staff; coordinating inspection logistics (workloads, County-wide coverage, construction schedules vs. inspection schedules); staff training and/or training oversight; oversight of inspector implementation of inspection SOPs; quality control/quality assurance reviews; assisting inspectors with technical issues; guiding difficult or special enforcement actions through the system; and maintaining County compliance with construction inspection requirements of NPDES Phase II and TMDLs.

RE-2: Post-Construction Program Implementation (*Impact Level – Moderate*)

Developing, implementing and enforcing a program to reduce pollutants in stormwater runoff after development is a significant piece of the NPDES Phase II permit. Implementation of this program will begin upon adoption of the new stormwater ordinance/manual. The basic County requirements are design, construction and maintenance in accordance with County stormwater standards and criteria. Activities will include inspector training, inspection of water quality BMPs during construction for compliance with approved design plans, long-term (e.g., annual) inspection of BMPs after construction for compliance with BMP maintenance requirements, enforcement of the post-construction provisions of the stormwater ordinance, and documentation and tracking of BMP locations, inspections, and enforcement actions.

RE-3: Development Plans Review Improvements (*Impact Level – Minimal*)

It is anticipated that the complexity and workload of the County plans review staff will increase with the adoption of the new stormwater ordinance/manual. This is due to the increased number of potential water quality designs that are allowed, and the detailed calculations for water quality-related BMPs and developments that incorporate LID approaches as well as the complexity of anticipated future regulatory requirements from TMDLs, etc. Plans review staff

should receive regular training on the latest trends in water quality BMPs and LID in order to maintain a high level of understanding of design requirements and criteria.

5.3.5 Engineering and Planning

Current:

Knox County currently participates in the National Flood Insurance Program (NFIP) and FEMA's Community Rating System (CRS) program. The County will continue proactive **flood protection/floodplain management** through enforcement of floodplain management regulations, use and oversight of existing (and future) watershed master plans, and maintenance of County flood maps.

Per the requirements of the NPDES Phase II permit, the County must complete a **map of all stormwater outfalls** by June 30, 2008.

Recommendations:

EP-1: Public System and Private Facilities Inventory (*Impact Level – Aggressive*)

This program activity recommendation expands the outfall map being developed as part of the current program to include the entire public stormwater system as well as private stormwater facilities (e.g., detention ponds). An understanding of the location and condition of the system of pipes, ditches, catchbasins and other components of the public stormwater system is key to ensuring proactive maintenance and capital improvement programs. Such data is also key to development of watershed master plans and compliance with water quality regulatory mandates.

EP-2: Watershed Master Planning (*Impact Level – Aggressive*)

Watershed master planning is included in the Planned Program as a useful tool to help the County move to a proactive maintenance and capital improvement program to address system needs. Already two of Knox County's watersheds have master plans for flood protection purposes. Additionally, environmental master planning generated by TMDL requirements is underway in three watersheds in Knox County through County partnerships with the Tennessee Valley Authority and the University of Tennessee. It is currently planned that this approach will be used as the basis for master planning in additional priority watersheds in Knox County.

It is the Board's recommendation that all County watersheds be master planned. Initial efforts in this task will determine what information is needed from watershed master planning efforts, determine master planning methods and standards, prioritize County watersheds planning needs and develop a long-term master planning schedule. Master planning will then begin on priority watersheds and will gradually cover all County watersheds in accordance with the plan and as funding allows.

EP-3: LID/BMP Concepts Oversight (*Impact Level – Moderate*)

The proposed Knox County stormwater management ordinance and manual require the use of water quality BMPs to treat stormwater runoff, and provide incentives for the use of Low Impact Development (LID) approaches to reduce runoff volumes and peak discharges. This program element provides for **planning, coordination and regulatory oversight of LID practices and water quality BMPs** that are used by developers to comply with County regulations. A number

of activities will be needed to ensure that these concepts are implemented in an effective manner, including:

- resolution of conflicts between desired LID practices and the current subdivision, zoning and other regulations;
- data management of buffer and water quality “credit” areas (as defined in the Knox County Stormwater Management Manual); and,
- long-term planning of resources, tools and additional incentives that promote or ease the use of LID approaches.

EP-4: Data Management Improvements (*Impact Level – Aggressive*)

The County will maintain effective data management tools that support the long-term goals of the stormwater program including system data, mapping of outfalls, tracking of regulatory compliance actions and maintenance activities on the drainage system. A detailed examination of existing data, needs and uses, existing data management systems and processes, and County computer capabilities/needs is a necessary first step. This will result in the development of a Data Management Action Plan that makes recommendations regarding data management improvements, and provides estimated costs for equipment, software, training and other data management needs. Implementation of the plan will follow soon afterward.

The effectiveness of many high priority actions can be impacted by a lack of data management planning. Knox County staff cited data management as one of their greatest needs. This need will increase significantly as stormwater inventory and master planning efforts begin. To bridge the gap between current needs and the Planned Program, data management planning is proposed at the beginning of the third year, with implementation to follow as soon as recommendations are approved by the County. Hiring a Stormwater Data Manager is proposed for the first year of the Planned Program in order to manage existing data management needs. The Data Manager will be responsible for guiding the County’s data management efforts through implementation of the data management plan.

5.3.6 Operations and Maintenance

Current:

Knox County will continue to provide **remedial maintenance** to correct local drainage problems as these issues arise, based on prioritization using the existing level-of-service (LOS) process.

Recommendations:

OM-1: Proactive Routine and Remedial maintenance (*Impact Level – Minimal moving to Aggressive in later years*)

Knox County will ensure the integrity of the drainage system by moving to a proactive maintenance program County-wide. The Board’s specific recommendation for the operations and maintenance cost center is three-fold:

1. For newly constructed stormwater management facilities, the County should not provide routine maintenance (e.g., mowing, debris clearing, vegetation maintenance, etc.). However, it is recommended that the County increase stormwater services for these facilities to provide remedial maintenance to ensure that the structural integrity, water quality control capabilities and flood control capacity of the facilities are

- maintained as designed and constructed. This recommendation does not include maintenance of stormwater system components that are solely designed for the purpose of drainage conveyance (e.g., gutters, catchbasins, channels, and pipes). This service increase shall be funded through the use of cash bonds for perpetual maintenance of stormwater facilities. (Stormwater funding recommendations are discussed in greater detail in Section 6 of this report).
2. For existing stormwater management facilities, the County should not provide remedial maintenance of private facilities, except in cases where public safety or health is compromised and access to the property is granted to the County. The County does not provide routine maintenance (e.g., mowing, debris removal). This is a continuation of current County level and extent of service policies for existing facilities.
 3. The stormwater system inventory and watershed master planning described in the Engineering and Planning cost center are key to an effective proactive program, providing the data to anticipate drainage problems and to prioritize and plan maintenance activities. The policy recommendation stated in item 2 above should be re-examined once the County gains improved knowledge of the stormwater system and the remedial maintenance and capital improvement needs of existing private facilities. Consideration should then be given to an expanded role for the County in the long-term maintenance of privately owned stormwater facilities for major remedial repairs.

OM-2: A *stormwater maintenance crew must be hired* as the inventory and master planning result in the identification of a significant number of stormwater maintenance issues, beginning the shift from “reactive” to “proactive.” Costs will include pay and benefits for the crew and supervisor, and associated vehicles and equipment. As the master planning and system inventory efforts progress, the need for a second stormwater maintenance crew will be assessed.

As proposed, the County will be responsible for providing maintenance of stormwater facilities in ROW and public land, and for oversight (e.g., inspection) and enforcement of the local regulations and the maintenance covenants. Additionally, the County will continue to provide floodplain management. The property owner will be responsible for maintenance of existing stormwater facilities on private property. New privately owned stormwater facilities will be maintained for remedial repairs by the County based on the financial support provided through a cash bond (as recommended in Section 6).

5.3.7 Capital Improvements

Current:

Knox County will continue to perform known and prioritized capital projects as funding becomes available, using existing CIP Project Managers and CIP Construction Inspectors.

Recommendations:

CIP-1: CIP assessment, prioritization, planning and implementation (*Impact Level – Moderate moving to Aggressive in later years*)

Currently known CIPs are listed below along with a ballpark estimate of cost for each. These CIPs were identified by County staff using the level of service process, flood complaint files, stormwater master plans and recent watershed studies.

- Residential property purchases - \$1,100,000
- Drainage/flood related level of service remediation/CIP projects - \$100,000
- Beaver Creek watershed stormwater facility retrofits/streambank stabilization - \$200,000
- Dutchtown Road area flood protection projects - \$160,000

Knox County will ensure the integrity of the drainage system by moving to a proactive capital projects program to address system needs. Capital projects will be recognized, assessed and prioritized based on the currently used level-of-service process, and the stormwater system inventory and watershed master planning activities defined in the Engineering and Planning cost center. New projects will be scheduled and implemented based on priority and funding availability.

Should this process result in the identification of a significant number of new capital projects, there may be a need to hire additional CIP Project Managers and CIP Construction Inspectors. CIP Project Managers are responsible for scoping CIPs, receiving bids and establishing contracts with consultants and subcontractors, managing the design and construction project (through consultants and contractors), and ensuring design compliance with applicable regulatory requirements for new construction. CIP Construction Inspectors are responsible for ensuring that the construction project is in compliance with design plans and regulatory requirements for construction sites. Like the operations and maintenance program, the Capital Improvements program will be driven by the system inventory and by the master planning efforts under the Engineering and Master Planning functional area.

5.3.8 Summary Planned Program Schedule of Activities

Table 7 presents the Planned Program schedule of activities for five years. The past and existing fiscal years (FY 06/07 and FY 07/08) are also shown.

Table 7: Planned Program Schedule of Activities

Functional Area	Line #		Current Budgeting		Planned (Future) Program						
			July-07	July-08	Year 1	Year 2	Year 3	Year 4	Year 5		
Administration		Program administration, planning and development									
	1	General administration activities									
	2	Secure program funding and resources									
	3	Stormwater Advisory Board/Roundtable									
Special Programs		Public Education/Participation									
	4	Existing NPDES Phase II compliance activities									
	5	Communications Plan development									
	6	Construction site management education									
	7	TMDL education program									
	8	New ordinance/manual workshops									
	9	Development community outreach/education									
	10	Stormwater 101 for the general public									
	11	Stormwater maintenance information for BMP owners									
	12	Program grant support/administration									
	Stormwater Quality Management		Regulatory Compliance Administration								
		13	NPDES permit and TMDL administration								
14		Stormwater Ordinance/Manual Adoption									
15		Renew NPDES Phase II permit									
16		Develop TMDL plans									
17		TMDL plan implementation (monitoring)									
18		Illicit discharge program									
19	Pollution prevention/good housekeeping program										
Regulation and Enforcement	21	Construction site inspections program									
	21	Develop EPSC SOPs									
	22	Hire Construction Site Inspectors and Inspections Supervisor(s)									
	23	EPSC inspector training									
	24	Post-construction BMP inspection program									
	25	Inspection staff training on water quality BMPs and LID									
	26	Development Plans Review									
	27	Maintain TDEC Level 1 and 2 training for staff									
	28	Plans review staff training on water quality BMPs and LID									
	29	Floodplain management program									

Table 7 (continued): Planned Program Schedule of Activities

Functional Area	Line #		Current Budgeting		Planned (Future) Program					
			July-07	July-08	Year 1	Year 2	Year 3	Year 4	Year 5	
Engineering and Planning		Stormwater system inventory/assessment								
	30	Outfall mapping								
	31	Public system and private facilities inventory/prioritization								
		Watershed master planning								
	32	Define criteria, prioritize and determine schedule								
	33	Develop master plans								
		WQ BMP and LID Concepts Oversight								
	34	Codes and ordinance changes								
	35	Buffer/credit area data management policies/procedures								
	36	Long-term planning of LID resources, incentives and tools								
		Data management improvements								
	Operations and Maintenance		Stormwater maintenance							
40		Remedial (reactive) maintenance								
41		Routine (proactive) maintenance								
42		Stormwater maintenance crew								
43		Needs assessment for 2nd stormwater maintenance crew								
Capital Improvement Projects	44	Currently planned capital projects								
	45	New project assessment and prioritization								
	46	Stormwater construction inspector(s) and proj. manager(s)								
	47	New project implementation								

5.3.9 Summary of Planned Program Costs

Table 8 provides a cost and staffing summary of new (i.e., recommended) services, that are included in the Planned Program that is being recommended by the Board. The costs in Table 8 are categorized by functional cost center.

**Table 8. Knox County Stormwater Program Cost and Staffing Allocation
 (new services only)**

Line	Functional Cost Center	FY 08-09		FY 09-10		FY 10-11		FY 11-12		FY 12-13	
		Costs	FTE	Costs	FTE	Costs	FTE	Costs	FTE	Costs	FTE
1	Administration	\$262,660	1	\$178,660	1	\$178,660	1	\$180,160	1	\$178,660	1
2	Special Supporting Programs	\$171,000		\$171,000		\$171,000		\$171,000		\$171,000	
3	SW Water Quality Management	\$216,530	2	\$138,815	2	\$138,815	2	\$178,815	2	\$176,530	2
4	Engineering and Master Planning	\$512,340	1	\$1,560,840	1	\$3,015,240	1	\$2,562,340	1	\$2,560,840	1
5	Operations and Maintenance	\$493,182	6	\$249,032	6	\$249,032	6	\$283,182	6	\$207,740	6
6	Plans Review and Regulatory Enforcement	\$1,589,410	17	\$1,298,390	18	\$1,672,960	22	\$2,031,290	23	\$1,862,600	25
7	Capital Improvements	\$2,741,140	2	\$5,102,140	2	\$7,602,140	2	\$10,354,280	4	\$15,204,280	4
8	Total Estimated Cost (new services)	\$5,986,262	29	\$8,698,877	30	\$13,027,847	34	\$15,761,067	37	\$20,361,650	39

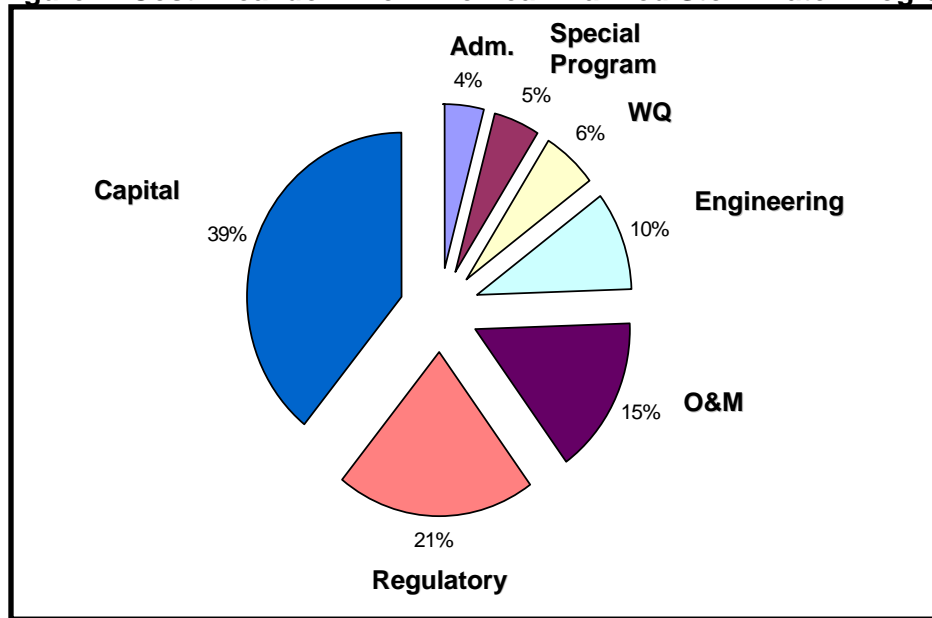
The table below provides a combined cost summary of existing and new services, categorized by functional cost center.

**Table 9. Knox County Stormwater Program Cost and Staffing Allocation
 (existing and new services)**

Line	Functional Cost Center	FY 08-09		FY 09-10		FY 10-11		FY 11-12		FY 12-13	
		Costs	FTE	Costs	FTE	Costs	FTE	Costs	FTE	Costs	FTE
1	Administration	\$431,761	3.4	\$353,680	3.4	\$359,805	3.4	\$367,645	3.4	\$372,707	3.4
2	Special Supporting Programs	\$504,466	2.6	\$516,137	2.6	\$528,217	2.6	\$540,720	2.6	\$553,660	2.6
3	SW Water Quality Management	\$644,043	4.6	\$581,291	4.6	\$596,778	4.6	\$652,806	4.6	\$667,111	4.6
4	Engineering and Master Planning	\$1,043,681	2.1	\$2,110,778	2.1	\$3,584,425	2.1	\$3,151,447	2.1	\$3,170,566	2.1
5	Operations and Maintenance	\$1,651,896	22.8	\$1,448,301	22.8	\$1,490,275	22.8	\$1,567,869	22.8	\$1,537,391	22.8
6	Plans Review and Regulatory Enforcement	\$2,218,040	26.0	\$1,949,022	27.0	\$2,346,364	31.0	\$2,728,263	32.0	\$2,583,967	34.0
7	Capital Improvements	\$4,201,785	3.4	\$6,564,883	3.4	\$8,986,293	3.4	\$11,740,531	5.4	\$16,592,630	5.4
8	Total Estimated Costs (all services)	\$10,695,671	65	\$13,524,091	66	\$17,892,157	70	\$20,749,281	73	\$25,478,032	75

Total costs shown in Table 9 are shown graphically in Figure 2, again categorized by functional cost center of Table 9.

Figure 2: Cost Breakdown for Five Year Planned Stormwater Program



5.4 Other Program Recommendations

The levels of funding that are presented in Tables 8 and 9 were discussed at length by the Board during meetings 9, 10 and 11. The compelling issues that are drivers of the total program costs over the five years of the Planned Program are:

- the stormwater inventory and watershed master planning efforts (included in costs on line 4), which lead to:
- proactive operations and maintenance costs (line 5);
- proactive capital improvements costs (line 7); and separately,
- the increase in staffing and associated equipment for regulatory oversight and compliance enforcement (line 6).

The discussion of the first, second and third bullets lead to a recommendation by the Board (OR-1 below) about prioritization of program activities in the first year.

OR-1: Priority Activities: The Board agreed that public education on stormwater and watershed/stormwater master planning should be considered priority activities. Respectively, these activities are contained in the Special Support Programs cost center (line item 2 in tables 8 and 9) and the Engineering and Master Planning cost center (line item 4). First, increased knowledge on the part of the general public and some targeted audiences is needed to generate support for the Board's Planned Program and funding recommendations. Second, master planning and system inventory activities are vital to gaining a strong understanding of the County's future needs for infrastructure, drainage and water quality improvements. Through this agreement, the Board provided the following recommendation:

- ***Program activities and funding for Special Supporting Programs (public education) and Engineering and Master Planning are considered priorities by the Knox County Stormwater Advisory Board. It is recommended that the projected FY08/09 funding for these cost centers be accelerated into FY07/08 provided that this acceleration of funding does not significantly impact or delay current necessary Public Works projects.***

OR-2: Development Process Improvements: The Board also discussed the County's current plan review and construction inspection/enforcement process for private development. A concern was raised that rezoning should occur only after a concept plan is submitted, at a minimum. This would allow for public input from a more educated perspective because the public will better understand the proposed plans for the property at an early point in the process. The pre-design conference was discussed, with a general thought that the conference should be mandatory, not voluntary as is currently stated in the draft Stormwater Management Manual. Ideally, this conference would occur after a rezoning request was submitted, if a rezoning is required, and would be used as an opportunity to identify and encourage Low Impact Development (LID) opportunities on the site to be developed. The need to have a pre-design conference with all relevant agencies, such as TDEC, involved was also discussed. It was also recognized that the County could not force other agencies to attend such conferences.

Board recommendations resulting from the discussion of the County development process are as follows:

- ***Knox County's development process should include a mandatory pre-design meeting for the concept plan to allow for a full discussion of development options on the site. This will first require the establishment of a meeting policy or procedure that is "all inclusive", ensuring the participation of other stakeholder agencies (e.g., TDEC, USACE, utilities, etc.) so that the planning process fully addresses all site elements.***
- ***A review, assessment and streamlining of Knox County's development process is recommended to determine changes that would create efficiencies and provide opportunities to encourage the use of LID practices.***
- ***The enforcement process should be examined and improved. Improvements should include tracking of developer compliance in a manner that allows for review of performance, enhanced data management to facilitate compliance tracking, and an enforcement escalation policy that would address cases of multiple and repeated violations.***

6.0 STORMWATER FUNDING

This section provides an overview of the stormwater funding information presented to and discussed by the Board. Section 6.1 presents general information on the primary stormwater funding approaches that are available to Knox County, as well as a brief summary of secondary funding methods that can be used to supplement the primary source of revenue. Section 6.2 provides the Board's recommendation(s) with regards to funding the planned stormwater program in Knox County.

6.1 Options Considered by the Board

The Board examined the funding mechanisms available to Knox County to support its stormwater management program, with the objective of recommending the right mix of funding tools to achieve the County's target level of service. Issues examined included funding equity (linking revenue sources with revenue beneficiaries) and funding adequacy (the ability of a potential source to produce sufficient and stable revenue).

There are two primary sources of revenue for stormwater management that are at the County's disposal and are the basis of funding in most local governments. These are:

- (1) the overall general resources of the County that are created by real property taxes, sales taxes, fees and charges, distributed State revenues and grants; or,
- (2) a stormwater user-fee, similar to other user-fees established for water and sewer services.

After considering how secondary sources can fund specific program elements, the Board discussed the following options for stormwater funding:

- maintain the status quo using the Highway Fund as the basis for the majority of services;
- shift existing resources from other programs to stormwater management;
- raise real property taxes or other taxes (some of which may require State legislative action) and dedicate a portion to stormwater management; and
- implement a dedicated stormwater user-fee as the primary resource in complement with some secondary funding strategies (plan review fees, grants, development fees) .

6.1.1 Overview of Stormwater Funding Mechanisms

Knox County has several funding options available by Tennessee statute. However, standards and limitations exist that influence the viability of these different funding mechanisms for use as primary and stable funding mechanisms for the County's stormwater management program. Stormwater funding mechanisms commonly used by local governments in the United States include taxes (e.g., on property, retail sales, real property sales, income of interest earnings, and business gross or net profits taxes), exactions, special assessments, and service fees (sometimes also termed user-fees or service charges).

Common stormwater funding mechanisms are summarized in Table 10. The table shows that each has a different underlying philosophy that guides the structure of the funding mechanism and the use of the revenues.

Table 10: 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.
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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 User-Fee	A stormwater service fee, often referred to as a stormwater user-fee, is funded primarily through service 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 Knox 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. Table 11 provides a listing of the primary and secondary funding options that may be available to Knox County for the purpose of funding stormwater management. The primary funding methods might be used as the sole sources of funding for a program, but are more typically used in combination with secondary sources.

Table 11: Primary and Secondary Stormwater Funding Mechanisms

Primary Funding Methods	Secondary Funding Methods
General Fund Appropriations Highway Fund Appropriations Stormwater User Fees	Other Service Fees Special Assessments 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 listed in Table 11 to some degree. Legislative and/or charter authority and the mission and priorities in each community have guided the selection of a preferred approach for stormwater funding.

6.1.2 General Fund Appropriations

The majority of General Fund revenues in most Tennessee localities are derived primarily from real property taxes and sales taxes. This is true in Knox County as well where approximately 65% of Fund revenues are from property taxes. Other major sources of General Fund revenues in Knox County include County local Option Taxes, Services Charges and Fees. The Highway Fund is a Special Revenue Fund and is primarily supported by Local Option Sales Taxes, Wholesale Beer Tax, and Redistributed State Taxes on Gasoline/Petroleum. It is the Highway Fund that currently provides the majority of resources for stormwater programs in Knox County. It could potentially support an increase in spending on stormwater programs through reallocation of current resources. Reductions in other services funded from the Highway Fund to avoid an increase in other tax resources may or may not be publicly acceptable.

6.1.3 Stormwater Service Fees (Stormwater User Fees)

Service fees are becoming an increasingly popular source of dedicated stormwater funding, with close to 1000 communities using fees throughout the United States. These fees, and the organizational elements and programs funded by them, are often referred to as “stormwater utilities”. Tennessee Code, Title 68 Health, Safety and Environmental Protection, Chapter 221 Water and Sewerage, Part 11 Storm Water Management, enable localities to regulate stormwater discharges, to establish a system of drainage facilities, and to fix and require payment of fees for the privilege of discharging storm water. This legislation is presented in Table 12.

Table 12: Stormwater Utility Enabling Legislation

<p>68-221-1107. Facilities user's fee.</p> <p>(a) All municipalities constructing, operating, or maintaining storm water or flood control facilities are authorized to establish a graduated storm water user's fee which may be assessed and collected from each user of the storm water facilities provided by the municipality.</p> <p>These fees shall be reasonable in amount and used exclusively by the municipality for purposes set forth in this part. Such a graduated storm water user's fee shall be based on actual or estimated use of the storm water and/or flood control facilities of the municipality, and each user or user class shall only be required to pay its proportionate share of the construction, administration, operation and maintenance including replacement costs of such facilities based on the user's actual or estimated proportionate contribution to the total storm water runoff from all users or user classes.</p> <p>To ensure a proportionate distribution of all costs to each user or user class, the user's contribution shall be based on factors such as the amount of impervious area utilized by the user, the water quality of user's storm water runoff or the volume or rate of storm water runoff. Users whose storm water runoff is not discharged into or through the storm water and/or flood control facilities of the municipality shall be exempted from payment of the graduated storm water user fee authorized by this section.</p> <p>The fee structure shall provide adjustments for users who construct facilities to retain and control the quantity of storm water runoff. Prior to establishing or amending such user's fees, the municipality shall advertise its intent to do so by notice published in a newspaper of general circulation in such municipality at least thirty (30) days in advance of the meeting of the governing body which shall consider such adoption or amendment.</p> <p>(b) The municipality providing such service is authorized to enter into a contract for the collection of such storm water facilities fees with any public or private corporation or municipal utilities board or commission operating a water, gas, or electric system other than an electric cooperative incorporated under the provisions of the "Electric Cooperative Law," title 65, chapter 25, part 2, in the area of the storm water</p>

facilities or to make contracts with any other city, town, or utility district to bill and collect storm water fees as a designated item on its utility bill.

The contract may provide for the discontinuance of utility service to storm water facility users who fail or refuse to pay storm water facility user charges, including the right not to accept payment of the utility bill from any user without receiving at the same time payment of any storm water facility charges owed by such user and not to re-establish utility services until such time as all past due storm water facility service charges owed by such user have been paid and/or the user of the storm water facility has performed all acts and discharged all obligations required by the ordinances or resolutions of the municipality.

68-221-1108. Financing of facilities

A municipal legislative body may finance storm water facilities under the provisions of the Local Government Public Obligations Act of 1986, as amended, compiled in title 9, chapter 21. To protect the public health and to assure payment of bonds issued for storm water facilities, the municipality may by appropriate ordinance or resolution use the procedures set forth in §§ 68-221-208 and 68-221-209, for payment and collection of charges.

The revenue generation capacity of a stormwater user fee is similar to that of the real property tax, except that the user fee is directly linked to impervious surface cover or another measurable characteristic that can be rationally linked to stormwater demand and/or services, rather than an assessed property value, which typically does not have such a rational linkage. 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 user-fee rate study**”.

Table 13: Data on Selected Stormwater Utilities in Tennessee

Locality	NPDES Permit Type	Single-Family Residential Stormwater Fee (per month)	Commercial Stormwater Fee (per month)	Total Annual Revenue Generated ¹
Chattanooga	Phase I	Per year: \$24.00 (<10,000 ft ² lot size) \$36.00 (>10,000 ft ² lot size)	Per year: Ranges from \$0.00000 to \$0.00816 per square foot of lot area, depending upon land use type.	\$5,000,000
Franklin	Phase II	\$2.74 (< 3,350 ft ² imperv. area) \$4.38 (> 3,350 ft ² imperv. area)	\$3.65 per 3,350 ft ² of impervious area	\$1,800,000
Johnson City ²	Phase II	\$1.50 in June 2007, escalating to \$3.00 by June 2009. 51% of fee (<1690 ft ² imp area) 168% of fee (>5575 ft ² imp area)	\$1.50 per 3,315 ft ² of impervious area, escalating to \$3.00 in 2009.	\$930,000 escalating to \$1,860,000 In 2009
La Vergne	Phase II	\$3.50	\$3.50 per 3,181 ft ² of impervious area	Unknown
Maryville	Phase II	\$3.97	\$3.97 per 2,400 ft ² of impervious area	\$1,600,000

1 – approximate value; 2 – Johnson City began billing in July 2007

Table 11: Policy Decisions Affecting User Fee Rate and Structure

<ol style="list-style-type: none">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/Highway Fund: Will the stormwater program fund pay for services received from the General Fund such as general overhead? (Indirect Cost Allocation for staff services such as Human Relations, Legal, Accounting, etc.)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 stormwater fund credited to that 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?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 amount of customer service costs will be needed?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 tenants (such as renters and leasers)?
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6.1.3.1 Stormwater Fee Billing

Stormwater fee billing is often a significant factor in implementing a stormwater fee. Stormwater billing is broadly defined as a process by which the fee is identified on a bill, the bill is sent to the customer and payment of the fee is received and processed. Two important factors that impact the decision on the selection of the appropriate billing method for a jurisdiction are: 1) technical feasibility of billing options; and 2) the political climate within the proposed service area.

Stormwater fees are typically billed through one of three different mechanisms: a real estate tax bill, a local water/sewer utility, or through a 3rd party billing system. Each method involves a number of advantages and disadvantages in terms of the technical feasibility and political climate. To some extent, each method is directly dependent upon an addressing system within the stormwater billing process. An evaluation of stormwater fee billing options available to Knox County identified the options discussed in the following paragraphs.

Billing Option 1 – Real Estate Tax Bill

Typically, the real estate tax bill represents the most technically efficient means of delivering the stormwater fee to the customer. Because a stormwater utility fee is inherently a parcel-based

fee, the parcel owner is usually the primary customer within a stormwater utility. In Knox County, each parcel that has been appraised contains a number of fields relating to the mailing address for the owner of the parcel. (Exceptions here include tax-exempt parcels such as government properties, churches, and other non-profit organizations, which do not receive real estate tax bills and therefore have no address in the tax bill database.) Other advantages include the ability to enforce fee payment by use of property liens if provisions in the tax law provide for such actions.

This option usually requires additional public relations work during the early stages of the utility implementation to ensure that the public understands the fee structure and calculation.

Billing Option 2 – Water/Sewer Utilities

Billing the stormwater fee through a local water/sewer utility is a good method for delivering the stormwater fee to the public as it validates the revenue as a “fee.” The stormwater fee appears on the water/sewer bill as any other utility service would.

In Knox County, an extensive address point layer is maintained for all residential and commercial addresses in the County by the Metropolitan Planning Commission (MPC). This GIS layer provides for instant linking between residential and commercial addresses and the GIS parcels. Based on previous work by AMEC in other stormwater utility projects, this link represents about half of the effort involved in using a water/sewer utility as the billing mechanism. The addressing file maintained by the MPC appears to be one of the best addressing components that AMEC has reviewed for this type of work.

On the other hand, there are nine water/sewer utilities that serve the citizens of Knox County. Of these nine, there are probably seven that serve the citizens of the County outside the cities of Knoxville and Farragut. This means that most likely all seven utilities would have to be consulted to determine the feasibility of using the water/sewer utilities as the billing mechanism for stormwater.

Billing Option 3 – 3rd Party Billing System

If political factors or technical feasibility issues prohibit the use of the real estate tax billing system or the local water/sewer utility system, an independent billing system could be acquired to facilitate billing. In Knox County, physical address information is available as an attribute of the parcels layer and would serve as the billing address for owners of stormwater accounts.

Although relatively easy to implement, an independent billing system is the most expensive option. In addition to the cost of acquiring a 3rd party billing system, the overhead costs and enforcement of non-payment penalties would be greater than the other two options.

7.0 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 that were discussed by the Board.

AREA OF APPLICABILITY									
Revenue Source	Generating Capacity			Ability of Source to Finance Stormwater Equitably			Stability of the Source		
Real Property Tax, Sales Tax, State Funds (General Fund/Highway Fund)	High	Medium	Low	High	Medium	Low	High	Medium	Low
	Revenues can provide for the full cost of service to the community.			Owners of real property pay regardless of contribution to stormwater infrastructure. Sales and business taxes are paid by all who conduct business in unincorporated areas of the County.			Stability for stormwater dependent on other annual budget priorities and overall economic conditions.		
Stormwater User 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 program to address stormwater system needs, including water quality and water quantity issues.		
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 for specific project.		
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.		
State/Federal Grants	High	Medium	Low	High	Medium	Low	High	Medium	Low
	Good for special activities when resources are made available. Must have project in development or concept state to ensure timely response to announcement.			Use is dictated by the grant source.			Used for specific demonstration projects, not a stable source of revenue.		

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 unless a user-fee is in place to repay bond debt.			Applicable for one-time capital expenses. Not meant as a source of revenue for ongoing expenses.		

7.1 Board Discussion and Recommendations

The Board’s discussion of stormwater funding in meeting 10 framed the approach recommended. In previous meetings, various primary and secondary funding options were reviewed, including the two primary tools of general revenues of the County and the creation of a user-fee dedicated to stormwater. In crafting the recommendation, the Board discussion focused largely on a stormwater user fee (through a utility) for County stormwater management, with other fees, grants, and funding sources providing secondary funding benefit. The Board acknowledged that it is not likely that the Commission would support a reallocation of general revenues or an increase in property taxes to support the program. Other discussion points included:

- The broad organization and location of the utility (i.e., formation within or outside of local government);
- The potential for challenges or lawsuits of the fee;
- The process of establishing a user fee system;
- How the user fee will be billed;
- Fairness and equity in the fee;
- Using the fee as an incentive for LID approaches; and
- The need for public education as a user fee is implemented.

The following recommendations were then developed by the Board through collaboration. Several iterations of wording were made by the Board before they collectively agreed on the language below.

- ***The Stormwater Advisory Board recommends the establishment of a stormwater utility, under the auspices of Knox County Department of Engineering and Public Works, to manage and implement the stormwater program.***
- ***Utility funding should be generated from all of the following sources:***
 - ✓ ***Primary funding – a user fee;***
 - ✓ ***Secondary funding:***
 - ***Inspection/review fees;***
 - ***State and Federal grants;***
 - ***Administrative penalties, fines and damages;***
 - ***Cash bonds for perpetual maintenance of new privately owned stormwater facilities.***

- ***The utility user fee should be equitable to ensure a proportionate distribution of all costs to each user or user class, with the user's contribution (or fee) based on factors such as the amount of impervious area, water quality impacts, flow volume and/or rate of runoff, and should include incentives for encouraging low impact development.***
- ***The utility fee should be collected through the Knox County Trustee's Office. Concurrently, the Board recommends the immediate authorization of funds to initiate the master planning process.***
- ***Public understanding of the comprehensive approach to stormwater management is recognized as critically important. Every effort should be made to communicate with the public, including the use of Advisory Board members to be "ambassadors" who can work with various citizen groups in providing background on the process and recommendations for the program enhancements. Public support can be established through clear and concise messages on the changes in service that will occur with additional resources.***
 - ***Prior to and as the implementation of the user fee is occurs, Knox County should concurrently implement a public education and communications campaign that focuses on educating citizens about the importance of stormwater management and the key elements of the planned comprehensive program.***
 - ***A communications plan should be prepared and fully funded as part of the user fee implementation process so that the Engineering and Public Works Department is empowered to reach as many citizens as possible. It is recognized that such an approach is important in communicating the purpose and equitable basis of the fee.***
 - ***In advance of County Commission review/consideration of the Advisory Board's report and recommendations, an educational message should be provided via the local newspaper or other effective means to all County citizens that conveys general knowledge of stormwater and the work of the Knox County Advisory Board.***
 - ***Communication tools such as a presentation with a script should be prepared and provided to the Advisory Board members who want to assist in community outreach. Training on the presentation and key messages should be provided as well.***
 - ***Continuation of an Advisory Board process is important during implementation of the user-fee. In addition, a Board should provide long-term, on-going advice and feedback during program implementation,***

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*Knox County, TN
Stormwater Advisory Board
Final Recommendations
October 2007*

APPENDIX A

STORMWATER ADVISORY BOARD MEETING MINUTES

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Stormwater Advisory Board Meeting 1 Minutes

October 2, 2006

I. Welcome and Introductions

Mr. Bruce Wuethrich welcomed the Stormwater Advisory Board (Board) and introduced County Mayor, Mr. Michael Ragsdale. Mayor Ragsdale addressed the Board members, thanking them for their participation and explaining that stormwater is an important and growing concern for Knox County. Mayor Ragsdale then shared with the Board the general reasons for the convening of the committee, examining the County's need to take action and defining the goals that the County envisions in this process. Mayor Ragsdale introduced the Board members. Following is a list of the Board members present at the first monthly meeting: The Mayor then returned the floor to Mr. Wuethrich.

Stormwater Advisory Board (Board):

Peg Buete	Victor Jernigan	Jamie Rowe
Harold Cannon	Alvin Nance	John Schoonmaker
Richard Cate	Tim Neal	Lisa Starbuck
Laura Cole	Ronnie Nease	Wayne Watson
Dawn Foster	Lourdes Perez (Absent)	Darrell Wright (Absent)
Marvin Hammond	Grant Rosenberg	

Knox County Staff

Bruce Wuethrich, Director of Public Works & Engineering
Chris Granju, P.E., Stormwater Management Coordinator
Cindy Pionke, P.E., Director of Planning and Development
Leo LaCamera, P.E., Drainage Engineer
Dwight Van de Vate, Senior Director Communications and Government Relations
Lorna Norwood, Deputy Director of Communications and Government Relations
Tracy Jones, Soil Consultant
Roy Arthur, Watershed Coordinator
Brian Hubbs, Plans Reviewer
Linda Underwood, Mayor's Office Administrator
Ryan Haynes, Mayor's Office Intern

AMEC Team

Elizabeth Treadway, AMEC - Knoxville
Mary Halley, AMEC - Knoxville
Doug Biagi, AMEC - Knoxville

II. Team's Purpose, Responsibilities and Goals

Mr. Wuethrich introduced Ms. Mary Halley of AMEC. She gave a brief explanation of the agenda for the meeting and the objectives of the Board, which is to advise and provide input to the policy and program structure that will guide Knox County in the establishment of Stormwater Program recommendations to the Knox County Mayor. She described the process which will be followed and the responsibilities of the Board members, which include representing their local interests while thinking and acting with a County-wide perspective. She explained the roles of the County staff (to answer questions and provide data/information) and AMEC representatives (facilitation, data presentation and state/national perspectives) and the ground rules for participation in the meetings.

III. Board Meeting Logistics

Ms. Halley discussed the Board meeting logistics. With the assistance of the Board, it was decided that future meetings will be held at 3:00 p.m. on the first Monday of each month, beginning with November 6, 2006. (Future meetings will be December 4, January 8, February 5, March 5 and April 2).

IV. Current Stormwater Program

Through the use of a Power Point presentation, Ms. Halley explained to the Board the County's current level of effort in stormwater management, highlighting that stormwater management activity can be found county-wide in the following cost centers:

- Administration
- Special Programs
- Billing and Finance
- Indirect Cost Allocation
- Stormwater quality Management
- Engineering and Planning
- Operations and Maintenance
- Regulation and Enforcement
- Capital Improvement Program

Ms. Halley discussed the principal "drivers" of the stormwater program for the County as flooding and water quality. She then gave a brief discussion encompassing overall stormwater, identifying pollutant types, Federal Regulations and an explanation of the TDEC 303(d) list. Highlights of the 303(d) list discussion identified the types of pollutants of concern for Knox County and the effects that urbanization has had on their levels. An explanation of the National Pollutant Discharge Elimination System (NPDES) Phase II regulations and compliance followed. The Board asked for more information on the subject, specifically, a copy of the County's submitted NPDES permit application. Ms. Halley then discussed Total Maximum Daily Load Program (TMDL), what they are and how they affect Knox County. She continued by highlighting the secondary "drivers" of the Knox County program and their effect on the County cost centers.

Ms. Halley then presented the stormwater program's activities in relation to the nine cost centers. Each cost center was explained in detail and examples of various functions performed by County staff were cited. During the discussion of the Special Programs cost center, particular attention was paid to the County's progressive approach in developing local partnerships and utilizing grants to study watershed TMDLs. The Stormwater Quality Program cost center included discussion of the six minimum control measures required by the NPDES permit with particular attention brought to the County's exemplary public education and outreach programs. The highlight of the Engineering and

Planning cost center was the initiative shown by the County in updating the floodplain maps and enacting stricter development regulations than mandated by the Federal government’s National Flood Insurance Program and Federal Emergency Management standards. In the discussion of the Regulation and Enforcement cost center, Ms. Halley explained the County has grading permit and site inspection procedures placing emphasis on the County’s increased focus on enforcement.

At this time, the floor was opened for questions. A concern of variances to floodplain regulations was expressed and discussed. It was clarified that the proposed stormwater ordinance will not relax the floodplain regulations.

V. Stormwater Issues Discussion

Ms. Treadway took the floor for discussion to explore the existing problems and concerns of the Knox County community. Committee members offered local stormwater problems or concerns. The table below illustrates the concerns voiced by the Board. The Board developed stormwater concerns, which documented some of the issues in the development of a stormwater program for Knox County.

Existing Challenges and Issues
Impacts farming has on water quality
NPDES permit performance to date
Next cycle of NPDES permit requirements
Meeting the public expectations of stormwater system
Importance of public education
Drainage variances
Stormwater program financing where everyone pays - equity
Clarify organizational alignment and provide staff resources
Understand current stormwater expenditures
Prioritization of investments in stormwater system and the process – who will make the decisions?
Improve development planning to minimize impacts based on the prioritization of investments in the stormwater system
Consistent floodplain management
Investigate enforcement process / resources
Use of practical solutions – conservative approach
Negative impacts of quantity and flow rate of runoff
Protection of integrity of streams including avoidance of stream modifications

During discussion of problems and issues, the subject of Knox County’s compliance with their NPDES permit was revisited. Board Member Jamie Rowe provided each member with a copy of the findings letter the County received from TDEC after their audit of the County’s permit. The Board asked for a copy of the County’s response letter to TDEC. The Board requested data on current program costs, Best Management Practices (BMPs) required under the permit, and samples of benchmark data from other communities.

Ms. Treadway explained to the Board that many other community committees have been through a similar series of meetings to capture concerns and issues with stormwater in their communities. AMEC will provide findings from a couple different communities to the Board for comparison of issues and concerns, but ultimately the Board should think through the issues of concern to them and Knox County. The outcome of this effort is a five-year plan for program development to ensure that the County is meeting expectations of the community. The next meeting will be a continued discussion of concerns and the prioritization of those concerns. It was emphasized to the Board that AMEC is at these meetings to facilitate capturing the Board's stormwater concerns and program goals and then assisting them in the development of recommendations to the Mayor for the County stormwater program.

The Board asked if an executive summary of the proposed County Stormwater Manual is available. The Board also requested a summary of fines that the County has levied in the past three years in its enforcement program.

The question of whether the EPA or TDEC regulations are driving the stormwater program was raised and Ms. Treadway explained that the regulations heavily influence what needs to be considered for the community to remain in compliance with these regulations. The inadequacy of the existing stormwater infrastructure was discussed which led to the discussion of the willingness of the community to fund a stormwater program that will address the resolution of these inadequacies. Concern was expressed that this additional financial burden would be placed on the development community when the entire community would benefit from updating the stormwater system. It was agreed that public education of the stormwater issues was important to build an understanding and acceptance on the community of stormwater program concepts. A suggestion was made at this time that the City of Knoxville should be represented at these meetings since some of the stormwater issues affecting the County are of concern to the City.

The meeting adjourned at approximately 5:10 p.m.

VI. Public Participation

Ms. Sandra Clark requested to be placed on the e-mail list to receive correspondence prior to the next Board meeting.

VII. Next Board Meeting

The Board will resume the stormwater program discussion on November 6, 2006, at 3:00 p.m. at the Ijams Nature Center, 2915 Island Home Avenue.



Stormwater Advisory Board Meeting 2 Minutes

November 6, 2006

Stormwater Advisory Board (Board):

Peg Buete	Victor Jernigan	Jamie Rowe
Harold Cannon (Absent)	Alvin Nance	John Schoonmaker
Richard Cate	Tim Neal	Lisa Starbuck
Laura Cole	Ronnie Nease	Wayne Watson
Dawn Foster	Lourdes Perez	Darrell Wright
Marvin Hammond	Grant Rosenberg	

Knox County Staff

Bruce Wuethrich, Director of Public Works & Engineering
Chris Granju, P.E., Stormwater Management Coordinator
Cindy Pionke, P.E., Director of Planning and Development
Leo LaCamera, P.E., Drainage Engineer
Lorna Norwood, Deputy Director of Communications and Government Relations
Tracy Jones, Soil Consultant
Roy Arthur, Watershed Coordinator

AMEC Team

Elizabeth Treadway, AMEC - Knoxville
Mary Halley, AMEC - Knoxville
Doug Biagi, AMEC - Knoxville

Others Present

Brent Johnson PE, City of Knoxville
Susan Dakak, Arcadis

I. Welcome

At 3:10 p.m. Ms. Mary Halley of AMEC greeted the Board and thanked everyone for their participation in this process.

II. Board Meeting Logistics

Ms. Halley informed the Board of the next meeting time and location as Monday, December 4, 2006 in the main building at the Ijams Nature Center.

III. Approval of minutes

Ms. Halley asked the Board for comments or corrections to the minutes of meeting #1 that were provided. No comments were received.

IV. New Business

Ms. Halley gave a brief explanation of the agenda for the meeting and reiterated the objectives of the Board, which is to:

Engage in a public process that:

- **Reviews** the County's current stormwater management program;
- **Identifies** program changes that will meet challenges for the future;
- **Identifies** costs and appropriate funding strategy; and,
- **Recommends** a stormwater program with funding method(s) that will guide Knox County in the establishment of a Stormwater Program recommendation to the Knox County Mayor.

Ms. Halley reminded the Board that this meeting was the second of a projected six that will be used in the study process that was outlined in the first meeting.

Ms. Halley discussed the definitions of "extent of service" and "level of service." Extent of service is defined as the stormwater structures for which a local government provides services and the boundary limits for delivery of those services. Level of service is defined as the types and quantity of the services provided to support the different parts of the drainage system. It was explained that both of these topics are policy decisions. The Knox County extent of service policy is that only County-owned public right-of-way (ROW) in the unincorporated area is maintained with the exceptions of life, safety or public health issues; or, projects that can be handled through the Environmental Stewardship Program.

The Knox County level of service policy is to provide periodic inspections/maintenance of problem drainage structures in the public right-of-way only, mainly complaint driven, and to provide regular inspections on construction sites (public and private).

Ms. Halley discussed the stormwater responsibilities of Knox County and of individual property owners. Knox County is responsible for the maintenance of stormwater facilities in the public ROW and public land, and regulation and enforcement of local regulations and maintenance covenants. The County is also responsible for floodplain management. Property owners are responsible for the maintenance of stormwater facilities located on private property. A definition of "maintenance covenant" was provided at this time as an agreement between Knox County and a property owner clarifying the maintenance responsibilities on a property.

Discussion took place regarding the level of service currently offered by Knox County and whether property owners of existing stormwater facilities will be able to take responsibility for repairs of problem facilities. It was stated that this will be an issue because stormwater maintenance

responsibilities are unclear to property owners. Mr. Bruce Wuethrich explained that the County currently repairs inadequate facilities that are posing a threat to the public and that routine maintenance such as mowing is expected of the property owner.

The topic of as-built certifications was discussed. A concern was raised that the new Knox County ordinance will need to be strengthened with regards to as-builts. Uncertainty was expressed as to the accuracy of as-built certifications provided by developers to the County in the future due to the lack of a comprehensive benchmark system existing throughout the County. The subject of the existing survey benchmark system located throughout the City of Knoxville was then discussed with Mr. Brent Johnson, Deputy Director of Engineering for the City of Knoxville. Concern was raised that the costs associated with providing such a benchmark network in Knox County would be extensive.

Ms. Halley defined the goals for the County Stormwater program as being:

- Public Safety;
- Public Health;
- Ease of mobility by protecting road network;
- Environmental protection/enhancement;
- Regulatory compliance; and,
- Regional cooperation.

Ms. Halley restated the program challenges and issues facing Knox County that were discussed by the Board in meeting #1 as:

- A demand for services that is growing faster than resources;
- A need to adopt the new ordinance/stormwater manual;
- A map of the stormwater system outfalls is needed by June 2008 to comply with NPDES Phase II regulations;
- There are new water quality monitoring requirements being imposed on the County by the issuance of Total Daily Maximum Loads (TMDLs);
- There is a need for maintenance of data that is collected and that is currently in the County system;
- Current inspection services are stressed with continued development activity;
- Private property drainage issues are increasing;
- There is a need to educate the public about stormwater issues;
- Maintenance is reactive to complaints and not proactive; and,
- Current capital funding is limited.

Ms. Halley asked the Board to continue discussion of the issues and challenges facing the Knox County stormwater program. Discussion by the Board included the continuation of the as-built plan discussion, with the same issues restated.

Low Impact Development (LID) concepts were discussed, including the higher cost of installing proposed BMPs and the financial impact on the development community. The need for workforce housing was proposed as further thought in this discussion and concern was expressed that Better Site Design or LID techniques would drive up development costs, therefore, increasing the cost of housing and limiting the availability of starter homes. At this time, Ms. Halley offered an explanation to the Board of LID concepts as being ones that promote designs that fit the land instead of fitting the land to meet the design. This is done through the use of techniques that will provide developments with a reduction in stormwater runoff volume by promoting the reduction of impervious surface and increasing stormwater infiltration. The Board questioned if the existing regulations will have to be examined for conflicts with LID practices. The example of road design widths was presented; LID

practices encourage narrower widths while current regulations do not allow for a reduction in pavement widths. This is an example of a regulation that may be modified to accommodate LID designs. The Board was referred to the draft Knox County Stormwater Management Manual Volume 2, Chapter 5 for further information regarding Better Site Design. The Board asked if Knox County staff was supportive of the Better Site Design concepts and the response was that staff will strongly encourage these techniques. Board member Tim Neal stated that the National Homebuilders Association believes that in 10 years Low Impact Development techniques will be the accepted practice and not the exception. The discussion then included the thought that community services such as fire protection or waste collection might be affected by LID techniques. Ms. Elizabeth Treadway explained to the Board that the community environment and not just the stormwater program must encourage a change in design philosophy.

Community education was then discussed with emphasis on property owner education. It was expressed that many property owners are not aware of the stormwater facility on their property or its function. Education of the real estate community was suggested.

Additional discussion of retrofitting existing stormwater facilities and stormwater system outfalls occurred. This brought up the fact that an inventory of existing structures needs to be collected. Additional discussion centered on the need to investigate improvements in Knox County's data management systems/process that impact stormwater.

This need for data collection and management triggered discussion of the requirements of the NPDES Phase II permit. The Board questioned the need for completion of this task, as stated in the current permit, by 2008, and what the ramifications would be if this was not achieved. Ms. Treadway provided an explanation of the fine structure associated with NPDES permit violations and the seriousness of the consequences a community could face. Ms. Halley offered the example of TDEC's enforcement of TDEC's permit and the sanctions imposed that require additional and more frequent site inspection.

The Board also expressed a need for increased inspection and oversight during construction processes. This need for increased construction oversight was recognized by the County. The Board referred to the TDEC report of the recent audit of Knox County's NPDES permit causing the discussion to center around the current staffing level of the County. The Board inquired how many people on staff are currently 100% dedicated to the stormwater program. Mr. Chris Granju answered the inquiry with four (4). The Board asked AMEC what stormwater staffing levels are typical in other communities. It was suggested to the Board to consider the type of stormwater program that would be desired in the future and not to only focus on the manpower required to meet immediate needs.

Ms. Halley recorded the list of issues (shown below) that was generated by the Board's discussion. It was explained to the Board that these issues are additions or enhancements to issues previously defined by County staff and by the Board in meeting 1. These issues will be added to the previous list (or combined where overlaps or similarities are noted), and all issues will be used to begin the process of prioritizing stormwater needs.

List of Issues Discussed by the Board in Meeting 2
Older stormwater facilities. Who will maintain and repair them?
Public understanding of stormwater-related easements.
Strengthen proposed as-built certification requirements.
Regulations should prevent stormwater issues – work proactively.
Provide adequate tools to development community for as-builts (benchmarks).
Identification and repair of existing stormwater issues.
Public understanding of stormwater facilities is minimal.
Data management improvements are needed.
Maximize County stormwater information through submittals from the public.
Stormwater funding.
Prioritizing stormwater issues with NPDES compliance.
Establishing sufficient funding to maintain compliance with NPDES and TMDLs.
Need a consistent legal process for construction enforcement.
Sufficient manpower.

V. Informational Items

The Board was provided the following items:

1. a CD containing the proposed Knox County Stormwater Management Manual;
2. an Executive Summary prepared by AMEC for Fairfax County, VA, entitled “Fairfax County Watershed Community Needs Assessment and Funding Options Report”; and,
3. a report prepared by AMEC for Arlington, VA, entitled “Stormwater Program and Financing Action Plan”;
4. a report entitled “Stormwater Management Benchmarking Report”.

Items 1 and 4 were provided in response to a request by the Board in Meeting 1. Items 2 and 3 were provided in response to a request by a Board member in Meeting 1 for examples of similar work performed by AMEC in other communities. Ms. Halley stated that the Board should be careful when attempting to compare Knox County and draw conclusions about the County stormwater program based on items 2, 3, and 4. Each community is different and has individual needs regarding stormwater management, and therefore makes decisions as necessary for that community.

VI. Public Participation

None.

VII. Adjournment

The meeting adjourned at approximately 5:10 p.m. The Board will resume the stormwater program discussion on December 4, 2006, at 3:00 p.m. in the main building at Ijams Nature Center, 2915 Island Home Avenue.

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Stormwater Advisory Board

Meeting 3 Minutes

December 4, 2006

Stormwater Advisory Board (Board):

Peg Buete	Victor Jernigan	Jamie Rowe
Harold Cannon	Alvin Nance	John Schoonmaker
Richard Cate	Tim Neal	Lisa Starbuck
Laura Cole	Ronnie Nease	Wayne Watson
Dawn Foster (Absent)	Lourdes Perez (Absent)	Darrell Wright
Marvin Hammond	Grant Rosenberg	

Knox County Staff

Bruce Wuethrich, Director of Public Works & Engineering
Chris Granju, P.E., Stormwater Management Coordinator
Leo LaCamera, P.E., Drainage Engineer
Lorna Norwood, Deputy Director of Communications and Government Relations
Tracy Jones, Soil Consultant
Martin Pleasant, Drainage Engineer
Roy Arthur, Watershed Coordinator
Brian Hubbs, Plans Reviewer

AMEC Team

Elizabeth Treadway, AMEC - Knoxville
Mary Halley, AMEC - Knoxville
Doug Biagi, AMEC - Knoxville

Others Present

Susan Dakak, Arcadis

I. Welcome

At 3:10 p.m. Ms. Mary Halley of AMEC greeted the Board and thanked everyone for their attendance.

II. Board Meeting Logistics

Ms. Halley reminded the Board of the next meeting time and location as Monday, January 8, 2007 in the main building at the Ijams Nature Center.

III. Approval of minutes

Ms. Halley asked the Board if there were comments or corrections to the minutes of meeting #2 that were provided. No comments were received.

IV. New Business

At this time Ms. Halley introduced Ms. Elizabeth Treadway of AMEC. Ms. Treadway emphasized that the issues discussed by the Board at the last two meetings are important and provide the framework for discussions in the next two to three meetings. These issues will be addressed through the Board's focus on crafting recommendations at a much broader scale. She emphasized that, having gained knowledge of local stormwater issues in the first two meetings, the objective of the Board is now to focus on long-range planning of, and direction for, the Knox County stormwater program. Ms. Treadway discussed the issues driving the assessment of the County stormwater program including the growing complexity of controlling the quality of stormwater runoff as well as the quantity of runoff. She explained that Knox County is not unique in having an aging storm sewer infrastructure that must be rehabilitated in much the same way as the aging sanitary sewer system and the water distribution network have been and are being upgraded, in order to meet the demands placed on it by the growth of the community. Additionally, with limited resources, the County's stormwater program is susceptible to the external influences placed on it. These influences are becoming driving forces that cross political boundaries. Federal regulations are imposed on states, and states in turn regulate communities. These new regulations are having an impact on how stormwater programs are perceived by their community and the expectations of their operation.

Ms. Treadway reiterated the goals for the County stormwater program that were discussed at the last meeting, which are:

- Public safety;
- Public health;
- Protection of the roadway network;
- Environmental protection and enhancement;
- Regulatory compliance; and,
- Regional cooperation.

Ms. Treadway asked the Board to continue the discussion of the goals for the County stormwater program in order to fashion a vision statement that would guide the program for the next five years. One concern voiced by a Board member at this time centered on the need for public participation and education. The Board expressed that emphasis should be placed on educating the general public as to what comprises a stormwater system, the importance of its effective operation and maintenance, and the financial impacts to the community. It was also suggested that the County's elected officials be included in the education process.

At this time, Ms. Treadway outlined an effective stormwater program development process,



beginning with a vision statement that leads to a mission statement of goals, setting priorities to achieve those goals, and finally the actions that must be taken to reach the desired stormwater program. Ms. Treadway explained that County stormwater staff had crafted a vision statement and presented it to the Board at this time. The Knox county staff vision statement is as follows:

Protect, manage and restore constructed and natural systems to ensure performance, integrity, efficiency and functionality while meeting or exceeding environmental regulatory compliance.

The County staff vision statement lead to discussion by the Board around the content of an effective vision statement. After much iteration, the preliminary vision statement developed by the Stormwater Advisory Board is as follows:

The Knox County Stormwater Management program shall protect, enhance and restore water quality and resources of our community for future generations.

Ms. Treadway explained that the crafting of a vision statement leads to developing a mission to carry out that vision. It was stated by a Board member that the previously stated goals (listed as bullet items on page 2 above) should be included in the County’s stormwater mission, and long-range planning and adequate funding should also be a part of the stated mission.

Thoughts developed by the Board concerning the mission of the stormwater program were:

- maintain public safety and health;
- maintain the roadway network;
- minimize flooding;
- education;
- long-range planning; and,
- funding.

Further discussion by the Board regarding how to carry out this mission lead to stating initiatives such as:

- the minimization of flooding;
- public participation, engagement and cooperation (involvement);
- public education;
- long range planning;
- floodplain management;
- responsible stewardship (budget); and,
- program review and assessment at regular intervals.

Ms. Treadway then explained to the Board the importance of the prioritization of the issues and concerns raised by the Board in the first two meetings. Those priorities established by the Board and Knox County staff in previous meetings have been condensed and combined and are listed in the following table.

PRIORITY	RANKING
Establish and/or maintain community support for stormwater management services for the County.	
Create a comprehensive vision for stormwater management that is embraced by County leadership and the community	



The County stormwater program will effectively comply with regulatory mandates, including specific TMDL and NPDES requirements.	
The County will maintain critical data in support of optimal system performance and in support of regulatory compliance, using tools that will be both efficient and effective as decision-making tools.	
The County will ensure effective installation of stormwater management infrastructure throughout the unincorporated area.	
The County will ensure highest protection of both public and private property from the negative impacts of stormwater runoff.	
The County will provide construction management oversight including regulatory framework and enforcement as well as effective plans review.	
The County will be proactive in addressing stormwater issues, including use of low impact development techniques, water quality best management practices and mitigation for runoff volume and flow rates.	
The County must ensure the integrity of the drainage system.	
The County will move to a proactive maintenance program Countywide.	
The County will move to a proactive capital improvement program to address system needs.	

Ms. Treadway went on to explain that prioritization of these issues should follow the vision established for the program. She reiterated that the Board is in a position to choose the direction of the County stormwater program. The effectiveness of the program will be directly proportional to funding, with a proactive stormwater program requiring the greatest level of funding. The Board stressed the importance of phrasing the program priorities to limit the liability exposure faced by the County.

It was asked if the priorities above were required by the State of Tennessee through Knox County's permit requirements. Ms. Halley and Ms. Treadway explained that, while the priorities certainly can support the County's compliance with water quality permit requirements, they are not all driven by the mandated requirements of a State or Federal permit. The remainder of the discussion by the Board centered on the language of sixth priority, "*The County will ensure the highest protection of both public and private property....*" It was voiced that a strict and literal interpretation of such a statement can be very difficult to attain. It was suggested that the language be rewritten to "*The County will reasonably ensure....*"

Ms. Treadway closed the meeting encouraging the Board to review the priorities list and think about what actions might be associated with each priority. She requested that the Board members come prepared at the next meeting to further discuss, rewrite (if needed) and consider these priorities so they can be ranked by each Board member in order of importance. This prioritization of the issues will then be utilized to develop the actions needed to further define the County stormwater program.

V. Public Participation

None.

VI. Adjournment

The meeting adjourned at approximately 5:05 p.m. The Board will resume the stormwater program discussion on January 8, 2007, at 3:00 p.m. in the main building at Ijams Nature Center, 2915 Island Home Avenue.



Stormwater Advisory Board Meeting 5 Minutes

February 5, 2007

Stormwater Advisory Board (Board):

Peg Buete	Victor Jernigan	Jamie Rowe
Harold Cannon	Alvin Nance	John Schoonmaker (Absent)
Laura Cole	Tim Neal (Absent)	Lisa Starbuck
Dawn Foster	Ronnie Nease	Wayne Watson
Marvin Hammond	Grant Rosenberg	Darrell Wright

Knox County Staff

Bruce Wuethrich, Director of Public Works & Engineering
Cindy Pionke, P.E., Director of Planning and Development
Chris Granju, P.E., Stormwater Management Coordinator
Leo LaCamera, P.E., Drainage Engineer
Tracy Jones, Soil Consultant
Martin Pleasant, Drainage Engineer
Roy Arthur, Watershed Coordinator
Brian Hubbs, Plans Reviewer

AMEC Team

Elizabeth Treadway, AMEC - Knoxville
Mary Halley, AMEC - Knoxville
Doug Biagi, AMEC - Knoxville

Others Present

Susan Dakak, Arcadis

I. Welcome

At 3:15 p.m. Ms. Mary Halley of AMEC greeted the Board and thanked everyone for their attendance.

II. Informational Item

Ms. Halley announced that the proposed stormwater ordinance would be scheduled for 1st reading consideration by the County Commission in February. The scheduled date for County sub-committee discussions is February 19, 2007. The Intergovernmental sub-committee will begin discussing the ordinance at 8:30 a.m. with the Finance sub-committee beginning discussion at 10:00 a.m. When questioned about the status of the third-party (i.e., City/County) review of the proposed ordinance, Ms. Halley stated that the review had been completed and the draft report indicated that the proposed ordinance was found to be as stringent as the City's existing ordinance. Mr. Granju stated that the third party consultant responsible for reviewing the ordinance was in the process of receiving their client's (City and County) comments on the draft review report and would publish the final report after all comments were addressed and received.

Concerns were raised by the Advisory board that obtaining public input via Commission sub-committee meetings and full Commission meetings would not be sufficient. Mr. Wuethrich reminded the Board that all Commission meetings, including the sub-committee meetings, were public meetings in which the general public can participate. Mr. Wuethrich also stated that, if necessary, a separate public meeting regarding the ordinance could be scheduled. Another concern by the Board was the timing of the ordinance adoption, in that the proposed ordinance would set the criteria to establish a budget for the stormwater program. It was explained that the ordinance does not set a budget. However, requirements set in the ordinance can establish stormwater program elements that influence funding/budget needs.

Mr. Wuethrich added that the proposed ordinance was necessary for some compliance initiatives and to avoid further delay, the ordinance would be scheduled for discussion by the County Commission as soon as possible given the results of the third party review.

III. Approval of minutes

Ms. Halley asked the Board if there were comments or corrections to the minutes of meeting #4 that were provided. It was noted that Alvin Nance was incorrectly shown as absent from the last meeting.

IV. New Business

Ms. Halley informed the Board that the Homebuilders Association appointed Kathryn Lewis as the replacement for Richard Cate, who resigned from the Board at the last meeting due to a change in employers. Ms. Halley explained that all information given to and discussed by the Board will be made available to Ms. Lewis in order to bring her up to date.

Ms. Halley began a review of the Advisory Board process to date. The Board has discussed the challenges and needs of the County stormwater program and identified goals for the program. The Board then crafted vision and mission statements to achieve the goals. From these statements, program priorities were identified. The Board must now consider a planned program to achieve these program priorities.

Ms. Halley led the discussion of the proposed planned program categorized by functional program area. The first functional program discussed was *Special Supporting Programs*. The most critical component of this program was identified as Public Education/Participation. The existing NPDES

Phase II compliance public outreach / education activities were explained. Ms. Halley went on to explain that the issue of appropriate and effective stormwater education could be addressed through the development of a communications plan. The plan would identify important education elements such as construction site management education, TMDLs, and BMP design and construction. Audiences should also be identified. Educational program components will focus on the general public (“Stormwater 101” and individual homeowner Best Management Practice), developers and engineers, and elected officials. The Board inquired if the proposed communication plan would be developed to meet or exceed the minimum required and stressed the importance of educating elected officials, as well as County staff, developers/engineers and the general public. (Ms. Halley explained that it would address more than water quality issues mandated in the permit, therefore it would exceed permit conditions.) Discussion surrounded around the timeline for the educational initiatives. Board members indicated that development and implementation of a communications plan should be done as early as possible.

The next planned program category discussed was *Stormwater Quality Management*. The component of regulatory compliance administration includes continued focus on NPDES and TMDL programs. The NPDES permit will have to be renewed in 2008 and unknown changes to the permit will have to be addressed by the County stormwater program. In addition to ongoing improvement in areas suggested by TDEC in their recent audit of Knox County’s program, the County has submitted a Total Daily Maximum Load (TMDL) monitoring program to TDEC for compliance with the requirements of their NPDES Phase II permit. This compliance measure will be modified based on direction by TDEC staff as the TMDL program evolves and a series of TDEC sponsored workshops are presented. It was noted by the Board that the timeline for the TMDL plan implementation (Figure 2, line 17 of the meeting #5 preparatory material) will need to be extended to include fiscal year 2007. The importance of passing the new stormwater ordinance and the associated design manual was stressed along with maintaining and improving the Illicit Discharge Detection and Elimination (IDDE) program. This planned program category will also include maintaining the Pollution Prevention / Good Housekeeping program that the County has implemented to monitor their own activities.

Ms. Halley then explained the *Regulation and Enforcement* planned program category, which includes plans review, construction site inspections and post-construction inspections. The planned program proposes to strengthen the construction site inspection program significantly. First, the County is developing Standard Operating Procedures (SOPs) for erosion and sediment control inspections. Next, the program proposes the addition of two construction inspection supervisors and 10 to 15 construction site inspectors to effectively handle the construction inspection workload. As the proposed ordinance is adopted and implemented, there will also be a need to hire and train post-construction inspectors, and train plans reviewers on Best Management Practices (BMPs) and Low Impact Development (LID) techniques that are included in the stormwater management manual.

The Board discussed a concern that the County citation process needs to be improved to be more effective. Mr. Granju explained that the new stormwater ordinance addresses this issue and will make enforcement more effective by being an administrative procedure with an appeals process instead of a judicial process. One Board member voiced that escalating consequences for repeat violators of construction site erosion and sediment control practices should also be considered in the enforcement program. Additionally, it was voiced that such enforcement procedures should extend to floodplain violations and should include mitigation measures as well.

Further discussion by the Board focused on the educational component of this program. It was stressed that the water quality BMP and LID education should be extended to include elected officials

and the Metropolitan Planning Commission (MPC). Discussion turned to issues involved in finding the additional inspectors for the program. Concern with the costs associated with finding qualified inspectors was raised. The Board inquired if staff had a feel for what an inspector might cost and what qualifications might be required. Mr. Wuethrich responded as to the cost of an inspector by stating it would be in the ballpark of \$50,000. Ms. Halley addressed the qualifications issue by informing the Board that TDEC has a certification process that will aid in finding or training qualified inspectors.

The next part of the planned program that was discussed was a combination of ***Engineering and Planning, Operations and Maintenance, and Capital Improvement Projects***. It was explained that a proactive maintenance and capital program, as established as a priority by the Board, will necessitate an inventory of the drainage system as well as master planning of local watersheds. The inventory will first determine the location of system outfalls (as required by the NPDES Phase II permit) and then be used to locate and assess the remaining public system and key private facilities. The inventory will be the foundation for other parts of this program, such as master planning, maintenance prioritization, and capital projects prioritization. This process will attain the Board's vision of replacing the current *reactive* stormwater program with a more *proactive* program. A proactive maintenance and CIP program will most likely lead to the addition of project managers to oversee the implementation of the various projects identified through the master planning effort and another dedicated stormwater maintenance crew.

It was explained that inventory of the drainage system and the master planning effort reinforces the need for a data manager to organize the County's existing data with the new system data. Although the Board did not highly prioritize data management, this data manager position is critical to the implementation of the master planning and CIP program efforts. In fact, County staff have voiced an immediate need for a data manager. The Board asked for some clarification of the duties of the data manager position. Mr. Granju explained that currently there are a number of separate databases containing information about complaint tracking, floodplain information, work orders and new construction. The data manager would be charged with combining all information to assist with stormwater planning.

The Board then asked for clarification of the outfall mapping process. Mr. Granju responded stating that a field team consisting of 3-5 people equipped with GPS technology and digital cameras, directed by a project manager, collect data such as outfall location and stream conditions. A Board member then inquired about the data platform that the stormwater program uses. Mr. Wuethrich responded that the County IT department fully supports the stormwater program and that they work closely with KGIS to ensure consistency of data.

The remainder of the ***Engineering and Planning*** program was then explained. In addition to the system inventory and the master planning effort discussed previously, an important segment of the engineering and planning program will be the oversight of the implementation of water quality BMPs and LID practices. County engineering staff will be tasked with enforcing the new ordinance design guidelines and educating the development community about the associated buffer requirements, available credits and incentives as well as the long term benefits involved with LID practices. This education program also ties into the public education and outreach program.

The last planned program discussed was ***Administration***. It was explained that the Administrative cost center is highly dependant upon funding and policy recommendations of the Board. For example, how will funding needs be met? Budgetary and financial support functions differ if the program is funded via tax-based sources versus a stormwater user fee. Second, does the Board

believe that it is necessary to continue some form of a Stormwater Advisory Board or Roundtable to ensure the vision and goals of the stormwater program are being met in the future program.

Ms. Halley introduced Ms. Elizabeth Treadway of AMEC. Ms. Treadway explained that now that a stormwater program has been built that will meet the vision of the Board, a preliminary budget for the program must be established. Once the Board accepts a program budget, it will be necessary to explore funding mechanisms that will provide the required funds to efficiently manage the program.

The Board echoed the importance of exploring all funding mechanisms and felt it would be a mistake to under fund the program. Ms. Treadway asked the Board if the planned program presented in the meeting is thorough enough to meet the vision of the Board. Board members reiterated the importance of educating elected officials about the stormwater program in order to garner the support necessary to build an effective stormwater program. Board members also expressed the need for remedial maintenance to fix the known inadequacies in the stormwater system. Ms. Halley stated that currently system maintenance was reactive, largely complaint driven, and that the intent of the planned program is to work toward implementing a proactive program. Mr. Wuethrich emphasized the importance of the system inventory as an important mechanism to get the County out of the reactive maintenance mode. Ms. Treadway stated that the planned program is a test of the community's tolerance of how much of a program is desired and how fast should it grow. The Board is being asked to take the test and make broad recommendations regarding program growth and ultimate magnitude. The application of costs to the planned program, which will be given to the Board for discussion in next meeting, is the last piece of information that the Board will use to make these decisions.

A Board member then inquired about how other communities achieved their funding streams. Ms. Treadway explained that each community is unique in funding strategy and that this emphasizes the link between program components and funding stability. This discussion prompted one Board member to question whether developer impact fees were a viable funding option because the feeling is that with all the new regulations to comply with, new developments already cost more and the higher costs are then transferred to the home buyer. These higher costs make it tougher to provide affordable housing.

Ms. Treadway promised the Board that read ahead material would be provided and that funding strategies will be discussed at the next meeting.

V. Public Participation

None.

VI. Adjournment

The meeting adjourned at approximately 5:10 p.m. The Board will resume the stormwater program discussion March 5, 2007, at 3:00 p.m. in the main building at Ijams Nature Center, 2915 Island Home Avenue.

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Stormwater Advisory Board Meeting 6 Minutes

March 5, 2007

Stormwater Advisory Board (Board):

Peg Buete	Victor Jernigan (Absent)	Jamie Rowe
Harold Cannon	Alvin Nance (Absent)	John Schoonmaker
Laura Cole	Tim Neal (Absent)	Lisa Starbuck (Absent)
Dawn Foster (Absent)	Ronnie Nease	Wayne Watson
Marvin Hammond	Grant Rosenberg	Darrell Wright
Kathryn Lewis		

Knox County Staff

Bruce Wuethrich, Director of Public Works & Engineering
Cindy Pionke, P.E., Director of Planning and Development
Chris Granju, P.E., Stormwater Management Coordinator
Leo LaCamera, P.E., Drainage Engineer
Lorna Norwood, Deputy Director of Communications and Government Relations
Tracy Jones, Soil Consultant
Roy Arthur, Watershed Coordinator
Brian Hubbs, Plans Reviewer

AMEC Team

Elizabeth Treadway, AMEC - Knoxville
Mary Halley, AMEC - Knoxville
Doug Biagi, AMEC - Knoxville
John Styron, AMEC Greensboro

Others Present

Mark Harmon, County Commissioner
Tony Norman, County Commissioner

I. Welcome

At 3:13 p.m. Ms. Mary Halley of AMEC welcomed the Board and thanked everyone for their continued attendance.

II. Approval of minutes

Ms. Halley asked the Board if there were comments or corrections to the minutes of meeting #5 that were provided. No comments were received.

III. New Business

Ms. Halley reminded the Board that the original schedule of the Stormwater Advisory Board included six meetings. It is anticipated that two additional meetings will be needed in order to have sufficient time to thoroughly discuss all the aspects of the County stormwater program and for the Board to develop program recommendations for the Mayor.

Ms. Halley recognized the attendance of Knox County Commissioner Mr. Mark Harmon and introduced Mr. John Styron, the GIS Manager from the AMEC Greensboro NC office. Mr. Styron's involvement in this project has been examining County data to determine the feasibility of a stormwater user fee (i.e., utility), should a user fee be included in the Board's recommendation.

Upon the request of a Stormwater Advisory Board member, Ms. Halley provided an update on last month's County Commission meeting which included the first reading of two stormwater-related ordinances. The proposed Knox County Stormwater Management Ordinance first reading was postponed until the Commission meeting on March 26, and the updates to the flood damage prevention ordinance passed its first reading and will be read for the second time at the March 26 Commission meeting. Mr. Chris Granju advised the Board that a Commission workshop was tentatively scheduled for March 26, during which public input would be received. The Board then questioned whether it is the mission of this Board to review and comment on these ordinances and their effect on the County stormwater program. After some discussion, it was decided that the Board would get a briefing on the ordinance in the next meeting in order to understand the impact of the ordinance on the program of services being considered. (It should be noted that after the Board meeting, it was decided that the Board will receive the same briefing on the ordinance that the County Commission will receive on March 26).

Ms. Halley introduced Ms. Treadway of AMEC. Ms. Treadway reminded the Board of the previous meeting's discussion of a preliminary budget for the desired stormwater program and that this meeting would focus on the various funding methods available to local governments to achieve the goals set for the stormwater program.

Ms. Treadway explained the four categories of revenue that can be generated by local governments as:

1. **Taxes**, being the primary revenue generator which can be used for any program or governmental purpose;
2. **Service charges**, revenues tied to a specific purpose such as stormwater services;
3. **Exactions**, those monies paid to a local government for a certain privileges, such as the local cable company using the public right-of-way for the installation of their network; and,
4. **Assessments**, funds paid by direct beneficiaries of some extension of a public benefit such as a downtown beautification project or water / sewer line extension projects.

Ms. Treadway informed the Board that municipal stormwater programs have primary and secondary

funding mechanisms. Ms. Treadway proceeded to give a more detailed explanation of each of the primary funding methods. **General Funds** are typically good for all municipal purposes. However, stormwater programs across the country are shying away from this method of funding because there are so many competing demands on general funds. It is difficult to keep money dedicated to a stormwater program while competing with other community priorities such as police, fire and educational needs. Typically, general funding is very stable unless the community has specific industries that are tied to economic performance in the local area. It has substantial capacity and can be used for general obligation bond debt financing. **Service Charges (Fees)** (also referred to as stormwater utility user fees), are tied to special, limited purposes. They have a high degree of flexibility in cost allocation and are dedicated to the services provided. Unlike the general fund, they are not subject to reallocation at the end of the year. They are established as an enterprise fund and are not subject to the general fund “turf battles” that often take place. This fund will typically pay the general fund for services and administrative costs. Service fees have high revenue stability and very substantial funding capacity, capable of funding a proactive stormwater program. **Special Purpose Taxes** are authorized for limited purposes. There are various types of taxes (sales, beer, gasoline, income/payroll, hospitality, franchise, ad-valorem, etc.) with different impacts that apply to different constituencies. They tend to be moderately stable and can generate significant revenue. They can also be used in general obligation bonding. **General Obligation and Revenue Bonding** is generally associated with capital expenditures, and often depends on other funding sources. Flexibility is limited by the fact that debt level is set forth in the municipal charter. While bonding does expedite spending on large projects, it also adds an interest payment expense.

Ms. Treadway continued the discussion by covering each of the noted secondary funding methods. **Special Service Fees** are typically imposed on a limited area or clientele and are structured to reflect the cost of special services or facilities. They have lower stability based on development swings and offer limited funding capacity. They may be used for bonding debt service for local improvements. **System Development Charges** are a recapture of delayed expenditures caused by development. For example as a development goes forward, the capacity of the system decreases. This builds the excess capacity in financial terms back into the process. These are often referred to as capitalization charges or CIP fees. These charges offer several ways to allocate costs (most used were developed through wastewater treatment programs), provide limited revenue potential, require front end funding on the capital projects, and usually have to incorporate a depreciation of assets over time. **Special Assessments** are based on an allocation of direct special benefits, meaning the benefits and the costs should align. Special assessments can be ad-valorem or non ad-valorem, an assessment or something else resembling service fee rates. Many different calculation parameters have been used to figure out special assessments. They apply mostly to localized improvements and are difficult to apply for water quality since they are hard to single out benefits to individual properties. Special assessments are hampered by a limited funding capacity through local cost allocations. **In lieu of Construction Fees** are often confused with impact fees, but are not the same thing. These fees can be utilized as a part of a comprehensive service fee (i.e. added to the program). These fees are typically applied to developments that have off-site impacts that could be mitigated on-site. The main disadvantage with these fees is that they don’t accrue fast enough to develop the stormwater system in line with the system capacity needs. They require front end capital funding by the local government and the fees rarely fully recover project costs. They are, however, one of the few funding mechanisms that are popular with the development community. **Developer Extension/Latecomer Fees** are not a direct revenue source. The initial developers extend stormwater systems with excess capacity designed to serve subsequent development (typical in water and sewer extensions). This fee structure defers capital funding until development takes place, which makes the compensation of the initial developer uncertain as time can vary. The municipality must act as the administrator to return fees. **Federal and State Grants and Loans** offer very limited programming support for stormwater related

projects. These types of monies are typically not consistent enough to fund pieces of the stormwater program with any reliability. Federal and state programs that have been used before include EPA, USGS cooperative programs, EDA project grants, CDBG block grants, Project Impact, and FEMA.

The Board's discussion developed around various funding sources beginning with developer impact fees and their use. Ms. Treadway explained that because of the nature of an impact fee, the one time payment for an impact to an adjacent facility is not stable enough to be a primary funding mechanism for a local government stormwater program. Impact fees are intended to mitigate the impact of development on the adequacy of service through off site improvements, which makes them hard to use for stormwater. Impact fees have to reflect the incremental costs of maintaining an adequate level of service, must be earmarked for specific uses and impacts to nearby developments, not impacts to developments miles away, and must be quickly spent in many areas.

A tax increase was brought up at this time. Ms. Treadway offered as an example of a similar sized county to Knox County, Fairfax County, Virginia. Fairfax County differs from Knox County in that it is approximately 95% built out, and a tax increase has a significant effect. In fact, the entire \$33 million county stormwater program is funded by the general fund. The question was then posed as to what effect a \$0.01 tax increase would have in Knox County. Mr. Wuethrich stated that a \$0.01 tax increase would generate approximately \$700K in Knox County. The Board questioned how many property parcels were located in Knox County. Mr. Styron responded that there are approximately 110,000 parcels. Ms. Treadway informed the Board that a tax increase would only affect only those parcels that pay taxes and not include some of the larger contributors to the drainage system such as schools and churches.

Ms. Treadway then explained to the Board the concept of a stormwater utility as opposed to a stormwater Utility. The common misconception of a utility is that it is often assumed as a separate entity (i.e., a Utility), such as a water, gas, or electric utility, that has a Board of Directors and large, often bureaucratic, operational style. In fact, most stormwater utilities are merely a funding method with a program concept and dedicated revenue stream that fits well within most typical local government organizational structures. Ms. Treadway explained why communities across the country are seeing the benefit of this "user fee" approach to stormwater program funding. Forming a stormwater utility is **SAFE**, **stable**, **adequate**, **flexible** and **equitable**. The **stability** of a utility comes from having a dedicated enterprise fund that does not have to rely on or compete for general funds. A successful stormwater program can be undermined by the uncertainty of year to year general fund allocation fluctuations and therefore not be effective in achieving its goals. **Adequate** funding is provided for a stormwater program by proper preparation and a thorough programmatic rate study. The **flexibility** offered by a utility is the primary source for entire program. Other fees can be used to enhance equity and credits can be given as encouragement for going above and beyond minimum stormwater system criteria and can be geographically based to account for environmental costs. Stormwater utility **equitability** is based on contribution to system rather than property value. Total impervious area on a property is commonly the basis for billing and is an additional incentive for credits.

Based on the Board questions of the need for exemption language and credits to be given to the agricultural community, Ms. Treadway emphasized the importance of policy decisions that must be made by the Board during the utility rate study process, should the establishment of a stormwater utility be the recommendation to the Mayor that results from these meetings.

Ms. Treadway emphasized the need for a strong public education outreach program, stating that most unsuccessful stormwater utilities failed prior to implementation because of the lack of public and

political backing. The need for stakeholder involvement is critical to a successful stormwater utility. She gave the example of a very successful multi-jurisdictional utility implementation in Beaufort County, SC. There, Advisory Board members, elected officials and stormwater staff were all willing and able to give stormwater related presentations to any interested community group, whether it was the local development community or a small neighborhood gathering. Educating the community on the stormwater program first and then the funding method to support the program, builds a strong foundation for program support.

Ms. Treadway continued by emphasizing that equally critical to the community education process is the need to follow a thorough and *legally defensible* process when establishing and building a rate structure for the utility. Policy decisions must be made on the basis of equity. The rate structure should be built to include all issues that will face the program, such as secondary funding sources, exemptions or credits, rate base and structure, fixed and variable program costs, and the crafting of the enabling ordinance. Since stormwater is now being included in the “traditional” services expected by a community, much like the water and sewer systems, funding comprehensive stormwater programs is more important than ever. There are various rate structures employed for generating revenue for a stormwater utility, however, the most equitable and commonly used rate structure is based on the amount of impervious surface area on a property (roofs, paved areas, etc.) Impervious coverage increases the proportion of rainfall that runs off the land. Impervious area service fee rate methodologies are used in hundreds of other cities and counties. Stormwater rates have also been based on the gross area of properties and a factor that reflects the intensity of development. A few cities and counties have incorporated both gross area and impervious area or the percentage of imperviousness into their rate calculation.

Simplified residential rates are common. Many stormwater service fee methodologies apply a flat-rate charge to all single-family residential properties. The impact of service fee charges to non-residential properties are normally higher than residential charges, reflecting the greater runoff they typically generate. The “Equivalent Rate Unit” (ERU) approach is often used to equate service fees on non-residential properties to the fees applied to residences.

Ms. Treadway shifted the discussion to an explanation of the Knox County stormwater management cost of service analysis comparing the eight functional cost centers, *Administration, Special Supporting Program, Stormwater Quality Management, Engineering and Master Planning, Operations and Maintenance, Plans Review and Regulatory Enforcement, and Capital Improvements*, of the existing and proposed programs. The current County stormwater program costs approximately \$4.7 million and is comprised of the equivalent of 35.8 Full Time Employees (FTE). Ms. Treadway then explained the new program costs in each of the eight program cost centers based on the additional program initiatives and Board Priorities that have been developed over the course of the first five meetings. In order to meet these new program initiatives, initial analysis of the program created a first year cost increase of \$6 million and a requirement for an additional 29 FTEs. Combining the anticipated year one costs with the existing program costs would take the County’s stormwater program from roughly a \$4.7 million, 35.8 FTE program up towards a \$10.7 million, 65 FTEs enterprise to address the water quality and water quantity services based on the priorities and needs. The five year program cost projections are shown in the table below. The Board was reminded that this is very preliminary and not to be “quoted” since there is much more discussion necessary to create final recommendations to the Mayor.

Five Year Projections	
Year One	\$10.7 Million
Year Two	\$13.5 Million
Year Three	\$17.9 Million
Year Four	\$20.7 Million
Year Five	\$25.5 Million

At this point, a Board member asked staff if there is a list of backlogged capital improvement projects. Staff responded that the current level of service process has identified numerous projects that, because of the lack of funding, have not undergone further investigation. The capital improvement cost center will be the driver of the program ultimately as the program of services moves from “reactive” to “proactive” in addressing community needs. The Board also questioned whether the current Dutchtown Road improvement project is funded by the stormwater program. Mr. Granju replied that this project was funded by capital improvement money from the highway division. Concurrently, there was a flood mitigation project in the same area funded by the stormwater capital improvement program.

Ms. Treadway noted that the big driver of the program costs are the priorities that were identified as important by the Board, the most significant one being the desire for a proactive stormwater program. The two main variables in the magnitude of these increased costs are:

1. The aggressiveness of moving the program toward a proactive Operations & Maintenance program; and
2. The aggressiveness of moving the program toward a proactive Capital Improvements program.

Based on the new program description to this point, Ms. Treadway gave an example of how these costs might translate into a fee. She stated again that this is very preliminary data and not to be quoted as fact. If, for example, the fee is based on a billing unit of 1000 ft² of impervious surface, it could be in the range of \$3 to 4\$ a month. Ms. Treadway reminded the Board that many policies have to be considered before a rate analysis could be completed and that it is not the charge of this Board to establish a potential rate recommendation.

Ms. Treadway stated that for the next meeting, the Board will further the funding strategy discussion. This discussion will include important policy decisions that will affect the Board’s recommendation to the Mayor. Discussion should answer questions such as:

- What will the final stormwater program include? and
- What will the approach to program funding be?

Ms. Treadway concluded the meeting by praising the Board for their dedication to this process and emphasizing the importance of the policy decisions they are considering for the direction of the stormwater program.

Ms. Halley stated she will e-mail all Board members with the proposed Knox County stormwater ordinance in preparation for next meeting. Commissioner Norman requested to be added to the mailing list.

IV. Public Participation

None.

V. Adjournment

The meeting adjourned at approximately 5:10 p.m. The Board will discuss the proposed stormwater ordinance on April 2, 2007, at 3:00 p.m. in the main building at Ijams Nature Center, 2915 Island Home Avenue.

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Stormwater Advisory Board Meeting 7 Minutes

April 2, 2007

Stormwater Advisory Board (Board):

Peg Buete	Victor Jernigan	Jamie Rowe
Harold Cannon(Absent)	Alvin Nance	John Schoonmaker
Laura Cole	Tim Neal (Absent)	Lisa Starbuck
Dawn Foster	Ronnie Nease (Absent)	Wayne Watson
Marvin Hammond	Grant Rosenberg	Darrell Wright (Absent)
Kathryn Lewis (Absent)		

Knox County Staff

Bruce Wuethrich, Director of Public Works & Engineering
Chris Granju, P.E., Stormwater Management Coordinator
Leo LaCamera, P.E., Drainage Engineer
Lorna Norwood, Deputy Director of Communications and Government Relations
Tracy Jones, Soil Consultant
Roy Arthur, Watershed Coordinator
Brian Hubbs, Plans Reviewer

AMEC Team

Elizabeth Treadway, AMEC - Knoxville
Mary Halley, AMEC - Knoxville
Doug Biagi, AMEC - Knoxville
Lee Gentry, AMEC Knoxville

Others Present

None

I. Welcome

At 3:10 p.m. Ms. Mary Halley of AMEC welcomed the Board.

II. Approval of minutes

Ms. Halley asked the Board if there were comments or corrections to the minutes of meeting #6 that were provided. No comments were received.

III. New Business

Ms. Halley reminded the Board that the meeting would cover the proposed Knox County stormwater ordinance, as requested by the Board, and that this meeting deviates from the original scope of the Board. Ms. Halley introduced Mr. Lee Gentry of AMEC, Knoxville, adding that Mr. Gentry would be available to address technical questions the Board may have concerning drainage and floodplain provisions in the proposed Knox County stormwater ordinance.

Ms. Halley began the discussion of the proposed ordinance with a presentation that contained the timeline followed by the County, outlining the process of obtaining the public input that was used as assistance in crafting the proposed stormwater ordinance. This timeline began in 2002 with the formation of the Site Planning Roundtable, a widely varied group of citizens that donated their time to discuss development issues in Knox County. This group continued to meet until late 2005 when the proposed ordinance was completed.

The proposed ordinance has been posted on the County's website for review and comment and a number of public presentations have been given to a variety of local community groups and the County Commission. Four more public meetings to receive comments on the proposed ordinance will take place before the ordinance goes back to County Commission in May. These meetings had not been scheduled. The Board was also informed of the April 12, 2007 public meeting to be held by Arcadis-Tetra Tech, the third-party consultant hired by the City of Knoxville and the County to review the proposed County ordinance and compare it with the City of Knoxville's ordinance for conformance to the Urban Growth Agreement's "as strict as" clause.

Ms. Halley's presentation then highlighted the proposed ordinance and the accompanying stormwater design manual. She explained the Integrated Design Approach that the County will follow, further explaining the presumptive water quality standard of 80% Total Suspended Solids (TSS) removal criteria, the better site design incentives that the County will use to promote this approach and the advantages gained when using this approach. She explained the concept of channel erosion protection, its usefulness in compliance with the County's NPDES permit and the Total Maximum Daily Load (TMDL), water quality buffers, the maintenance, inspection and enforcement policies that the County will utilize.

After Ms. Halley's presentation, the Board discussed many of the ordinance issues that were presented, ranging from enforcement of the design standards in the manual to the maintenance responsibilities for new stormwater BMPs and infrastructure.

Ms. Elizabeth Treadway of AMEC then spoke to the Board about the recent articles that appeared in the local press that incorrectly reported costs associated with the proposed Knox County stormwater ordinance. She emphasized to the Board that the costs that were discussed were **not** costs associated with the implementation of the proposed ordinance as reported in the press, but rather costs associated with the implementation of a comprehensive stormwater program. Additionally, she reviewed the reason for the formation of the Board, cautioned the Board about speaking ahead of the process and

fostering public discussion of potential Board recommendations on cost and program elements until this information is presented to the Mayor for his review.

Ms. Treadway reiterated to the Board the previous meeting's discussion of a **preliminary** budget for the desired stormwater program and that lengthy discussion still needed to occur about the level of service that the County would provide to the community. After the level of service discussion, the funding options available to local governments to achieve the goals set for the stormwater program could be then be resolved.

Ms. Treadway concluded the meeting by reminding the Board of the importance of their mission and that the read ahead material that was distributed prior to meeting #6 would be good review for next month's meeting.

IV. Public Participation

None.

V. Adjournment

The meeting adjourned at approximately 4:50 p.m. The Board will resume discussion of level of service and the various funding options available on May 7, 2007, at 3:00 p.m. in the main building at Ijams Nature Center, 2915 Island Home Avenue.

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Stormwater Advisory Board Meeting 8 Minutes

May 7, 2007

Stormwater Advisory Board (Board):

Peg Buete	Victor Jernigan	Jamie Rowe
Harold Cannon(Absent)	Alvin Nance	John Schoonmaker
Laura Cole	Tim Neal	Lisa Starbuck
Dawn Foster (Absent)	Ronnie Nease	Wayne Watson
Marvin Hammond (Absent)	Grant Rosenberg	Darrell Wright (Absent)
Kathryn Lewis (Absent)		

Knox County Staff

Bruce Wuethrich, Director of Public Works & Engineering
Chris Granju, P.E., Stormwater Management Coordinator
Cindy Pionke, P.E., Director of Planning and Development
Leo LaCamera, P.E., Drainage Engineer
Lorna Norwood, Deputy Director of Communications and Government Relations
Tracy Jones, Soil Consultant
Roy Arthur, Watershed Coordinator
Martin Pleasant, Drainage Engineer

AMEC Team

Elizabeth Treadway, AMEC - Knoxville
Mary Halley, AMEC - Knoxville
Doug Biagi, AMEC – Knoxville

Others Present

None

I. Welcome

At 3:15 p.m. Ms. Elizabeth Treadway of AMEC welcomed the Board.

II. Approval of minutes

Ms. Treadway asked the Board if there were comments or corrections to the minutes of meeting #7 that were provided. Board member Wayne Watson was mistakenly listed as absent. The minutes were reported as meeting #6 instead of meeting #7. These corrections were noted and corrected.

III. New Business

Ms. Treadway began the meeting by reminding the Board of past discussions regarding their formation of program priorities and informing the Board that consideration of two major questions need to be discussed by the Board:

- Does the program, as outlined, meet the expectations that the Board has set? and,
- If not, what changes are required?

Ms. Treadway began a presentation reviewing the proposed Knox County Stormwater Program. Beginning with discussion of the current stormwater program, Ms. Treadway explained that currently the two major cost centers are Operations & Maintenance and Capital Improvements. **The total budget for the existing program is \$4,709,410 and requires 35.8 Full time employees (FTEs).**

The Board was then reminded of the program priorities they arrived at during previous discussions, which are:

- Create comprehensive vision that is embraced and supported by County leadership and the community. Obtain appropriate resources through fair and equitable funding to carry out the vision and mission.
- The County stormwater program will effectively comply with regulatory mandates, including specific TMDL and NPDES requirements.
- The County will maintain critical data in an efficient and effective environment that supports optimal system performance and regulatory compliance.
- The County will provide construction oversight, including regulatory framework including enforcement and engineering plans review that ensure effective installation of stormwater infrastructure throughout the unincorporated area.
- The County will reasonably ensure the highest protection of both public and private property from the negative impacts of stormwater runoff.
- The County will be proactive in addressing stormwater issues including use of low impact development techniques, water quality best management practices and mitigation methods for runoff volume and flow rates.
- The County must ensure the integrity of the drainage system by moving to a proactive maintenance program and a proactive capital improvement program county-wide to address system needs.

Ms. Treadway then presented the recommended changes to each program cost center that would be required to achieve these priorities. Beginning with the **Special Supporting Program** cost center focusing on the Communications Plan Implementation, this component includes:

- Video Production/Print Media Production;
- Training Materials; and
- Purchase of media space.

The total for the proposed first year new costs to the Special Supporting Programs are **\$171,000**.

The next cost center presented was ***Stormwater Quality Management***. To attain the priorities set by the Board, this portion of the proposed program will include:

- Two new staff;
- TMDL Monitoring services;
- Supplies and Equipment;
- Vehicle; and,
- Training Materials.

Based on additional tasks required of the stormwater management section, it is estimated that the first year costs for Stormwater Quality Management will be **\$216,530**.

The ***Engineering and Master Planning*** cost center was explained as having the following needs;

- One new position;
- Inventory of System;
- Master Planning of all Watersheds;
- Data Management Assessment Plan; and,
- Data Plan Implementation.

The estimated first year costs for this portion of the program are **\$512,340**.

The analysis of the ***Operations and Maintenance*** cost center revealed the following needs:

- New Maintenance Crew – 6 people;
- Equipment for Crew;
- Supplies for construction activities/repairs; and,
- Supplies and training for safety and construction site management.

First year costs estimated for this program cost center are **\$493,182**.

Discussion of the ***Plans Review and Regulatory Enforcement*** cost center explained that the desired level of service would require:

- New Inspectors and Supervisors – 17 staff;
- New Plan Reviewer – Year 3;
- New Post Construction Inspectors (2) – Yr 3;
- Training costs; and,
- Vehicles and supplies.

The first year additional costs for this component of the proposed stormwater program are **\$1,489,410**.

The ***Capital Investments*** portion of the proposed program will generate a need for:

- A Project Manager and an Inspector – 2 staff;
- Vehicles and supplies; and,
- Capital Projects.

New first year costs are proposed to require **\$2,741,140**.

The **Administration** cost center of the stormwater program will necessitate:

- One additional staff (Adm. Asst.)
- Leased space for staff of stormwater program
- General supplies and support equipment

First Year New Costs = \$262,660

The total proposed first year additional program costs are \$5,986,262 with 29 additional FTEs. This total for the proposed first year program expenses are based on the assumption that the priorities set by the Board will require a level of service that will necessitate these additional services and staff.

Combining the current costs with the proposed program costs yield a **total first year program requiring a budget of \$10,695,262 and the need for 65 FTEs.** The proposed five year budget is listed in Table 1. These projected costs are reflective of the need to move the stormwater program to a more proactive approach.

Table 1

Total Stormwater Program Costs	
Year 1	\$10,695,671
Year 2	\$13,524,091
Year 3	\$17,892,157
Year 4	\$20,749,281
Year 5	\$25,478,032

Ms. Treadway reminded the Board that the magnitude of total cost of the future stormwater program are, to a large degree, dependant upon on the aggressiveness of the County in moving to: 1) a proactive operations and maintenance program; and 2) a proactive capital improvements program. Hence, the following two questions were posed to the Board:

- How aggressively do you move to proactive O&M?; and,
- How aggressively do you move to proactive capital improvements program?

Prior to discussion by the Board, Ms. Treadway reminded the Board that the answers to these questions are policy decisions that factor into the *level of service* and the *extent of service* of the County's stormwater program. The *level of service* is determined by the types and quantity of services provided to support the different parts of the drainage system and the *extent of service* is based on the stormwater structures for which the County provides services and the boundary limits set for the delivery of those services. Currently, the County services County-owned public right-of-way only in the unincorporated area with the exceptions of life, safety or public health issues and projects that can be handled through the Environmental Stewardship Program. The proposed stormwater system responsibilities are for the County to provide maintenance of stormwater facilities in ROW and public land, and regulation and enforcement of the local regulations and the maintenance covenants. Additionally, the County will continue to provide floodplain management. The property owner will be responsible for maintenance of stormwater facilities on private property.

Ms. Treadway concluded her presentation by emphasizing to the Board the importance of considering the service expectations for the County stormwater program. The Board should consider if there needs to be a fundamental change in the County's responsibility that would change current policy on the *extent of service* (the physical limits of county responsibility)?

A Board member asked how the benefits versus program costs of an increased extent of service are quantified. Ms. Treadway responded that there is really no clear way to quantify the benefits of attaining cleaner water using typical Cost-Benefit analysis methods due to the subjective nature of the measurement of success (e.g., is it improvements to water quality or achievement of water quality standards, etc.).

Privately Owned Stormwater Facilities:

The subject of maintenance of privately-owned stormwater facilities was discussed next. The Board inquired as to what maintenance the property owner would be responsible for. Ms. Treadway explained that typically the maintenance of the physical characteristics and the operational integrity becomes the responsibility of the property owner. The question arose as to what burden of responsibility will be placed on the average home owner by the proposed stormwater ordinance. Mr. Granju explained that under the current and proposed ordinance, maintenance of stormwater facilities is the responsibility of the property owner. Concern was raised about the removal of possibly contaminated sediment from the bottom of stormwater facilities, the costs associated with the removal and the issue of liability, which can be very burdensome to an individual home owner while the benefit of maintenance is received by all land-owners whose property drains into the facility.

Role of Homeowner Associations in Private Facility Maintenance:

One member of the Board suggested the stormwater facility be placed on a common tract that a homeowners association would then have the responsibility to maintain. Ms. Halley explained that establishing a homeowners association can be a solution so long as the association remains viable and capable of long-term maintenance. She further explained that, in Knox County, homeowner's associations often dissolve over time, making enforcement of any stormwater maintenance responsibility very difficult. The Board raised concern about the practicality of expecting an individual property owner to be solely responsible for the maintenance of a stormwater facility and that there will be a very slim chance of an individual accepting such a responsibility. Ms. Halley gave the example of South Burlington, Vermont and their approach to this issue. The City will accept responsibility for maintenance of stormwater facilities in residential properties but not commercial properties. Ms. Treadway gave the example of James City County in Virginia, where a homeowners association can choose to contract with the county for the maintenance of their stormwater facility. One Board member explained that the proposed County ordinance may resolve this issue during construction because some developers are choosing to handle ownership of stormwater facilities through a "c corporation" until the development is complete.

Existing Facilities and Potential Upgrades/Retrofits:

The subject of retrofitting or upgrading existing substandard facilities and how the enforcement of such a recommendation would work was discussed. Several Board members recommended that the County take over the maintenance responsibility of those structures. Mr. Wuethrich explained that master planning efforts would identify problem facilities that are the source of a flooding, erosion or water quality problem, and that such facilities would likely be handled through the capital improvements program to bring them up to standard only and not for long-term maintenance. He further explained that existing facilities were built to the regulatory requirements that were in place at the time of their construction and the County would likely not be retrofitting existing facilities that do not meet existing regulations unless the facilities proved to be problematic. The enforcement of stormwater maintenance criteria for new subdivisions can be handled at the early planning stages of the subdivision process. However, existing problematic areas that were constructed prior to stormwater standards offer a different challenge – one that is not well understood until a system inventory and subsequent master planning can be completed. The maintenance in these areas is

currently reactive and complaint driven. The Board agreed that this issue emphasizes the need for strong educational, maintenance & operation and capital investment components in the stormwater program and also necessitates a policy decision to clearly define the level of service and maintenance responsibilities of the County. Expansion of the Environmental Stewardship Program was proposed as one potential tool for resolution of the maintenance issue.

Four Options for a Change in Extent of Service/Level of Service for Privately Owned Stormwater Facilities:

Four options were defined during the above discussions. These included:

1. Increase program responsibilities and fund through user fees to provide assistance to all private property owners of stormwater facilities to manage the maintenance and long-term operation of the facility.
2. Share the responsibility for the facility with the County providing major maintenance (identified as structure improvements such as sediment removal or dam maintenance) while the property owner is responsible for providing routine maintenance and operation.
3. Provide assistance for future maintenance only once the facility is inspected and deemed to be operational based on original design standards under which it was built.
4. The County is not responsible for maintenance services of private facilities, except through the Environmental Stewardship Program. The County will be responsible for regulatory oversight to see that the private facility owner brings the facility up to standards and provides long-term maintenance.

These options will be presented to the Board along with a background paper for the next meeting. This paper will frame the policy/program options for building recommendations from the Board to the Mayor. In preparation for the next meeting, Ms. Treadway challenged the Board to consider the level of service the County should provide and the funding methods needed for achieving the desired proactive stormwater program. She also reminded the Board of the importance of the strong educational component necessary to accomplish a proactive program.

Program Funding:

The previous discussion led to the discussion of program funding. Ms. Treadway explained the stormwater utility concept as a fee charged for a service, referring the Board to the meeting #6 read ahead material they were provided. This type of utility does not mean a separate entity, it is merely one of the primary stormwater department funding methods, along with the general and highway funds, available to the County. A stormwater utility is an enterprise fund that will be controlled by the County and does not require partnering with an existing utility. Ms. Treadway stressed the importance of stormwater program level of service policy decisions that are being made, especially if the Board makes the recommendation that the County implement a stormwater utility. These policy decisions will affect the stormwater fee and rate structures. Ms. Treadway noted the importance of the master planning effort that will be required to appropriately direct the funds available to the various stormwater program cost centers.

Development Process:

The Board discussed the need to analyze the development process followed by the County and the need for this process to be discussed at future meetings. The Board also felt that a representative of the Metropolitan Planning Commission (MPC) should be asked to attend the next meeting to help clarify this process. Ms. Treadway concurred and noted the importance of understanding the limits of impact the County regulations place on the overall development process and how that understanding

will assist the Board with the policy decisions that must be made. Ms. Halley stated she will e-mail the current County development process flow chart to Board members prior to the next meeting.

Public Meetings for Ordinance:

The Board inquired of County staff if the public meetings to discuss the proposed stormwater ordinance had been scheduled and suggested that an abbreviated version of the PowerPoint presentation offered to the County Commission be presented. Staff provided the following meeting schedule:

- May 17 @ East Knoxville/Burlington Library;
- May 22 @ Bonny Kate/Pinkston Library;
- May 29 @ Halls Senior Center; and,
- May 31 @ Cedar Bluff Library.

All meeting times will be 5:30 pm – 7:00 pm.

IV. Public Participation

None.

V. Adjournment

The meeting adjourned at approximately 5:05 p.m. The Board will resume discussion of level of service and the various funding options available on June 4, 2007, at 3:00 p.m. in the main building at Ijams Nature Center, 2915 Island Home Avenue.

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Stormwater Advisory Board Meeting 9 Minutes

June 4, 2007

Stormwater Advisory Board (Board):

Peg Buete	Victor Jernigan (Absent)	Jamie Rowe
Harold Cannon	Alvin Nance (Absent)	John Schoonmaker
Laura Cole	Tim Neal (Absent)	Lisa Starbuck
Dawn Foster	Ronnie Nease	Wayne Watson (Absent)
Kathryn Lewis (Absent)	Grant Rosenberg	Darrell Wright (Absent)
Marvin Hammond (Absent)		

Knox County Staff

Chris Granju, P.E., Stormwater Management Coordinator
Cindy Pionke, P.E., Director of Planning and Development
Leo LaCamera, P.E., Drainage Engineer
Lorna Norwood, Deputy Director of Communications and Government Relations
Tracy Jones, Soil Consultant
Roy Arthur, Watershed Coordinator
Martin Pleasant, Drainage Engineer

AMEC Team

Elizabeth Treadway, AMEC - Knoxville
Mary Halley, AMEC - Knoxville

Others Present

Dan Kelly, MPC

I. Welcome

Ms. Halley called the meeting to order at 3:10 p.m. and introduced Dan Kelly from the Metropolitan Planning Commission.

II. Approval of minutes

The approval of minutes for meeting 8 was not considered.

III. New Business

Development Process Review

Ms. Halley reviewed Knox County's development process by providing an overview of the process flowcharts that are provided in the County's draft Stormwater Management manual. The flowcharts present the overall steps involved in the rezoning process, and significant detail in the parts of the process that involve the Knox County Department of Engineering and Public Works. The first chart reviewed was the Subdivision Development Process. Rezoning requirements were discussed addressing the issue of when a rezoning should occur. A concern was raised that rezoning should occur only after a concept plan is submitted, at a minimum. This would allow for public input from a more educated perspective because the public will better understand the proposed plans for the property at an early point in the process. Mr. Dan Kelly of MPC stated that concept plans submitted to MPC are the same for the City of Knoxville and Knox County. MPC encourages all developers to come and discuss their concept plan as early in the process as possible.

The pre-design conference was then discussed, with a general thought that the conference should be mandatory, not voluntary as is currently stated in the draft Stormwater Management Manual. Ideally, this conference would occur after a rezoning request was submitted, if a rezoning is required. Ms. Halley explained that the voluntary pre-design conference was discussed in the draft Manual because the County believed it could be an opportunity to identify and encourage Low Impact Development (LID) opportunities on the site to be developed. Mr. Chris Granju explained that MPC and the County will meet with the developer at any time a meeting is requested; however, the critical need is to have all the other agencies, such as TDEC, that are involved in the site use approval be present as well. County staff noted that if those other agencies are not present at a pre-design conference, the site planning can be disrupted when the other agencies get involved later in the process. Mr. Granju stated that this issue was discussed at length by the Knox County Site Planning Roundtable. The Roundtable recognized the need to have a pre-design conference with all the agencies involved; however, it was also recognized that the County could not force other agencies to attend such conferences.

The Board recommended that Knox County's development process include **a mandatory pre-design meeting** for the concept plan to allow for a full discussion of development options on the site. The meeting should be "all inclusive" to ensure that the planning process fully addresses all site elements (e.g., TDEC, USACE, utilities, etc.).

The Board recommended that there be **a review, assessment and streamlining of Knox County's development process** to determine changes that would create efficiencies and provide opportunities to encourage the use of LID practices.

Ms. Halley continued the review of the flowcharts, going over the steps for the single Site Development Process, which is similar to the Subdivision Development Process. This process includes a mandatory pre-construction conference prior to issuance of a grading permit, design plan

approval steps, and the construction/inspection phase. At the end of the process, “as built” drawing and plat submittal and the final bond release are the last steps to the site development elements. The Grading Permit Process was then reviewed, with brief discussion of the small lot plan submittals versus the standard grading permit process, where a more formal erosion prevention and sediment control plan is required.

A Board member stated that the TetraTech report indicated that a standard procedure be prepared on how to address enforcement from an “escalation” perspective. Mr. Granju explained that standard operating procedures (SOPs) are being prepared for construction site inspection and enforcement. There was discussion by the Board on how documentation is prepared for inspections, fines, and the process of preparing and issuing Notice of Violations (NOVs). Ms. Halley stated that, via TDEC’s audit reports to NPDES Phase II permitted cities/counties, TDEC has begun stating that a detailed enforcement plan is needed. The Board then discussed whether the enforcement plan should be codified in ordinance form or to remain as policy. The legality of managing “repeat offenders” in a different way than compliant developers was identified as a concern by County staff. Further, data tracking of enforcement and repeat offenders was identified as a needed “process” improvement.

The Board recommended that the enforcement process be examined and improved. Improvements should include tracking of developer compliance in a manner that allows for review of performance, enhanced data management to facilitate compliance tracking, and enforcement escalation policy that would address multiple violations.

Stormwater Service Expectations:

Ms. Halley reviewed the discussion from Meeting 8 on the extent of service for the maintenance of stormwater facilities on private property. The four options presented in the preparatory reading material for meeting 9 of the board were reviewed: property owner maintenance (current policy); County maintenance after upgrade; shared County/property owner responsibilities, and County maintenance. Ms. Halley provided an indication of the cost magnitude of each option as compared to the current policy.

An additional option was presented by a Board member: funding of “shared” responsibilities for future development could be addressed by the requirement of an escrow account that is established at the beginning of a development, and a fixed dollar amount should be deposited by the developer to provide for future maintenance. The creation of a homeowners association should be required as well to maintain the facilities.

A recommendation was presented by a Board member that current extent of service policy be maintained, while emphasizing to the public the issues of flooding and erosion/sediment which are the items of most concern for the public. Education of the public is important as part of the process, both on the maintenance issue as well as the funding issue. The funding amounts that are shown in the planned program as currently proposed would then be used to perform stormwater capital improvements in the County right-of-way. It was further suggested that the current policy should be maintained for five years, at which time the policy would be reexamined by the Stormwater Advisory Board.

For development of the recommendation to the Mayor and ultimately to County Commission, the Board’s recommendation should also include a list of potential capital projects to support the first year efforts. It is recognized that the system inventory and master planning will generate the future growth plan for the cost of capital investment.

All of the potential service options were discussed and, in general, there was no broad agreement by the Board on any one approach. With the Board meeting coming to a close, Ms. Elizabeth Treadway suggested that, because broad agreement could not be reached on a stormwater service recommendation in the course of two meetings, that the Board instead craft a recommendation to the Mayor that the issue be examined and considered more extensively in the near future. Several Board members requested that the issue be discussed again in the next meeting.

IV. Public Participation

None.

V. Adjournment

The meeting adjourned at approximately 5:05 p.m. The Board will resume discussion of level of service and the various funding options available on July 9, 2007, at 3:00 p.m. in the main building at Ijams Nature Center, 2915 Island Home Avenue.



Stormwater Advisory Board Meeting 10 Minutes

July 9, 2007

Stormwater Advisory Board (Board):

Peg Buete	Victor Jernigan	Jamie Rowe
Harold Cannon	Alvin Nance (Absent)	John Schoonmaker
Laura Cole	Tim Neal	Lisa Starbuck
Dawn Foster	Ronnie Nease	Wayne Watson
Kathryn Lewis (Absent)	Grant Rosenberg	Darrell Wright (Absent)
Marvin Hammond		

Knox County Staff

Bruce Weuthrich, Director of Public Works
Chris Granju, P.E., Stormwater Management Coordinator
Cindy Pionke, P.E., Director of Planning and Development
Lorna Norwood, Deputy Director of Communications and Government Relations
Tracy Jones, Soil Consultant
Roy Arthur, Watershed Coordinator
Martin Pleasant, Drainage Engineer

AMEC Team

Elizabeth Treadway, AMEC - Knoxville
Mary Halley, AMEC - Knoxville

Others Present

Joe Sullivan, Metro Pulse

I. Welcome

Ms. Mary Halley called the meeting to order at 3:10 p.m.

II. Approval of minutes

Ms. Halley asked the Board if there were comments or corrections to the minutes of meeting #8 that were provided. No comments were received.

Ms. Halley asked the Board if there were comments or corrections to the minutes of meeting #9 that were provided. A Board member asked about the status of Knox County's development of standard operating procedures (SOPs) for the erosion prevention and sediment control program. Mr. Chris Granju said that several SOPs have been developed and are being used by County staff. However, he stated that it is expected that these SOPs will be fine-tuned as County staff utilize them and determine which procedures, if any, need modification.

A Board member commented about the discussion held during meeting #9 regarding concept plans being submitted after rezoning has occurred. In meeting #9, a lengthy discussion was held regarding the most appropriate time for concept plan submittal – before or after the Metropolitan Planning Commission (MPC) considers a rezoning request. The Board member stated that the concept plan cannot be completed until the zoning of a property has been determined. Another Board member countered that the MPC and public should be able to understand the concept plan for a property when rezoning is requested, and therefore the plan should be available at the time rezoning is considered by the MPC. This would in-turn be an opportunity to consider Low Impact Development (LID) approaches and better stormwater management alternatives.

Neither of the above comments required changes to the minutes of meeting #9.

III. New Business

Ms. Halley stated that it was hoped that the Board could complete their work in two meetings (including the current meeting). The objective of these meetings would be to develop and finalize stormwater program and funding recommendations that will be included in the final report. Toward this end, she defined the questions that remain to be answered by the Board:

1. Is the Board comfortable with the program of services and the associated program costs that have been presented to the Board in past meetings as the future stormwater program that will be recommended to the Mayor?
2. Is a user fee the preferred recommendation to fund the program?
3. What other recommendations would the Board like to put forward?

The floor was opened for discussion. A Board member suggested that the recommendations for improvements/modifications to the County stormwater management program that were included by consultant Tetra Tech (in their report on the comparison of the City and County ordinances) that are not reflected in the proposed stormwater management ordinance should be addressed by the Stormwater Advisory Board. Discussion ensued on whether the Board should make a broad statement that the Tetra Tech recommendations be implemented by the County, or whether the Board should speak specifically about each individual Tetra Tech recommendation. One Board member stated that an individual review of the recommendations may be too time-consuming for the Board in their current role. Ms. Elizabeth Treadway reminded the Board that they developed a recommendation in the last meeting regarding the assessment and streamlining of the County development process. She stated further that the Board could consider expanding this

recommendation to include a statement about supporting and examining the Tetra Tech recommendations. Mr. Bruce Wuethrich stated that the development review flowchart that is currently included in the proposed Knox County Stormwater Management Manual was misinterpreted, and has resulted in incorrect statements/conclusions in the Tetra Tech report. He corrected the misinterpretation by clarifying that in Knox County, a grading permit approval requires a detailed design plan. The Board was also reminded about the recommendation that was developed by the Board in meeting #9 which strongly encouraged mandatory pre-design meetings in order to provide opportunities for education on process requirements and possible LID approaches. It was left that the Board could offer a general recommendation that the TetraTech report be discussed with the City and the consultant team that prepared it to clarify erroneous statements and that the Board could recommend that the report be considered in development of procedures and activities of stormwater management within the County.

A Board member provided a personal summary of what has been learned in the past 9 meetings and what questions still remain:

1. Knox County is facing larger stormwater effort because of new regulations. There has been no disagreement from the Stormwater Advisory Board on the costs and on plans for staffing or enforcement that are in the proposed program.
2. The Board developed a mission statement which defined clearly what the program must be about.
3. How are we going to pay for this program?
4. What entity is going to be responsible for carrying out the program? There needs to be the establishment of stormwater utility.
5. What options are we going to consider for funding?

The Board member recommended that the Stormwater Advisory Board propose the establishment of a stormwater utility, and that the Board endorse program plan to do master planning in order to understand the capital improvement needs and cost.

The Board as a whole discussed the above summary. Discussion points included the following:

- The County may need an entire, separate department that can be dedicated to stormwater management.
- A utility can de-politicize stormwater funding to some degree.
- Deciding on a Board recommendation for the funding approach to pay for the program may simplify the process of making recommendations on program activities, staffing and costs.

It was suggested that there could be five different ways Knox County could fund the program, as a comprehensive approach. These were identified as follows:

- a stormwater utility fee;
- inspection and review fees;
- state and federal grants;
- fines and damages; and/or,

- cash bond from the developer of a property for stormwater ponds built within the property boundaries to help with perpetual maintenance.

There were many questions from the Board on where a stormwater utility would reside within the County. Ms. Treadway reminded the Board that often a stormwater utility is simply a methodology of funding a program of services as an internal enterprise, and is often referred to as a user fee rather than a utility. This is a utility as opposed to a Utility, which has a separate entity with a separate governing board, etc. She suggested that a County stormwater utility could possibly maintain the Stormwater Advisory Board as an advisory/program review board to guide and engage the public in the decision making process. Another option might be to have a separate body appointed by Commission to guide the utility. One Board member stated that the utility should be formed within County government, as opposed to outside of local government. A utility that is separate from County government may have no enforcement authority.

A Board member then proposed that they recommend the establishment of a stormwater utility that would fall under the auspices of Knox County government, within Engineering and Public Works for daily operations. The utility would operate within County government using an oversight governing body that can be inclusive of County Commission or appointed/approved by Commission.

It was asked if a user fee (i.e., stormwater utility) can be challenged/sued? Ms. Treadway stated the right of challenge always exists and has been exercised in stormwater utilities throughout the nation. However, the State of Tennessee's legislation on stormwater user fees is very clear. The stronger the state and local legislation is, the more likely the County will be able to stave off lawsuits that challenge the utility.

It was asked how the utility could be established. Ms. Treadway stated that there are two options: Option A) The County can establish the utility legislatively before the fee is started. This supplies the governing body with an administrative framework to begin forming and setting policy, and finalizing program structure and the financial analysis. With the analysis then complete, The County can issue a statement of charges and begin collecting fees at some future date in order to implement the program. Option B) The Commission could proceed with utility implementation activities (as defined in option 1 above) without legislative establishment of the utility. This may include the formation of a Board to move ahead with policy and program decisions. Then, the fee and utility would be legislatively established at the same time.

One Board member motioned for option A as a recommendation to the Commission, along with a recommendation to initiate a master planning program in order to understand the costs associated with the Capital Improvements Projects (CIP). Ms. Treadway asked the Board how aggressively the County should move to a proactive CIP program. The five year cost that is currently shown in the planned program is a placeholder for the aggressiveness of program that is desired by the Board, and the Board has not yet determined the appropriate CIP program cost. This topic was not discussed further.

Discussion on the utility funding approach continued. Discussion points and Board member suggestions included the following:

- The user fee should be billed through the Property Assessor's office.
- The Board should include in the recommendation on the utility a statement that the user fee should be fair and equitable, based on the demand for stormwater management services in Knox

County. There should be equity in how much a property owner pays, but also in the distribution of costs by how much a property contributes to the stormwater system.

- The user fee should consider the variability of housing stock (e.g., large houses versus small houses).
- The user fee should function as an incentive for the use of LID approaches.
- It should be recognized that the fee will increase as the program of services increases.

Ms. Treadway suggested that the Board recommend public education for a utility and the stormwater management program. This is necessary so everyone can understand the purpose of the fee and what issues the Board wrestled with in order to get to the recommendation of a fee.

The following recommendations were then developed by the Board through collaboration. Several iterations of wording were made by the Board before they collectively agreed on the language below.

The Stormwater Advisory Board recommends the establishment of a stormwater utility, under the auspices of Knox County Department of Engineering and Public Works to manage and implement the stormwater program.

Utility funding should be generated from all of the following sources:

- **Primary funding – a user fee;**
- **Secondary funding:**
 - **Inspection/review fees;**
 - **State and Federal grants;**
 - **Fines and damages;**
 - **Cash bonds for perpetual maintenance of stormwater facilities.**

The utility user fee should be equitable to ensure a proportionate distribution of all costs to each user or user class, with the user's contribution (or fee) based on factors such as the amount of impervious area, water quality impacts, flow volume and/or rate of runoff, and should include incentives for encouraging low impact development.

The utility fee should be collected through the Knox County Trustee's Office. Concurrently, the Board recommends the immediate authorization of funds to initiate the master planning process.

It was requested by the Board that County staff come to the next meeting with a description of costs for the CIP program, and their thoughts on plans for the master planning effort. It was recognized that the CIP and master planning costs are "moving targets" because knowledge of system needs is gained every day. However, it was stated that the costs in the current program may be severely deflated and not at all indicative of what CIPs costs may be encountered once the program has begun.

It was reiterated that public communication and educational methods are needed to support staff, the Mayor and County Commission in handling overall communication about the stormwater program and the funding strategy in anticipation of the negative reaction that may come regarding implementation of a utility. It was recognized that the audience for this communication varies. County Commissioners need to be armed with information in order to address issues, create understanding and communicate their vision on stormwater management to their constituents.

AMEC staff offered to craft the wording for the recommendations on the CIPs, master planning, and public education, for consideration by Board members in the next meeting in order to facilitate the process of development of final recommendations.

Ms. Treadway asked for Board members to email their recommendations/thoughts for the issues that must be discussed at the next meeting. This information will help formulate an agenda for the next meeting.

IV. Public Participation

None.

V. Adjournment

The meeting adjourned at approximately 5:10 p.m. The Board will resume discussion of program recommendations on August 6, 2007, at 3:00 p.m. in the main building at Ijams Nature Center, 2915 Island Home Avenue.



Stormwater Advisory Board Meeting 11 Minutes

August 6, 2007

Stormwater Advisory Board (Board):

Peg Buete	Victor Jernigan	Jamie Rowe
Harold Cannon	Alvin Nance	John Schoonmaker
Laura Cole	Tim Neal	Lisa Starbuck
Dawn Foster (Absent)	Ronnie Nease	Wayne Watson (Absent)
Kathryn Lewis (Absent)	Grant Rosenberg	Darrell Wright (Absent)
Marvin Hammond		

Knox County Staff

Bruce Weuthrich, Director of Public Works
Chris Granju, P.E., Stormwater Management Coordinator
Tracy Jones, Soil Consultant
Roy Arthur, Watershed Coordinator

AMEC Team

Elizabeth Treadway, AMEC - Knoxville
Mary Halley, AMEC – Knoxville
Curt Jawdy, AMEC - Knoxville

Others Present

Joe Sullivan, Metro Pulse

I. Welcome

Ms. Mary Halley called the meeting to order at 3:15 p.m.

II. Approval of minutes

Ms. Halley asked the Board whether anyone had comments or corrections to the minutes of meeting #10 that were provided by email. No comments were received.

III. New Business

Ms. Halley stated that it was hoped that the Board could complete their work by the end of the meeting. The remaining discussion points were described as follows:

1. Does the Board have any specific recommendations for stormwater program staffing and resources other than the staffing/resource levels show in the Planned Program (presented in the draft Board report) that will be recommended by the Board?
2. Does the Board support the magnitude and schedule of costs for watershed master planning, maintenance and capital improvements that are shown currently in the Planned Program?
3. Should the Board put forward any recommendations regarding the Arcadis/Tetra Tech report that compared the County's proposed stormwater management ordinance with the City's existing stormwater ordinance?
4. Does the Board have any changes to the public education recommendation that was crafted for their review/edit prior to the meeting?

Ms. Halley stated that the first two points above were raised by a Board member earlier in the day through an email to all the Board members, staff and consultants. Clarification on the email was requested as a starting point for discussion by the Board. Initial dialogue centered on whether the Engineering Department is sufficiently staffed for current responsibilities, and the number of staff that would be necessary to carry out the Planned Program. Mr. Bruce Wuethrich stated that the County has funding for two additional employees in FY 2007/2008, but that he has work for 17 additional employees under the current workload. His most pressing need is for construction site inspection staff. Ideally, indicated he would like inspection staff to be doubled initially through the addition of seven inspectors. It was added that the County would need to add office space for the additional inspectors should the Planned Program become reality, which would most likely be handled by renovations to the existing Baxter Avenue facility. Toward that end, the Planned Program cost analysis includes funding for office facilities and equipment.

A Board member then asked whether Knox County currently has the staff necessary to carry out stormwater master planning efforts as presented in the Planned Program. Mr. Wuethrich explained that any master planning work would be handled using experienced outside services (i.e., consultants) as appropriate for the work, and that his staff did not have the time or modeling tools that were necessary to perform detailed master planning.

Discussion shifted to the master planning cost estimates and schedule of activities that was presented in the draft Board report that was emailed to Board members for their review prior to the meeting. In response to questions from earlier Board meetings, Ms. Halley presented an overview of master planning level of effort/cost versus detail of product for three broad levels of stormwater master planning:

- Comprehensive Approach: \$46,000/mi² or \$18.7M to master plan the entire county;
- Moderate Approach: \$27,600/mi² or \$11.2M to master plan the entire county;

- Minimal Approach: \$11,500/mi² or \$4.7M to master plan the entire county.

Ms. Halley explained that the basis for the master planning levels versus costs presented was the original cost estimate for the First Creek Watershed Master Plan, which included extensively detailed hydrologic (rainfall/stormwater runoff response) and hydraulic (drainage and flood elevations) analysis, as well as predictive water quality modeling. She then explained the level of detail that would go into each of the three modelling options. The original First Creek cost estimate represented the “Comprehensive” level master plan. The moderate level included hydrologic, hydraulic and water quality modeling at a less detailed scale, but allowed for sufficient hydrologic information to predict watershed runoff response timing and allow “what-if” analysis for stormwater management mitigation practices. In contrast, the Minimal option is less detailed, relying upon well-informed estimating procedures to mimic the response of watersheds to rainfall events. The Minimal option does not include consideration of water quality. It was explained that each master planning level should be considered on a case-by-case basis for County watersheds. More rural and slowly developing watersheds may be candidates for minimal level planning, thereby addressing water quantity impacts, while rapidly developing watersheds could warrant more detailed approaches to include both water quantity and water quality modeling.

A Board member questioned whether the County Commission would be willing to fund the expense of master planning, given that the entire stormwater budget for FY 2007/2008 is approximately equal to the \$4.7M needed for the “minimal” option presented by Ms. Halley. Ms. Elizabeth Treadway clarified the master planning budget presented in the draft Board report by reviewing how proposed costs are spread-out over five years, as the County gains funding and capability to perform this work:

- 2008/2009 Master Planning costs: \$0.5M
- 2009/2010 Master Planning costs: \$1.6M
- 2010/2011 Master Planning costs: \$3.0M
- Thereafter: \$2.6M

A Board member then suggested that \$0.5M for master planning in FY 2008/2009 would be too little, too late. It was suggested that master planning efforts are a prerequisite for an effective capital improvements program in order for the capital improvement project (CIP) expenditures being proposed in the Board report to be deemed acceptable by County Commission and local residents. Ms. Treadway informed the board that the CIPs costs for the first plan year (FY 2008/2009) were estimated based on known CIPs, but that CIP and maintenance costs for out-years were, at this point, “place holder” costs that were based broadly on CIP costs for cities of similar size and attributes, and then scaled and scheduled in a manner that expressed the Board’s stated priority for “proactive” maintenance and capital improvement programs. Ms. Halley reiterated that Board had been prompted several times in past meetings to examine these costs, and to adjust the magnitudes of each year if they desired to do so. This very issue is discussion item 2, listed above in these minutes.

Board members again requested that County staff provide a list of CIPs in the Board report. Mr. Wuethrich urged the Board not to release a CIP list to the public because it is not comprehensive – the list that currently exists is a compilation of projects that have been identified via citizen complaints or master planning efforts over the years. He stated that there may be many stormwater infrastructure needs that do not show up on the existing list merely because no one has called to complain or the area has not been studied. Additionally, the CIP priorities can quickly change after a storm event, when previously unknown but more damaging impacts may occur, such as a bridge wash-out or flooded neighborhood. The County does not purposely publish a CIP priority list so that citizens are not upset when the project in their neighborhood is delayed when a more pressing problem comes to

light in another neighborhood. Several Board members voiced support of Mr. Wuethrich's statements regarding the publishing of detailed CIP priority information. Mr. Wuethrich reminded the board that money allocated for CIPs can carry over from one fiscal year to the next and are not unavailable if the projects intended for implementation are delayed.

The question of whether the currently proposed magnitude of the CIP program would be seen as acceptable without a more significant budget for master planning continued to be discussed. Several Board members said that the County Commission would not approve a large increase in funding without knowledge of specific stormwater problems, and that master planning was required to gain that specific knowledge. Concern was also expressed that the public would not accept a recommendation for a stormwater utility without knowledge of specific service changes and improvements to the system that would benefit them directly.

Ms. Treadway maintained that the current backlog of projects was enough to work on for the first year of program expansion, and that master planning efforts would identify capital improvement needs in future years. She reminded the Board that it would take a year from approval of a stormwater utility to actual implementation, where funding from the utility would be realized by the County. This time is necessary to set up a master customer database, research rate schemes, set utility rates and to identify and resolve the myriad of policy issues that are vital to the success and effectiveness of a stormwater program funded by a utility. She informed the Board that it would be very difficult to obtain funds for FY 2007/2008, with the 07/08 budget already adopted by County Commission. Mr. Wuethrich and several Board members expressed support for this statement. Various means for obtaining funding in FY 2007/2008 to support an immediate focus on master planning efforts were discussed by the Board. These included a budget revision, shifting funding allocations within the Department of Engineering and Public Works, dipping into the County's "emergency" funds, and a special bond issue.

Several Board members forwarded the view that residents would not be willing to fund a stormwater utility if they didn't understand the need and how they would benefit from the fee. The Knoxville Utility Board (KUB) outreach campaign was held up as a successful public education example that helped residents come to terms with the need for two 50% rate hikes. They were given concrete details on improvements to the system that would affect them (e.g. no more overflows). However, a Board member pointed-out that KUB entered the public education process with the advantage of having detailed master planning studies and knowledge of system needs in-hand. The Stormwater Advisory Board does not have this advantage with the stormwater system.

A Board member asked whether the utility would be locked into a long-term user fee rate by using the backlog list. Ms. Treadway answered that the rate can be adjusted using a fixed escalation or using capital improvement needs as a driver for rate increases as system needs and overall performance knowledge is gathered.

A Board member then motioned to close discussion on the master planning/CIP funding issue by adding the following statement to the final Board report, and potentially in a cover letter to the final report:

"Public education and master planning budgets are critical for FY 2008/2009 and we request the funds be distributed in FY 2007/2008 to begin that process if at all possible"

The motion was approved by the Board.

A Board member suggested that public education materials could be mailed with the property tax bills in the fall. The Board also approved the addition of the following statement the final Board report or cover letter:

“The Board requests that a newsletter on the stormwater program, utility, and user fee be mailed along with this year’s property tax notices for residents that will be affected by the possible utility”

Mr. Wuethrich added that the public education efforts should be handled by an outside consultant that is well-versed in stormwater utility creation and public outreach.

A Board member then reiterated that homeowners would be much more likely to support a stormwater utility if they can see a direct benefit to themselves. County maintenance of detention basins in residential subdivisions would be a direct benefit. This possibility was discussed by the Board. Mr. Wuethrich described the current procedure as follows:

1. a property owner calls with a detention basin problem and a County stormwater staff person investigates that problem;
2. should the issue with the basin fall within the County’s current policy for work on private property (i.e., if the issue clearly has an impact on public health, safety or welfare), the homeowner signs a waiver allowing work to be done on their property;
3. a county crew performs the necessary repairs (this does not routine maintenance, such as mowing, brush removal, etc.);
4. this work is done on a case-by-case basis and does not have specific funding; it happens rarely.

A Board member then suggested the creation of a fund to assist homeowners with remedial maintenance of detention basins on residential property. An objection was raised on the grounds that the homeowner agrees to the maintenance when he signs the deed (which contains a covenant of permanent maintenance of stormwater facilities). Another Board member then noted that the Board report includes a recommendation that provides for future stormwater structure maintenance through a “perpetual maintenance bond” that is established prior to plat approval by the County.

A Board member urged that the final report should contain a paragraph requesting that County Commission adopt the recommendations that are presented in the Arcadis/Tetra Tech consultant team regarding the County’s proposed stormwater management ordinance and manual. The Board member presented a list of Arcadis/Tetra-Tech recommendations to the Board. At the request of another Board member, Mr. Chris Granju gave an overview of how the County staff responded to each of the recommendations that were listed by the Board member. He noted that the County’s responses are posted on the County’s stormwater website. A Board member stated that the Board had not reviewed the consultant’s report in detail, that the recommendations provided by the alternate Board member seemed highly technically detailed and that he/she was not comfortable in supporting a Board statement on the report recommendations. This was supported by another Board member, who stated that the Board should not make a statement at all regarding the consultant’s report and instead defer handling of the consultant’s report to the County staff. Ms. Treadway suggested that a detailed analysis of the recommendations was outside the scope of the Board, but that a more general comment could be added to the report. Ultimately, no consensus could be reached and no action was taken on the subject.

Ms. Halley then thanked the board for their hard work and outlined the steps needed to finish the final report. AMEC will incorporate the work of meeting #11 and issue a draft final report to the Board for review and comment. If possible, comments will be received by email or other written means. AMEC will then incorporate the Board's comments. The final step will be to coordinate with County staff on submitting the report to the Mayor's office and determining whether the Mayor or County Commission requires anything further of the Board.

IV. Public Participation

None.

V. Adjournment

The meeting adjourned at approximately 5:45 p.m.

APPENDIX B

BOARD MEETING PREPARATORY MATERIALS

Preparatory reading material was not sent to the Stormwater Advisory Board for meetings 7, 8, 10 and 11. Therefore, no such material is included in this appendix.

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Advisory Board Meeting 1 Existing Storm Water Program

1.0 INTRODUCTION

This paper describes Knox County’s current stormwater management program. Information for this document was obtained through interviews with key staff and administrators that are involved with the day-to-day stormwater activities performed by the County. The information received during these interviews has been categorized into the nine functional cost centers of a comprehensive county stormwater management program. These cost centers are presented in Table 1, along with a listing of what activities can be included in each cost center.

Table 1: Comprehensive Stormwater Management Program Functional Elements (Cost Centers)	
<p>1. Administration General Administration Program Planning and Development</p> <p>2. Special Programs Public Awareness and Involvement GIS and Database Management Special Programs Planning and Dev</p> <p>3. Billing and Finance Billing Operations Customer Service Financial Management Capital Outlay</p> <p>4. Indirect Cost Allocation Overhead Costs Cost Control Support Services</p> <p>5. Storm water Quality Management Industrial Program NPDES Regulatory Compliance Public Education/Involvement Illicit Discharge Elimination Construction Runoff Post-construction Runoff Municipal Good Housekeeping TMDL Compliance Street Sweeping/Maintenance Stream Monitoring Spill Response and Clean-Up Water Quality Master Planning Water Quality Permitting Programs</p>	<p>6. Engineering & Planning Development Plan Review Design Criteria and Guidance Field Data Collection Quantity Master Planning Design, Field and Ops Engineering Hazard Mitigation Zoning and Sub. Regs. Support Multi-objective Planning Support</p> <p>7. Operations & Maintenance General Maintenance Management General Routine Maintenance General Remedial Maintenance Emergency Response Infrastructure Management Public Assistance</p> <p>8. Regulation and Enforcement Code Development Code Enforcement Grading/Construction Permitting Drainage Inspections/Enforcement Flood Insurance Program Multi-Obj Floodplain Management Erosion Control Enforcement</p> <p>9. Capital Improvements Major Capital Improvements Minor Capital Improvements Land, Easement, and Right-of-Way</p>

(Source: modified from *Municipal Storm Water Management*, Debo and Reese, 1995)

It is important to note that some of the program elements listed in Table 1 may not need to be performed in Knox County, even if they are performed elsewhere. The degree to which the activities in each cost center are, or are not, implemented in a jurisdiction is dependant upon that jurisdiction's size and capability, and its stormwater issues, needs and objectives. Few cities and counties need or have all of these functions.

2.0 STORMWATER IN KNOX COUNTY

2.1 General Stormwater Management Structure

In order to understand Knox County's local stormwater management program, it is necessary to first understand the general policies that form the basis for day-to-day County stormwater activities. These policies are typical for a city or county in the southeast United States.

The County stormwater system is comprised of a system of inlets, catchbasins, gutters, pipes, and ditches that convey stormwater runoff through the jurisdiction. As a matter of policy, Knox County is responsible for the management and physical maintenance of the components of the stormwater system that are located within the public rights-of-way. (It is important to understand that streams are not often located in the public right-of-way, except where the stream crosses under a roadway.) This defines the extent of the physical system for which the County has operation responsibility: however, in case of emergencies such as a threat to public health, personal safety, or roadways/habitable structures, the County may take immediate action, regardless of system location, to correct the threat. Such issues are considered on a case-by-case basis.

It then follows that private property owners are responsible for the control of stormwater runoff on their property. However, because stormwater runoff on private property is likely to ultimately discharge to the County stormwater system, the County regulates stormwater controls on private properties through a local stormwater ordinance. These regulations are largely targeted at the management of stormwater controls for newly developed land, or redeveloping land, both during and after construction.

In terms of staffing, Knox County's stormwater staff are, in general, highly utilized carrying out the day-to-day activities of the stormwater program. Staff provide management and support for non-routine activities, such as watershed groups and the management of water quality grants. To augment staffing resources, consultants and/or subcontractors are utilized for non-routine projects or activities or projects having a limited timeframe, or require specialized equipment or expertise.

2.2 Physical Stormwater Issues

Citizen complaints provide a good indicator of the physical stormwater issues that exist within a municipality. In general, the Knox County Department of Engineering and Public Works receives approximately 150 drainage-related citizen complaints per month. The number of complaints rises during rainy periods, and decreases during extended dry periods. Some of these complaints are strictly private property issues, and therefore are not formally addressed

by Knox County. Like most municipalities, stormwater-related complaints in Knox County fit into three main categories: flooding; erosion; and, water quality.

2.2.1 Flooding

When flooding occurs, water from a stream, ditch, pipe, lake or other storage or conveyance facility temporarily overflows and inundates adjacent lands. Flooding can be caused by uncontrollable events, such as a very large rainfall, or a series of small, but soil saturating, rainfalls. Flooding can be due to stormwater system issues, such as undersized conveyance systems, poor operability, system aging, clogged or blocked system components, or damaged systems. Or, flooding can be a result of a combination of two or more of these causes.

The location that flooding occurs can lead to clues as to the cause. Flooding is most often expected in the floodplain of a stream, where high stream overflows naturally accumulate. However, flooding can also occur on roadways, yards, and even buildings that are located away from a stream, but are poorly situated relative to an operational stormwater conveyance system, and/or located very close to a system that is not operating properly.

Knox County's stormwater management program has some tools in place that attempt to control flooding issues. First, Knox County's stormwater ordinance contains language that is intended to limit or prevent the poor placement of habitable structures or roadways relative to the floodplain or stormwater conveyance system. Second, Knox County's public works activities exist to maintain and repair the stormwater conveyance system within public rights-of-way.

Even with these tools in place, citizen complaints related to flooding occur. The causes of the flooding issues vary, and include all of those causes listed previously. Many of these complaints come from property owners whose home or business was constructed prior to the use of stormwater regulations that prevented poor placement of structures relative to the stormwater system. For example, the basement or first floor of a structure might have an elevation that is lower than the lowest point of the nearby public street, allowing runoff from the street to drain onto the property and possibly into the structure.

A continuing cause of flooding in Knox County subdivisions is the modification of single lot drainage patterns from the overall site drainage pattern that was approved for the development. There is currently no plans review or permitting process that allows Knox County to "catch" these modifications that occur on a single lot. The result is often nuisance flooding in adjacent properties (e.g., damp crawlspaces, soggy yards, standing water), rather than a more damaging structural flooding issue. These are often private property issues that are resolved by property owners without County intervention.

2.2.2 Erosion

Erosion is defined as the removal of soil particles by the action of wind, water, or ice. For purposes of this paper, two main types of erosion are discussed: 1) streambank erosion; and, 2) construction related erosion.

Streambank erosion occurs when stormwater runoff discharging through streams and ditches undercuts and/or dislodges sediment from the streambank. Streambank erosion is often the result of too much water moving too swiftly in the stream, and/or insufficient vegetation located along the streambank. Often, both of these issues are the cause. As development in an area increases, there is a related increase in the amount and quickness (i.e. rate) of stormwater runoff that discharges to a stream. As well, it is not atypical for a developed area that is located along a stream to remove or significantly decrease trees and other woody vegetation that can adequately anchor a streambank in place. Faster, deeper stream flows after rainfall events in a stream that no longer has the necessary vegetation to remain stable will cause streambank erosion.

Knox County's current stormwater ordinance contains provisions for controlling the rate of stormwater runoff, but not necessarily the volume. As well, the ordinance contains limited language pertaining to the removal of streamside vegetation. In the experience of County staff, most streambank erosion problems occur on private property where the owner does not have adequate streamside vegetation or armoring to anchor the banks during rainfall events. Knox County's proposed stormwater management ordinance (discussed later in this paper) contains provisions for streamside vegetation management in areas of new development.

Construction related erosion occurs when soils that are exposed as a result of construction activities become dislodged during a rainfall event, and are carried downstream in stormwater runoff. The control of construction related erosion and sediment is a challenge in Knox County, and it is one of the areas of the County's stormwater management program that has received the most attention in recent years, from County staff, the general public and State regulators. Mud that has discharged to a public street or onto an adjacent private property is the most common complaint that is received by the Department of Engineering and Public Works.

Knox County has stormwater regulations that require the prevention of erosion and control of sediments on construction sites. Compliance with these regulations is reviewed when new development plans are received by the County, and when inspections of construction sites are performed. As required by State regulations, County employees are receiving required training on erosion prevention and sediment control requirements and practices, and improvements to County inspection training, process and enforcement criteria have recently been made. However, inspection and enforcement resources are continuing to be challenged by the positive economic growth in this growing County. Seven construction inspectors are currently monitoring compliance with County regulations on more than 300 open construction sites located in Knox County.

2.2.3 Water Quality

In this paper, the term "water quality" refers to the overall ecological health of Knox County's natural waterways (streams, lakes, etc.). Water quality is relevant to the discussion of County stormwater management because stormwater runoff is known to be one of several contributors to the degradation of water quality. Increased temperatures and the relatively high pollutant levels that can be found in uncontrolled stormwater runoff can cause the decline of water quality.

The water quality of Knox County's streams has been assessed by the Tennessee Department of Environment and Conservation (TDEC). The results of this assessment have been published in the State of Tennessee's list of "impaired" waters, also called the 303(d) list. This list indicates that over 225 miles of Knox County streams are considered impaired by the State of Tennessee due to siltation (e.g., the presence of excessive amounts of sediment in the water). The cause of sediment in local streams has been identified in section 2.2.2 as erosion. Construction related erosion is likely the largest contributor.

Knox County must comply with two major State-level regulations that target water quality improvement through the control of stormwater runoff. Both are administered by TDEC, and are summarized below.

The overarching objective of the National Pollutant Discharge Elimination System (**NPDES Phase II regulation**) is to reduce the discharges of pollutants, via stormwater runoff, to local streams and other waterbodies. Phase II regulated jurisdictions are required to implement a series of programs and activities that focus on local stormwater quality regulation, enforcement, and pollution prevention. It is important to know that the programs and activities are widely varied and include regulation and enforcement activities, educational programs, new development planning and design, stormwater system maintenance activities, facilities maintenance activities, and even some of the special supporting programs identified previously. Because of this, compliance with the NPDES Phase II regulation is pervasive throughout the County's stormwater management program, and therefore impacts every functional cost center. In fact, many of the activities that are discussed in detail in later sections of this paper are implemented by Knox County as part of NPDES Phase II compliance.

Knox County must also handle compliance with **total maximum daily load (TMDL) requirements** that have been set by TDEC. The TMDL specifies the maximum amount of a specific pollutant of concern that a designated segment of a water body that is placed on the 303(d) list can receive and still meet water quality standards. The TMDL also allocates pollutant loadings among the sources of pollution, such as agricultural runoff, industrial runoff, and municipal stormwater runoff. Several TMDLs have been issued for water bodies in Knox County, including one for sediment, and more are anticipated.

The TMDL program has the potential for broad impact on Knox County's stormwater management program and property development regulations because it requires that pollution in stormwater runoff be addressed at the local level. The program requires the development of a plan that may impose requirements or restrictions for specific local regulations or programs. Adopted TMDL plans are available from TDEC or at TDEC's website (<http://www.state.tn.us/environment>).

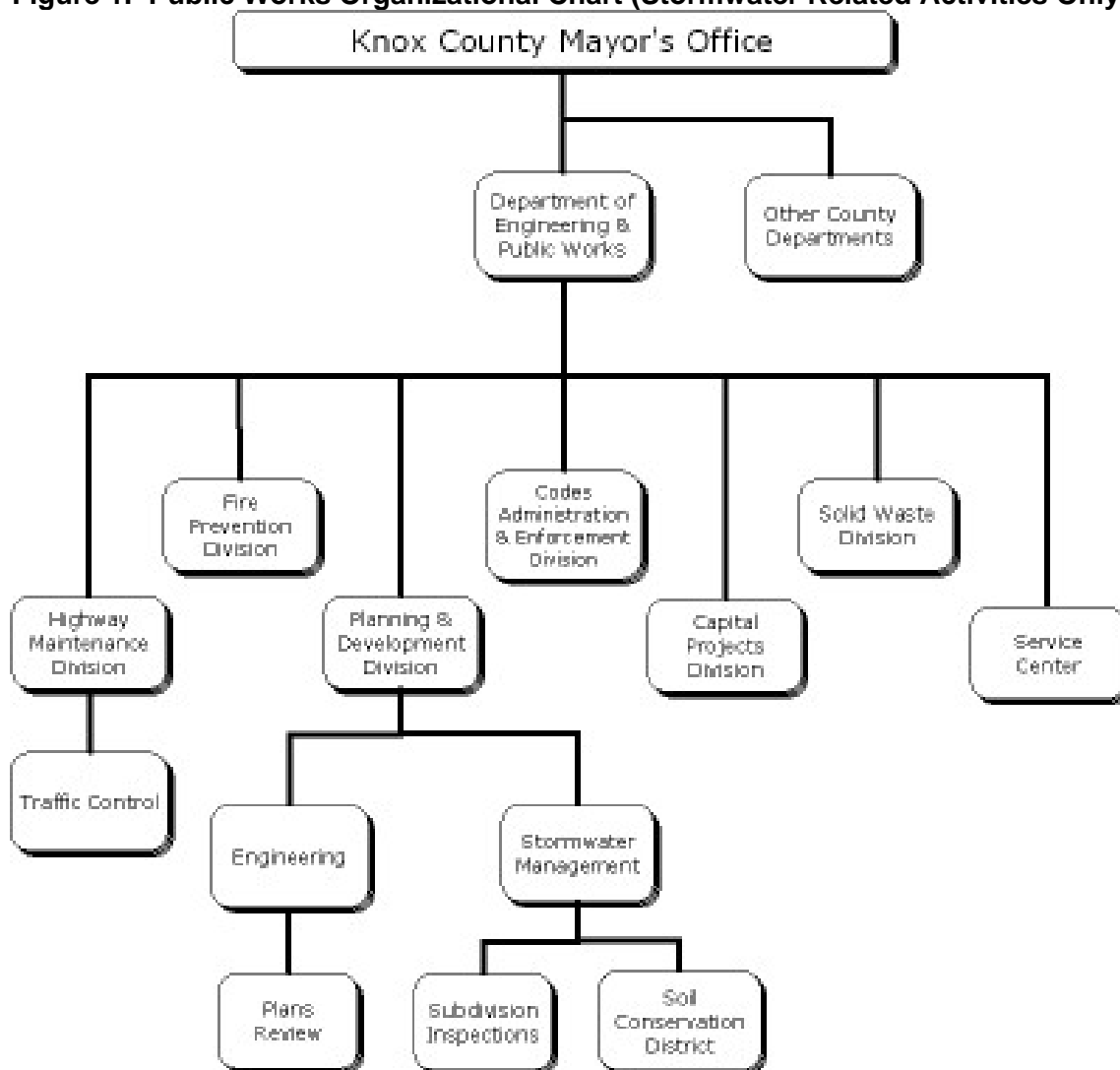
3.0 PROGRAM ORGANIZATION

Figure 1 presents an organizational chart for the departments and divisions that have stormwater-related responsibilities in Knox County. The vast majority of the Knox County's stormwater management program is managed and performed by the Department of Engineering and Public Works. Staff within this department that have stormwater management responsibilities include the Public Works Director, Division leaders, administration personnel,

construction and maintenance supervisors, maintenance personnel, engineers, technicians, construction and building inspectors.

To a lesser degree, other departments and agencies have very specific stormwater related responsibilities. These include: Parks and Recreation, the Knox County Library, Knox County Schools, the Health Department, and the Sheriff's Department. Largely, the responsibility of each of these entities lies in the areas of municipal good housekeeping and pollution prevention. Described simply, these entities are responsible for maintaining their grounds, facilities and vehicles in a manner that prevents pollutants from entering the County stormwater system. The Health Department also provides assistance to the Department of Engineering and Public Works in the enforcement of septic system requirements and handling potential or existing cross-connections of septic systems with the stormwater system.

Figure 1. Public Works Organizational Chart (Stormwater Related Activities Only)





4.0 DISCUSSION OF FUNCTIONAL AREAS

The following pages present a detailed discussion of the responsibilities and activities that comprise Knox County’s existing stormwater management program.

4.1 Administration

The administration of Knox County’s stormwater management program is performed largely in the Department of Engineering and Public Works. Administration activities typically include program budgeting and cost allocation, staff hiring and management, maintenance and capital improvement project prioritization and oversight, the preparation of bids and execution of contracts with consultants and contractors, and coordination/communication with the Mayor’s office and County Commission.

The Public Works Director is responsible for the overall administration of the program. This requires approximately 30 to 40 percent of the Director’s time. In addition to administrative duties, the Director is often involved in specific stormwater issues, such as enforcement actions or maintenance activities, as appropriate to bring resolution to the issue.

4.2 Special Supporting Activities

Knox County leads, participates, or provides support for a number of special activities that are strongly tied to stormwater management. Knox County’s efforts in the special programs cost center are led by staff in the Stormwater Management Division. Special supporting programs are listed in Table 2 below, along with a short descriptor of each program. A summary of the activities that provides more details on the nature of the County’s involvement can be provided upon request.

Table 2: Special Supporting Programs

Name	Descriptor
Beaver Creek Task Force Beaver Creek Watershed Association Stock Creek Watershed Association	Public involvement through watershed-based citizen action committees.
Environmental Stewardship Program (ESP)	Public assistance for environmental solutions to private property problems.
EPA “Eco-Trading” Grant EPA 604(b) Grant	Water quality modeling and planning.
Building out of the Box Educational Workshops	Public education on site planning alternatives.
Water Quality Forum Participation Adopt-a-Stream Adopt-a-Watershed (AmeriCorps)	Public education and involvement on water quality topics/activities.
Hazard Mitigation Program	Development and maintenance of a County Hazard Mitigation Plan.

East TN MS4 Working Group	Discussion group for local jurisdiction that comply with the NPDES Phase II rule
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4.3 Stormwater Quality Management

Knox County's stormwater quality management program is handled by the Stormwater Management Division. The major responsibility of the Division is to comply with Federal and State water quality regulations, namely the NPDES Phase II regulation and TMDLs. Given the length and detail of the County's NPDES Phase II application and TMDL requirements, the full list of programs and activities that the County is required to perform as part of the compliance program will not be presented in totality. However, activities that are currently performed for NPDES Phase II compliance are listed in Table 3 according to the appropriate regulatory minimum control measure.

Table 3: NPDES Phase II Compliance Activities

Minimum Control Measure	Activity
Public Education, Outreach and Involvement	✓ Water Quality Forum, Tennessee Growth Readiness, Adopt-a-Stream program, AmeriCorps Volunteer program, Environmental Stewardship Program (ESP), Watershed based initiatives
Illicit Discharge Detection & Elimination	✓ Enforcement of local Illicit Discharge and Illegal Dumping regulations
Construction Site Runoff Control	✓ Grading plan review and approval, Plan review and inspection staff training on Erosion Prevention and Sediment Control (EPSC), EPSC inspections of new development sites, Enforcement of current EPSC regulations, Preparation of updated EPSC regulations, Providing EPSC education to site contractors
Post-construction Runoff Control	✓ Preparation of water quality control regulations for new development, Preparation of design guidance for water quality control BMPs, Site Planning Roundtable facilitation
Municipal Good Housekeeping and Pollution Prevention	✓ Pollution prevention policies and training, Installation of a salt storage facility, Installation of a vehicle wash rack facility

Knox County's NPDES Phase II permit application and the TMDLs are available to the public upon request, or from TDEC. When reviewing these documents, it is important to keep in mind that, per the NPDES Phase II permit regulations, Knox County is not required to have all compliance activities implemented until 2008.

In the summer of 2006, TDEC performed an extensive audit of the County's compliance with the NPDES Phase II regulation. Every activity listed in the permit application was examined.

Activities that could be improved, where they existed, were noted. Knox County was found to be, and remains, in compliance with all permit conditions.

4.4 Engineering and Planning

In Knox County, the Engineering and Planning cost center includes the general activities of site development planning, regulatory floodplain management, and other planning activities, such as stormwater master planning or greenspace planning.

4.4.1 Site Development Planning

The Engineering and Planning Division is responsible for the review and approval of stormwater management plans and the issuance of grading permits for new developments. To summarize this duty briefly: a stormwater management plan must depict the proposed layout of the site after construction, the developers intention for site grading, the proposed stormwater conveyance system (i.e., curbs, gutters, catchbasins, pipes, ditches) and the stormwater water quality treatment and flood control (detention) facilities. In addition, a grading plan must be submitted which shows the best management practices that will be used to prevent erosion and control of the sediment-laden stormwater runoff during construction. The Engineering and Planning Division reviews these plans to determine compliance of the proposed stormwater and erosion control practices with the County's stormwater ordinance. Grading permits are issued by the Division upon approval of the grading plan.

It should be noted that plans review and permit approvals are activities that are required to maintain compliance with the NPDES Phase II regulation.

4.4.2 Regulatory Floodplain Management

Knox County is a participant in the National Flood Insurance Program (NFIP), which is administered by the Federal Emergency Management Agency (FEMA). The County's participation in the NFIP is required in order for citizens to obtain Federal flood insurance and to maintain the County's eligibility to receive Federal disaster funding and State hazard mitigation funding. At a minimum, participation in the NFIP requires that Knox County adopt and enforce minimum level floodplain management regulations. These regulations are intended to prevent or control development in or near flood-prone areas along local streams, and to maintain sufficient conveyance areas along streams during high flow periods (i.e., after storm events).

Knox County's floodplain management regulations are stated in the stormwater ordinance and the flood damage prevention ordinance. The Engineering and Planning Division is responsible for enforcement of these regulations as they pertain to new developments located near streams (e.g., floodplain fill requirements, floodway encroachments, etc.). The enforcement of these regulations not related to new development, or the resolution of existing flooding issues (such as a purchase of flooded property) is handled by the Stormwater Management Division.

Since 1997, Knox County has worked to improve outdated local floodplain elevation mapping for approximately 130 miles of streams located throughout the County. This was done in an effort to better manage the County's existing floodplain, reduce future flood elevations, and assess existing and future structural and roadway flooding problems associated with floodwaters from

overflowing streams. This information is utilized today by Knox County to regulate development in and near floodplains. The Metropolitan Planning Commission (MPC) utilizes this information for community sector plans and zoning purposes. Finally, local developers utilize the information at the site planning stage of development.

Knox County implements floodplain management standards to a higher level than that required by FEMA. In addition, Knox County has undertaken several additional floodplain management initiatives, such as the floodplain mapping development described above and public education tools for flood-proofing and flood damage prevention. In the early 2000's, FEMA recognized Knox County's efforts by awarding an on-going 5% reduction in flood insurance rates County-wide. Currently, Knox County is investigating its eligibility to gain another 5% reduction (for a total of 10%) in insurance rates as a result of the production of additional flood elevation mapping.

4.4.3 Other Planning Activities

A number of other planning efforts affect the current County Stormwater Management Program. These efforts, which are described below, are handled by the Stormwater Management Division.

In the early 2000's, Knox County began the development of **stormwater master plans** for the Beaver Creek watershed, located in north and northwest Knox County, and the Ten Mile Creek watershed, located in west Knox County. In addition to providing some of the floodplain elevation mapping described in the previous section, the master plans provided information on floodplain elevations projected in the future, a technical basis for setting more stringent floodplain regulations, and recommendations for flood mitigation projects in areas that experience existing flooding. Although the master plans have been completed, Knox County presently continues to utilize the information gained for several purposes, as listed below.

1. Regulatory purposes – New developments that are located in the floodplain of master planned streams may be regulated to the future floodplain elevation.
2. Planning purposes – Stormwater master plans provide insight into the “timing” of streams. Thus, the County has a tool that can provide insight into the best management option for a new development, such as waivers of flood control requirements, or the need for more stringent requirements.
3. Capital Improvement Planning – The Ten Mile Creek and Beaver Creek watersheds were chosen for master planning because of their existing flood problems. A number of these problems were examined in the master plan, and recommendations were provided for problem resolution. Several of these recommendations would be handled as capital improvements.

The Stormwater Management Division has been a key participant in the development of a **Green Infrastructure Plan** for the Beaver Creek watershed. This “pilot” plan highlights areas that are best suited for development in various densities, and areas best suited for conservation, based on environmental factors (water quality, trips generated, wildlife habitat, walkability, etc.). Development of the plan was spurred by the recommendation of the Site Planning Roundtable to institutionalize environmental planning in the County. If adopted, the plan would be used in conjunction with other planning mechanisms in the County.

In partnership with the City of Knoxville, Knox County is providing 50% of the funding for required to develop the **First Creek Watershed master plan**. One of the objectives of the project is the determination of flood mitigation alternatives, both structural and non-structural for this highly developed watershed.

4.5 Regulation and Enforcement

The Stormwater Management Division is responsible for the implementation and enforcement of stormwater related regulations and site design guidance. Currently, Knox County regulates stormwater utilizing the Stormwater Ordinance (Chapter 3.5) adopted in early 2005. The ordinance addresses the general areas of site development criteria, floodplain management (discussed previously), and illegal discharges and dumping. Enforcement actions are most commonly seen in the area of construction related erosion.

4.5.1 Future Stormwater Management Standards and Design Guidance

It has long been a goal of the Department of Engineering and Public Works to improve local stormwater standards and design guidance. This goal became a priority in the early 2000's, when the NPDES Phase II regulation was being developed and it was clear that regulated municipalities would be required to see that water quality control was considered in the design and construction of new developments. At that time, the County initiated steps to develop comprehensive design standards and guidance that would include the necessary requirements for NPDES Phase II compliance. Shortly after beginning this project, the Tennessee Valley Authority (TVA) approached Knox County with funding and resources to formulate a citizen stakeholder group, called a Site Planning Roundtable, that would provide recommendations on how local codes and ordinances could be improved for water quality control purposes. Given the interrelation between TVA's goals and Knox County's need for improved stormwater guidance, the Roundtable's scope of work was to examine the local site development process and the need for stormwater quality design standards. The Knox County Site Planning Roundtable was formed in 2001 and worked off and on through 2004. Twenty-two recommendations, including formulation of comprehensive design guidance for stormwater management facilities, were put forward by the group.

Upon formulation of the recommendations, Knox County began development of a comprehensive stormwater management ordinance and associated policy and design guidance, presented in the form of the Knox County Stormwater Management Manual. The ordinance and manual were completed in 2006 and are currently under review by the City of Knoxville to ensure that Knox County's new stormwater standards are as stringent as the City's standards.

The Stormwater Management Division is responsible for oversight of the ordinance and manual, both now and after adoption of these standards, which could occur as soon as January 2007. Currently, the division continues to provide support for the education of stakeholders, the County Mayor, County Commission, and others on the County's future standards.

4.6 Operations, Maintenance and Capital Projects

4.6.1 Background

Stormwater activities related to operations and maintenance of the County stormwater system include:

- **Routine maintenance** – Routine maintenance can be defined as cleaning, clearing and debris removal activities performed to keep the stormwater system in proper working order. All routine maintenance is performed by County public works crews.
- **Remedial maintenance** – Remedial maintenance activities are small to moderate construction activities that are needed to repair, replace, and/or rehabilitate failing components of the stormwater system. County public works crews perform all remedial maintenance.
- **Capital construction** – Capital construction projects (CIP) are large stormwater related projects that require engineering design, large-scale construction, and/or land acquisition. CIPs commonly have a cost of \$50,000 or more. Due to their large size and complexity, CIPs design and construction is usually handled by consultants and contractors working under the direction of a County Project Manager.
- **Complaint response** – Often, response to citizen complaints leads to performance of routine or remedial maintenance, or capital construction activities.

4.6.2 Operations and Maintenance

Table 4 presents the staff and estimated stormwater related workloads for operations and maintenance. Each crew has dedicated equipment as appropriate for their most common work duties, including vehicles, dump trucks, and backhoes. Some equipment, such as a high lift or paver/roller, is shared as needed.

Table 4. Operations and Maintenance Staff and Workloads

Position	Number of Staff	Time Spent on Storm Water, annually
Maintenance Directors	2	25%
District Maintenance crews (1 crew per 7 maintenance districts)	5 to 7	20-25%
Drainage Maintenance crew	5	100%
Dirty Lot crew	5	20-25%
Paving crew	5	When needed
Emergency response crew (rotating responsibility staffed from other crews)	5	When needed

Other departments that have facilities or grounds maintenance responsibilities will generally perform their own routine and remedial maintenance. These departments include Parks & Recreation, the Sheriff Department, the Knox County Library and Knox County Schools.

The majority of the stormwater related maintenance work is done in reaction to a citizen complaint or a drainage/street problem that is noticed by staff. There is no routine schedule for maintenance of general system components, with the exception of known problem areas. District supervisors will generally know these areas and will handle maintenance of them as necessary. The County uses a ranking method to prioritize maintenance activities, with issues that can impact public safety, nearby structures or roadway safety having first priority. Last year, Knox County Public Works performed a total of 2764 service requests, of which 537 were drainage, stormwater or erosion control related.

4.6.3 Capital Improvements

Capital improvements are often targeted at flooding problems that have caused, or have the potential to cause, structural damage or unsafe roadway conditions. CIPs that are currently underway include: the rebuilding of the stormwater system that serves Arrowhead Subdivision in south Knox County, where several homes were experiencing chronic flooding; and, the construction of floodwalls along Dutchtown Road in west Knox County to prevent roadway flooding caused by sinkholes in the area.

However, due to the relatively high cost and complexity of CIPs, they are often left waiting on appropriate funding levels. Although, no "master list" of CIPs exists, County staff have a general idea of problem flood areas. Flood mitigation alternatives in these areas include culvert and bridge replacements/upsizing and property buyouts. It is estimated that there are approximately 10 to 20 homes in Knox Co that have serious chronic flooding issues that are difficult to correct, due to floodplain issues, sinkhole backups, or poor home placement near detention ponds. A number of these have been considered in stormwater master planning efforts, and a conceptual solution has been formulated. Typically, these projects are waiting on sufficient funding, which can sometimes be obtained through hazard mitigation grants.

Within the Public Works department, stormwater CIPs compete for available funding with transportation improvements. Transportation improvements, which often include life/safety issues that can affect a large number of people, typically receive priority over stormwater issues. An intersection with a high accident rate that can be corrected by realignment is an example of such an issue. At this time, the stormwater CIP program cannot be expanded given the County's transportation improvement needs in growing areas.

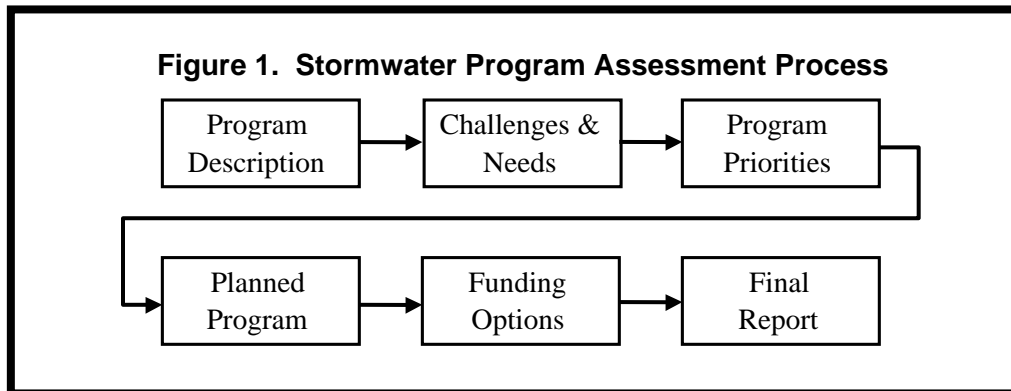
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Advisory Board Meeting 2 Stormwater Service Policies & Challenges, Issues and Needs

1.0 INTRODUCTION

The Stormwater Advisory Board has been following the stormwater assessment process that is shown in Figure 1. In meeting 1, we talked about the current stormwater program resources, organization and activities. We then began discussion of current challenges, issues, and needs. In the second meeting we will continue our discussion of stormwater challenges, and will clearly define the stormwater service policies that have been set in Knox County. This discussion will set the stage for the Board to define priorities for the future County stormwater management program.



2.0 SERVICE POLICIES

2.1 Background

Each local government must make decisions concerning the maintenance of the stormwater infrastructure so maintenance activities can be applied to all components of the stormwater system within their jurisdiction consistently. What defines the public stormwater system versus private stormwater systems? For which parts of the stormwater system should a local government be responsible? What services should a local government provide to various parts of a stormwater system? What responsibilities do private property owners have?

To answer these questions, a local government must define its “extent of service” and “levels of service”. When combined, these two concepts provide the framework for regulations and/or policies for the local stormwater system maintenance program. These concepts are defined below.

Extent of Service (EOS): The extent of service is a policy decision that defines the stormwater structures for which a local government provides services. Knox County performs construction, inspection and maintenance of the system components that are located in the public right-of-way. As a matter of general policy, Knox County does not perform stormwater maintenance on private property. However, the Stormwater Advisory Board learned in Meeting 1 that maintenance on private property may occur if a threat to life, safety or health exists, or if the maintenance issue can be corrected through programs that are outside of Knox County's maintenance, such as the Water Quality Forum's Environmental Stewardship Program.

Level of Service (LOS): The maintenance level of service is defined by the types of services a local government provides to different parts of the drainage system. For example, a local government may perform maintenance for residential drainage systems, but only provide inspection and enforcement of maintenance agreements for systems located on non-residential parcels.

Within right-of-way areas that are highly susceptible to flood damages, Knox County's level of service includes periodic inspections, cleaning or clearing as needed and emergency response. Conversely, the level of service for maintenance in right-of-ways that are not susceptible to flooding consists of inspections and maintenance on an infrequent, or complaint-driven, basis. Knox County provides stormwater maintenance in an approximately 411 square mile unincorporated area. In the County's National Pollutant Discharge Elimination System (NPDES) Phase II Application, submitted to the Tennessee Department of Environment and Conservation (TDEC) in March 2003, it was estimated that that the stormwater system consisted of the following:

- 1,530 miles of open ditches;
- 900 miles of stormwater conveyance pipes;
- 61,240 culverts; and,
- 71,590 catchbasins.

Further, Knox County provides regulatory controls for hundreds of linear miles of stream floodplain.

Knox County performs construction inspections on private property (i.e., development or redevelopment sites) to oversee compliance with local drainage and water quality control regulations for properties that will discharge stormwater runoff to the publicly-held drainage system. Erosion prevention and sediment control practices are inspected during construction to determine compliance with the grading plan approved by Knox County for the development site, and the proper operation and maintenance of such controls during the course of site construction. As well, the construction of stormwater management controls (e.g., catch basins, pipes, ditches, detention ponds, water quality controls) is inspected to determine compliance with the stormwater management plan that was approved by Knox County for the development site.

2.2 County Stormwater Responsibilities

With respect to maintenance of the stormwater management system after its construction, the Knox County Department of Engineering and Public Works has the following responsibilities:

- ✓ Maintenance of the stormwater system located in public right-of-ways and on other public lands;
- ✓ Administration and enforcement of stormwater management regulations and associated inspections;
- ✓ Administration and enforcement of floodplain management regulations and associated inspections, in accordance with the requirements of the National Flood Insurance Program (NFIP) and in order to secure the County's participation in the Community Rating System (CRS) program.
- ✓ Administration and enforcement of maintenance covenants for stormwater facilities and best management practices (BMPs) located on private property.

2.3 Private Property Owner Responsibilities

Knox County requires that the owner(s) of stormwater management facilities and/or BMPs ensure the proper operation of the stormwater system located on private property, at the sole costs and expense of the owner(s). This policy is not uncommon in the State of Tennessee, but is often poorly defined in local regulations. In 2002, this fact was recognized by the Knox County Site Planning Roundtable, which was convened to provide recommendations on compliance with the post-construction runoff control measure of the NPDES Phase II permit and improvements in the County's site development process. Several recommendations pertained to property owner maintenance requirements, including clearly tying the responsibility for maintenance of private stormwater facilities to property owners and establishing and enforcing penalties for not maintaining private stormwater control facilities. These recommendations included the recognition that Knox County would need to implement a more rigorous site development plans submittal and inspection process, as well as provide educational materials for site developers and stormwater facility owners, to ensure that private property maintenance would be successful.

In the development of proposed stormwater management ordinance and Stormwater Management Manual, Knox County has taken steps to improve communication and enforcement of this requirement. The requirement for submittal of as-built plans by a site developer, also called development certifications, was instituted in April 2005 with the adoption of the current ordinance. These plans must depict an accurate representation of all stormwater facilities that have been constructed on a new development site. Further, after adoption of the proposed regulation, new developments and redevelopments must have an Operations and Maintenance (O&M) Plan for every stormwater facility that is located on the site, which is recorded with the property's deed. The O&M Plan serves two purposes. First, it is considered a legal statement of responsibility with regards to the stormwater BMPs located on the property and binds the property owner (and subsequent property owners) to the long-term proper operation and maintenance of such BMPs. Second, the plan is intended to provide the property owner with information to accurately locate BMPs on the property, and guidance to adequately



inspect and maintain the BMPs. O&M Plan requirements are presented in detail in the draft Knox County Stormwater Management Manual.

Finally, it should be noted that, although Knox County requires that property owners take responsibility for stormwater facilities located on private property, the County has, and will continue to, intervene and perform maintenance in a situation where structural failure of a stormwater facility could result in downstream impacts.

3.0 CHALLENGES, ISSUES AND NEEDS

This section presents the challenges, needs, and issues facing Knox County's stormwater management program. The information presented in this section was determined through interviews of Knox County staff by AMEC Earth & Environmental, Inc., and from information received from the Stormwater Advisory Board (the Board) at the end of Meeting 1. The Board will have the opportunity to provide additional input on this topic during Meeting 2. As the Board further refines, discusses and prioritizes these issues, they will eventually serve as the framework for identifying and developing stormwater program goals and objectives.

The challenges, issues and needs that have been identified by Knox County staff are presented in Table 1. The issues are framed in terms of the functional cost centers that were identified in Meeting 1. This was done to allow Board members to absorb information quickly and to easily locate areas of greatest interest.

The initial challenges, issues and needs that were identified by the Stormwater Advisory Board in Meeting 1 are listed in Table 2, again in terms of the functional cost centers. Additional listings may be added by the Board during Meeting 2, during which the topic of stormwater challenges will be more fully discussed and further refined. Both tables can be expanded by the Board as needed so that all issues and needs are captured.

It should be noted that not all challenges, needs, and issues presented will carry equal weight. An important role of the Stormwater Advisory Board will be to examine all the issues raised, ask questions, and determine which areas deserve further evaluation. The results of these discussions will serve as the framework for developing program goals and objectives.

Table 1: Stormwater Challenges, Issues and Needs Identified by County Staff

Program Cost Center	Challenge/Issue/Need
Not cost center specific	Adoption of the new ordinance and design manual is crucial, as it impacts Knox County's regulatory compliance, alternative "green" development incentives, special programs, and enforcement strategies.
Administration, Billing, Finance and Indirect Costs	Adequate funding and other resources for stormwater services are difficult to obtain. Stormwater competes for funds within a budget where other services (e.g., law enforcement and public safety, education, and health) are often the higher priority.

Table 1: Stormwater Challenges, Issues and Needs Identified by County Staff

Program Cost Center	Challenge/Issue/Need
	<p>Existing data management systems and processes are highly individualized to both the responsible person and the activity. Systems and processes should be examined to determine what, if any, changes should be made to increase program efficiency and effectiveness.</p> <p>Stormwater regulations and services continue to increase due to positive economic growth in Knox County. However, resource allocations, including funding, do not keep-up with the demand for services.</p>
Special Programs	<p>The Beaver Creek Task Force is developing some pilot public education programs for site developers and contractors on the subject of improved erosion prevention and sediment control. There is currently no funding or resources from the County to get these programs implemented.</p>
Stormwater Quality Management	<p>Outfall maps of the entire County that are prepared in accordance with TDEC requirements are needed by 2008 in order to maintain compliance with NPDES Phase II regulations.</p> <p>Training on the purpose, design, construction and maintenance of water quality best management practices that are part of the proposed stormwater management ordinance/manual is needed for all County stormwater staff.</p> <p>Compliance with sediment TMDLs includes water quality monitoring (i.e., the collection of physical/chemical data). This is an entirely new activity for Knox County and resources need to be identified to handle the responsibility and cost. The County must address milestones for compliance in 2007.</p>
Regulation & Enforcement	<p>Development in Knox County continues to increase, which challenges the resources currently available to inspect construction sites and enforce stormwater regulations.</p> <p>Improved policies and processes are needed to ensure proper design of stormwater drainage on individual lots that are part of a larger subdivision. Education on the benefits of maintaining drainage features on individual lots as designed and constructed is needed for homeowners.</p> <p>As the County's stormwater management program grows with NPDES Phase II requirements and the proposed stormwater management ordinance, County staff will need dedicate resources for occasional "quality control" reviews and re-evaluations of plans review, inspection and enforcement processes in order to determine the effectiveness and/or efficiency of new program elements.</p> <p>The ability to receive <u>digital</u> as-built plans for new developments would be of help in the update of stormwater outfall mapping, and future enforcement of stormwater regulations.</p>
Operations & Maintenance	<p>County staff spend significant time responding to stormwater complaints that prove to be private property issues that are not caused by "public" stormwater.</p> <p>The County does not currently have an inventory of its stormwater system. Therefore, long-range planning for O&M and capital improvement projects cannot be performed as effectively as is desirable to ensure that investment is made at the point of greatest need.</p>



Table 1: Stormwater Challenges, Issues and Needs Identified by County Staff

Program Cost Center	Challenge/Issue/Need
	There is minimal public understanding of the County's stormwater management responsibilities.
Capital Improvements	There are competing needs for capital improvement funds. Stormwater projects are often delayed or not performed entirely due to transportation projects that are needed to correct a public safety issue of higher priority.
	Long-range planning of capital improvement projects is not performed. Therefore, known capital improvement projects are not prioritized, and it is believed that a great number of potential projects (i.e., streambank restoration, culvert replacements) have yet to be identified.
	There is no available budget to plan for and resolve backlogged capital improvement projects. In many instances, Knox County must wait for the opportunity to receive disaster relief funds to fix problem areas.

Table 2: Stormwater Challenges, Issues and Needs Preliminarily Identified by the Stormwater Advisory Board

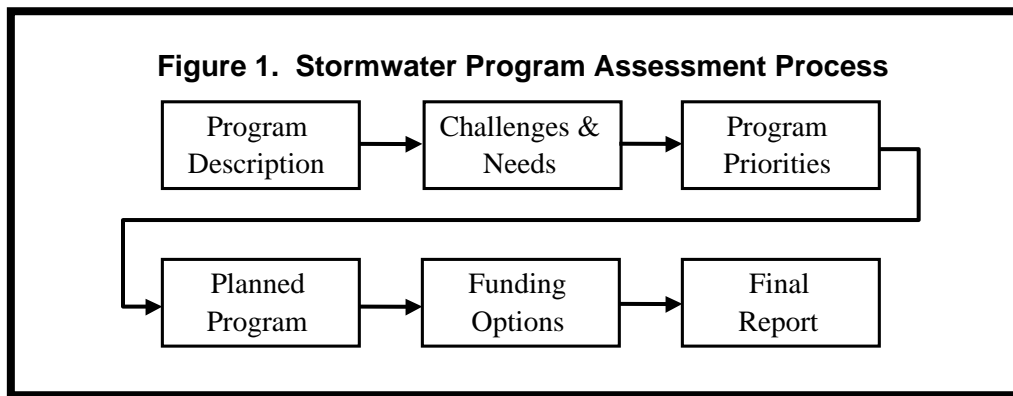
Program Cost Center	Challenge/Issue/Need
Administration, Billing, Finance and Indirect Costs	Meeting the public expectations of stormwater system
	Stormwater program financing where everyone pays - equity
	Clarify organizational alignment and provide staff resources
	Understand current stormwater expenditures
	Prioritization of investments in stormwater system and the process – who will make the decisions?
	Use of practical solutions – conservative approach
Special Programs	Importance of public education
Stormwater Quality Management	Impacts farming has on water quality
	NPDES permit performance to date
	Next cycle of NPDES permit requirements
Engineering & Planning	Negative impacts of quantity and flow rate of runoff
	Improve development planning to minimize impacts based on the prioritization of investments in the stormwater system
Regulation & Enforcement	Drainage variances
	Consistent floodplain management. Investigate enforcement process / resources
	Protection of integrity of streams including avoidance of stream modifications



Advisory Board Meeting 3 Setting Stormwater Program Priorities

1.0 INTRODUCTION

The Knox County Stormwater Advisory Board has been following the stormwater assessment process that is shown in Figure 1. In meeting 1, we talked about the current Knox County stormwater program resources, organization and activities. In meeting 2, the challenges, issues and needs of the program were discussed. In the third meeting, the Board will attempt to set broad priorities for the future stormwater program, based upon potential resolutions to the problems identified in meeting 2. To set the stage for discussion in meeting 3, this paper identifies potential resolutions to those problems.



2.0 PRIORITY DEVELOPMENT

A critical element of designing a program that meets the needs and expectations of the County's citizens and businesses is to first develop objectives and priorities based on the previously identified challenges, issues and needs. Table 1 lists the issues identified in meeting 2, categorized by functional cost center. Since meeting 2, issues identified by staff and the Board have been combined and some have been abbreviated and further condensed where overlaps occurred or where the same issue was identified by both staff and the Board.

Table 1 also presents the probable priorities and actions for each issue. The purpose for presenting this information in this format is to prompt prioritization, and ultimately recommendations, by the Stormwater Advisory Board. The actions identified herein should not be viewed as the only actions that can be utilized to address Knox County's stormwater issues. However, they are presented as potential "first" efforts for the County program that should be considered by the Board, or to spur thought by Board members regarding alternatives to those presented in this paper. It is important to understand that the Board will be setting broad priorities that provide the stable framework of the County stormwater program. Therefore, the potential actions presented in Table 1 are directional in nature, and are designed to make it possible to build specific actions around them. Once priorities are identified, a five-year program plan will be developed and will be built from the input of the Board and staff.

In meeting 2, the Committee was presented with potential goals for the County stormwater program. These are:

Public safety

Public health

Protection of roadway network

Environmental protection and enhancement

Regulatory compliance

Regional cooperation

In meeting 3, the Board will review these preliminary goals as an additional basis for establishing priorities. The Board will discuss the policy implication of the current level and extent of service strategies that guide the program today. This discussion will assist the Board and staff in understanding the expectations of the public with regard to the stormwater services provided by the County and will provide a framework for establishing priorities.



Table 1: Goals, Challenges, Priorities and Potential Actions

Goal for Program	Challenge, Issue, Need	#	Priorities / Potential Actions
Administration			
Addresses all long-term goals of the program.	Adoption of the proposed ordinance is crucial to regulatory compliance, special programs and enforcement.	1a	<p><u>Priority:</u> Need for comprehensive vision above County staff levels. Need for proactive educational approaches. Need for greater political and public support.</p> <p><u>Action:</u> County adopts new ordinance and design manual in early 2007.</p>
Addresses all long-term goals for the program.	The organizational responsibilities and priorities of the stormwater program should be clarified to meet the needs of the public.	1b	<p><u>Priority:</u> Need for a comprehensive vision with political and public support.</p> <p><u>Action:</u> Board will define community-based priorities which will be incorporated with the staff-driven priorities and presented as recommendations for action to the Mayor.</p> <p>Key policies will be reviewed by the Board and staff such as the Extent and Level of Service recommendations, program strategies for the five year plan and funding recommendations.</p>
Addresses all long-term goals for the program.	<p>Adequate funding and other resources for stormwater services and maintenance are difficult to obtain.</p> <p>Current resource allocations (funding, manpower, etc.) do not meet increasing stormwater service and regulatory (NPDES and TMDL) demands.</p> <p>Financing the stormwater program should be equitable for all parties.</p>	1c	<p><u>Priority:</u> Need to address increasing demands for system maintenance as well as increasing regulatory mandates in a manner that is financed equitably, providing for long-term planning of system improvements and ensuring effective regulatory compliance.</p> <p><u>Action:</u> Funding analysis should be completed and will be in this study process. The Board should specifically relate the criteria for any recommended funding methodology presented in this study.</p>
Special Programs			
Regulatory compliance, regional cooperation, environmental protection and enhancement	The general public does not understand stormwater, and the County's regulations and level/extent of service.	2a	<p><u>Priority:</u> Knox County should provide the public as well as specific targeted audiences (e.g., general public, development community, engineering community) with information on water quantity and water quality to increase understanding of services and of individual actions that can contribute to effective stormwater management.</p> <p><u>Action:</u> Knox County already has active public education and involvement initiatives in the Beaver Creek and Stock Creek watersheds, and with several local schools. A specific communications plan should be developed with assistance of internal and external</p>



Table 1: Goals, Challenges, Priorities and Potential Actions

Goal for Program	Challenge, Issue, Need	#	Priorities / Potential Actions
			stakeholders with the goal of implementation in the next fiscal year.
Stormwater Quality Management			
Regulatory compliance	Outfall maps must be completed by June 2008 to maintain compliance with NPDES permit.	3a	<p><u>Priority:</u> The County will ensure effective compliance with regulatory mandates.</p> <p><u>Action:</u> County staff will initiate necessary external assistance to complete the outfall mapping by June 2008. Budget is already allocated for this effort in fiscal year 2006/2007. Continued funding/resources will need to be in-place in the future to ensure that the data is maintained over the compliance period of the County's permit.</p>
Regulatory compliance, environmental protection and enhancement	Adequate funding and resources will be needed to support continued compliance with NPDES and TMDL requirements.	3b	<p><u>Priority:</u> The County will comply with all regulatory mandates established through the NPDES and TMDL programs.</p> <p><u>Actions:</u> County staff will finalize TMDL plans in early 2007, which will include enforcement of NPDES Phase II requirements for construction sites (see item 5b below) and water quality monitoring. The County will ensure that adequate funding is allocated to support NPDES compliance and TMDL plans. Among other needs, it is anticipated that additional manpower/funding will be needed to meet future state expectations for construction inspections, enhancement of construction site runoff enforcement program to meet local qualifying program status (once defined by TDEC), and TMDL and any future NPDES-related monitoring that may be required by TDEC.</p>
Engineering and Planning			
Addresses all long-term goals for the program.	Existing data management systems need review and possible improvement and consolidation.	4a	<p><u>Priority:</u> County will maintain effective data management tools that support the long-term goals of the stormwater program including system data, mapping of outfalls, tracking of regulatory compliance actions, and maintenance activities on the drainage system.</p> <p><u>Actions:</u> A detailed examination of existing data, needs and uses, existing data management systems and processes, and County computer capabilities/needs is a necessary first step. Upon gaining this information, recommendations will be made regarding data management improvements and data/process consolidation.</p>
Addresses public safety, protection of the roadway network, environmental protection and enhancement and regulatory compliance.	<p>As-built information needs to be correctly referenced to topographic data.</p> <p>System data should be effectively maintained to support maintenance and capital program.</p> <p>County stormwater information</p>	4b	<p><u>Priority:</u> The County should ensure effective installation of stormwater infrastructure.</p> <p><u>Action:</u> County should determine most effective manner for submittal of as-built drawings and for the long-term management of design drawings, maintenance requests and work orders to provide a long-term data management strategy. Data submittal and management issues will be handled through actions implemented via 4a.</p>



Table 1: Goals, Challenges, Priorities and Potential Actions

Goal for Program	Challenge, Issue, Need	#	Priorities / Potential Actions
	should be maximized through submittals from the public.		
Regulation and Enforcement			
Addresses public safety, environmental protection.	Individual lot construction and landscaping practices are a common cause of drainage problems because they do not follow the drainage plan for the larger subdivision.	5a	<p><u>Priority:</u> The County should ensure highest protection to private property through effective regulation, public education and construction oversight of the stormwater system for both water quality and water quantity controls.</p> <p><u>Actions:</u> (1) Inspection during construction will be enhanced through additional resources that place increased emphasis on individual lot issues. (2) An effective method for ensuring post-construction maintenance, including County inspections, should be added to County responsibilities. (3) Property owners need additional education on drainage issues and regulations – this should be a focus of the communications plan discussed in 2a.</p>
Addresses all long-term goals for the program.	The County's construction site regulatory program and associated initiatives must have adequate resources and staff and be consistently applied and enforced.	5b	<p><u>Priority:</u> The County will provide construction site regulation and oversight, including plans review, inspection and enforcement strategies.</p> <p><u>Action:</u> (1) A consistent set of processes and procedures will be implemented by all County inspectors and plans reviewers. (2) Additional staff are needed to keep up with increasing development pressures. (3) The County's public education program, identified in the communications plan discussed in 2a above, will target construction site issues and be targeted to developers and citizens who can often self-police potential issues, either alerting County inspectors to potential problems, or mitigating problems prior to off-site sediment discharges. (4) The Beaver Creek Task Force has begun preliminary planning for an educational program for site contractors and developers. Funding should be provided for this and potential other developer/contractor related education initiatives.</p>
Addresses all long-term goals for the program.	<p>The County should work proactively to mitigate the negative impacts of runoff volume and flow rate.</p> <p>County stormwater staff need training on the water quality best management practices (BMPs) and low impact development (LID) approaches listed in proposed stormwater manual.</p>	5c	<p><u>Priority:</u> The County should be proactive in addressing stormwater issues, including use of low impact development techniques, water quality best management practices and mitigation methods for runoff volume and flow rates.</p> <p><u>Action:</u> (1) Adopt new ordinance and design manual. (2) Continue to educate County staff on design strategies and enforcement standards. (3) Educate the development and engineering community annually on stormwater requirements. (4) Though volume controls are not a standard requirement, it should be encouraged. (5) Provide adequate staff to enforce standards and regulations. Work from a "preventative position" – focusing on potential problems to mitigate. (6) The County will take the lead in outreach education on LID and BMP practices, partnering with the City and other appropriate agencies and organizations.</p>



Table 1: Goals, Challenges, Priorities and Potential Actions

Goal for Program	Challenge, Issue, Need	#	Priorities / Potential Actions
Goals			
Operations and Maintenance			
Addresses all long-term goals of the program.	An inventory of the stormwater system is needed for O&M and capital planning.	6a	<p><u>Priority:</u> The County will maintain drainage system data in support of the regulatory compliance, system maintenance and capital improvement programs. Such data will be geo-referenced, continuously updated, and made available to the public.</p> <p><u>Action:</u> An inventory and mapping of the drainage infrastructure system will be undertaken as the first step. Preliminary planning will be needed to identify the data users and uses, thus ensuring the most effective collection and management of the data with other public submittals. As well, such planning can determine the technical (i.e., computer) tools, training, and potential staff that may be needed for the most appropriate use of the data.</p> <p>Through KGIS, Knox County has access to sufficient technical expertise to support a detailed geo-spatial database of the stormwater system.</p>
Addresses public safety, protection of roadway network, environmental protection and regulatory compliance.	<p>As-built certifications and processes must allow the County to effectively enforce post-construction maintenance requirements.</p> <p>Residential property owners need help maintaining stormwater facilities.</p> <p>Property owners need to be educated about easements and stormwater facility maintenance, especially as property changes ownership.</p>	6b	<p><u>Priority:</u> The County must ensure the integrity of the drainage system using post-construction regulation and enforcement strategies as well as public education.</p> <p><u>Action:</u> (1) As-builts must clearly indicate the location, identification and as-constructed details of stormwater facilities and the County should ensure their accuracy. Enforcement actions where non-compliance is noted should be clearly defined and actively undertaken. (2) The County will need to clearly define maintenance enforcement processes and procedures and identify manpower needs to effectively enforce post-construction maintenance. (3) The County should recoup maintenance costs from non-compliant property owners when County action is required to address failed post-construction efforts. (4) An effective public education campaign that targets property owner maintenance must be established.</p>
Addresses public safety, protection of roadway network, environmental and regulatory compliance.	<p>Existing or near-future stormwater maintenance issues should be identified and prioritized for repair or mitigation.</p> <p>Who will maintain/repair existing stormwater facilities that are already problematic and/or do not have as-built data?</p>	6c	<p><u>Priority:</u> The County will move to a proactive maintenance program County-wide.</p> <p><u>Action:</u> The County should develop a long-term system maintenance program based on an assessment of actual need. The program should clearly define maintenance policies, priorities and actions for privately owner facilities that were constructed prior to adoption of the current stormwater ordinance. Policies and procedures to obtain easements for problematic facilities on private property must be defined.</p>
Capital Improvements			



Table 1: Goals, Challenges, Priorities and Potential Actions

Goal for Program	Challenge, Issue, Need	#	Priorities / Potential Actions
Addresses public safety, public health, protection of roadway network, regional cooperation, and environmental protection.	The current approach for long-range capital improvement planning should be enhanced, with clear identification of prioritization criteria for capital improvement projects.	7a	<p><u>Priority:</u> The County will move to a proactive capital improvement program to address system needs.</p> <p><u>Action:</u> (1) The County will complete master plans on all watersheds, partnering with appropriate agencies, by 2012. (2) The Capital Improvement Program for stormwater projects will be driven by the establishment of a rating system to ensure effective system performance. CIPs identified through master plans are prioritized into the CIP program along with construction projects identified through complaints and system failures. (3) An effective capital improvement program has the ability to identify and acquire land, easements, and rights-of-entry. Properties and easements necessary for the stormwater program should be acquired as soon as funds become available, especially in areas likely to be subject to development or redevelopment in the near future.</p>

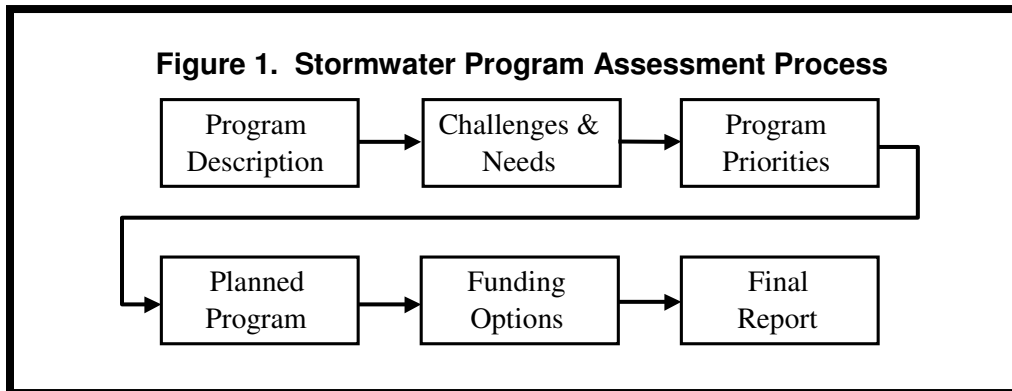
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Advisory Board Meeting 4 Setting Stormwater Program Priorities

1.0 INTRODUCTION

The Knox County Stormwater Advisory Board has been following the stormwater assessment process that is shown in Figure 1. In meeting 1, we talked about the current Knox County stormwater program resources, organization and activities. In meeting 2, the challenges, issues and needs of the program were identified. Meeting 3 was spent discussing the “mission” of the Knox County stormwater program and setting the stage for establishing broad program priorities.



2.0 STORMWATER PROGRAM MISSION AND PRIORITIES

The mission statement shown below was drafted based on input/discussion of the Board is below. The minutes of meeting 3 outline the Board’s discussion of the stormwater program vision and mission that was used to develop this statement.

Draft Mission Statement:

It is the mission of the Knox County Stormwater Management Program to protect public safety and health by improving and/or maintaining water quality, minimizing flooding, and providing effective infrastructure to protect the roadway network from the impacts of stormwater runoff. In carrying out the mission, the Program will engage the community through public participation and outreach (education), effectively plan for the future to address floodplain management and water quality protection, and ensure stable and equitable funding that will provide for responsible stewardship and predictability in meeting the goals and vision for Knox County. The Program will be reviewed and assessed on a routine basis to measure accomplishments toward goals and to update targets (both short and long term).



In meeting 3, the stormwater program priorities that are listed in the following table were presented to the Board. Preliminary discussion that occurred during the meeting focused on the wording of one or more of the priorities.

PRIORITY	RANK
Establish and/or maintain community support for stormwater management services for the County.	
Create a comprehensive vision for stormwater management that is embraced by County leadership and the community	
The County stormwater program will effectively comply with regulatory mandates, including specific TMDL and NPDES requirements.	
The County will maintain critical data in support of optimal system performance and in support of regulatory compliance, using tools that will be both efficient and effective as decision-making tools.	
The County will ensure effective installation of stormwater management infrastructure throughout the unincorporated area.	
The County will ensure highest protection of both public and private property from the negative impacts of stormwater runoff.	
The County will provide construction management oversight including regulatory framework and enforcement as well as effective plans review.	
The County will be proactive in addressing stormwater issues, including use of low impact development techniques, water quality best management practices and mitigation for runoff volume and flow rates.	
The County must ensure the integrity of the drainage system.	
The County will move to a proactive maintenance program Countywide.	
The County will move to a proactive capital improvement program to address system needs.	

3.0 HOMEWORK

In meeting 4, we hope to finalize our discussion of program mission and priorities so that the Board can begin broad planning for the future program. Once priorities are identified, a five-year program plan, with includes actions that are directional in nature, will be built from the input of the Board and staff. Please review the draft mission statement and the stormwater priorities shown above. Your homework, to be performed prior to meeting 4, is as follows:

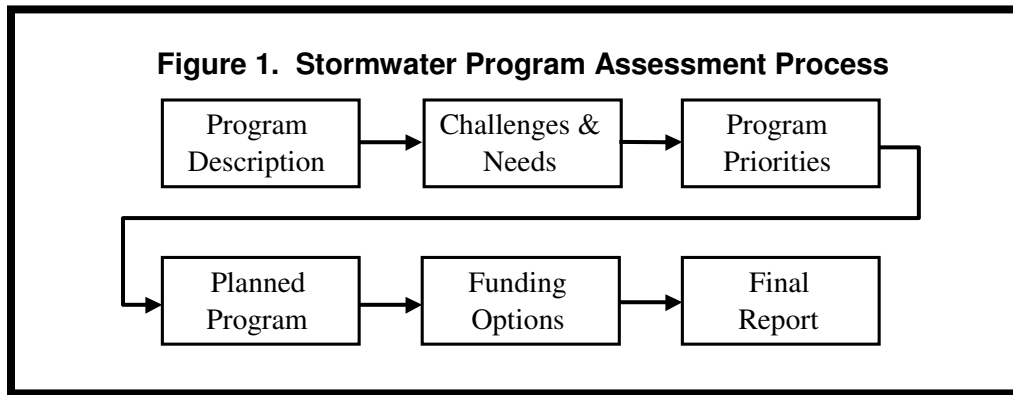
1. Come prepared to the meeting to discuss and/or revise and finalize the mission statement that is presented above.
2. Rank the stormwater priorities using the table provided above. Bring the completed table to meeting 4, or email your ranking to Mary Halley at mary.halley@amec.com before the meeting. If you feel you must modify/reword the priority statements or add a new priority, please bring those suggestions to the meeting for discussion by the Board.



Advisory Board Meeting 5 Preliminary Look at the Planned Program

1.0 INTRODUCTION

The Knox County Stormwater Advisory Board has been following the stormwater assessment process that is shown in Figure 1. This paper describes the preliminary planned program that has been developed based upon the past work of the Board.



2.0 STORMWATER PRIORITIES

In meeting 4, the Stormwater Advisory Board discussed and ranked seven priorities of the Knox County stormwater program. The priorities and their final rank are presented in Table 1 below.

Table 1. Ranked Stormwater Priorities	Rank
Create a comprehensive vision for stormwater management that is embraced and supported by County leadership and the community. Obtain appropriate resources through fair and equitable funding to carry out the stormwater program vision and mission.	1
The County must ensure the integrity of the drainage system by moving to a proactive maintenance program County-wide and a proactive capital improvement program to address system needs.	2
The County stormwater program will effectively comply with regulatory mandates, including specific TMDL and NPDES requirements.	3
The County will reasonably ensure the highest protection of both public and private property from the negative impacts of stormwater runoff.	4
The County will provide construction management oversight, including regulatory framework and enforcement as well as effective plans review that ensures the effective installation of stormwater infrastructure throughout the unincorporated area.	5
The County will be proactive in addressing stormwater issues, including use of low impact development techniques, water quality best management practices and mitigation methods for runoff volume and flow rates.	6
The County will maintain critical data in support of optimal system performance and in support of regulatory compliance, using tools that will be both efficient and effective as decision-making tools.	7



3.0 PRELIMINARY PLANNED PROGRAM

3.1 Program Components

The major components of the planned stormwater program are listed below, categorized by functional program area.

<p>Administration General program administration, planning and development</p> <p>Special Supporting Programs Public education/participation Grant participation/support</p> <p>Stormwater Quality Management Regulatory compliance (NPDES/TMDLs) Illicit discharge detection/elimination program Pollution prevention/good housekeeping</p> <p>Regulation and Enforcement Construction site inspection program Post-construction inspection program Development plans review Stormwater drainage inspections/enforcement Floodplain management program</p>	<p>Engineering and Planning Outfall mapping Stormwater system inventory/assessment Watershed master planning Sub. regs. and zoning oversight/support Watershed/stormwater data management Maintenance prioritization and planning Capital projects prioritization and planning Capital projects compliance</p> <p>Operations and Maintenance Remedial (reactive) maintenance Routine (proactive) maintenance Infrastructure management Emergency response</p> <p>Capital Improvement Projects Capital improvements Land, easement, right-of-way acquisition</p>
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3.2 Planned Program Activities

A preliminary schedule of the activities that are associated with each component of the planned program is presented in Figure 2, which also includes a statement of the program priority(s) which each activity corresponds. The schedule is broken into the current budget year (ending July-07), the next budget year (ending July-08), and the following five years. This was done to account for regulatory compliance activities currently budgeted or likely to be budgeted next year that will be unaffected by the Board's recommendations. For example, compliance with NPDES Phase II outfall mapping requirements will require funding next year.

The activities listed in Figure 2 are described in detail in Table 2. The table includes an indication of whether an activity is existing (currently performed or planned) or newly proposed as program enhancements or improvements. Together, Figure 2 and Table 2 comprise a preliminary draft of the planned stormwater program for Knox County, which was developed based on the vision, mission, and priorities for the stormwater program as defined by the County stormwater staff and the Stormwater Advisory Board.



Figure 2. Preliminary Planned Program

Functional Area	Line #	Priority #	Current Budgeting		Planned (Future) Program					
			July-07	July-08	Year 1	Year 2	Year 3	Year 4	Year 5	
Administration		Program administration, planning and development								
	1	General administration activities	1							
	2	Secure program funding and resources	1							
	3	Stormwater Advisory Board/Roundtable	1							
Special Programs		Public Education/Participation								
	4	Existing NPDES Phase II compliance activities	3							
	5	Communications Plan development	1, 3							
	6	Construction site management education	3, 5							
	7	TMDL education program	1, 3							
	8	New ordinance/manual workshops	3, 6							
	9	Development community outreach/education	6							
	10	Stormwater 101 for the general public	1, 3							
	11	Stormwater maintenance information for BMP owners	1, 3							
	12	Program grant support/administration	6							
Stormwater Quality Management		Regulatory Compliance Administration	3							
	13	NPDES permit and TMDL administration	3							
	14	Stormwater Ordinance/Manual Adoption	3							
	15	Renew NPDES Phase II permit	3							
	16	Develop TMDL plans	3							
	17	TMDL plan implementation (monitoring)	3							
	18	Illicit discharge program	3							
19	Pollution prevention/good housekeeping program	3								
Regulation and Enforcement	21	Construction site inspections program	3, 5							
	21	Develop EPSC SOPs	3							
	22	Hire Construction Site Inspectors and Inspections Supervisor(s)	3,4,5							
	23	EPSC inspector training	3, 5							
	24	Post-construction BMP inspection program	3							
	25	Inspection staff training on water quality BMPs and LID	3, 6							
	26	Development Plans Review	3, 5							
	27	Maintain TDEC Level 1 and 2 training for staff	3							
	28	Plans review staff training on water quality BMPs and LID	6							
	29	Floodplain management program	4							



Figure 2. Preliminary Planned Program (continued)

Functional Area	Line #		Current Budgeting		Planned (Future) Program					
			July-07	July-08	Year 1	Year 2	Year 3	Year 4	Year 5	
Engineering and Planning		Stormwater system inventory/assessment								
	30	Outfall mapping								
	31	Public system and private facilities inventory/prioritization								
		Watershed master planning								
	32	Define criteria, prioritize and determine schedule								
	33	Develop master plans								
		WQ BMP and LID Concepts Oversight								
	34	Codes and ordinance changes								
	35	Buffer/credit area data management policies/procedures								
	36	Long-term planning of LID resources, incentives and tools								
		Data management improvements								
	37	Hire a Stormwater Data Manager								
	38	Assessment and planning								
	39	Plan implementation								
Operations and Maintenance		Stormwater maintenance								
	40	Remedial (reactive) maintenance								
	41	Routine (proactive) maintenance								
	42	Stormwater maintenance crew								
	43	Needs assessment for 2nd stormwater maintenance crew								
Capital Improvement Projects	44	Currently planned capital projects								
	45	New project assessment and prioritization								
	46	Stormwater construction inspector(s) and proj. manager(s)								
	47	New project implementation								



Line #	Activity/Action Description
Administration	
Program Component: General administration, planning and development	
1	<p>General program administration (existing activities) Administration activities include general program administration program budgeting and cost allocation, staff hiring and management, overall program oversight, the preparation of bids and execution of contracts with consultants and contractors, and coordination/communication with the Mayor's office and County Commission. Such existing activities will continue through the life of the program, and could possibly expand depending upon funding recommendations of the Board.</p>
2	<p>Secure program funding and resources (new action – program improvement) Fair and equitable funding to carry out the program was listed as the highest priority by the Stormwater Advisory Board, and therefore securing of funding will likely be an immediate action item in the planned program. The Board will develop recommendations on the appropriate method(s) of funding and more specific action item(s) will be written in keeping with these recommendations.</p>
3	<p>Stormwater Advisory Board/Roundtable (new activity – program enhancement) A citizen-based stormwater advisory group, whether appointed by the Mayor (as a Board) or generated through interested citizens, will continue to provide broad policy recommendations to ensure that the vision and mission are carried-out. This will allow the public to play a key role in ensuring that the services and activities of the stormwater management program carry-out the vision and mission of the program.</p>
Special Supporting Programs	
Program Component: Public Education/Participation	
4	<p>Current public education/participation activities (existing activities) Existing activities that County staff will continue to perform for NPDES Phase II compliance include:</p> <ul style="list-style-type: none"> ✓ Providing a grading permit brochure to permit applicants; ✓ Support of the Adopt-a-Watershed/Adopt-a-Stream programs; ✓ Support of the Water Quality Forum and its website; ✓ Support of the Tennessee Growth Readiness program; ✓ Participation in various local programs such as River Rescue, Earthfest, etc. ✓ Support of/participation in various local watershed groups and initiatives; ✓ Environmental stewardship program.
5	<p>Communications Plan (new action – program enhancement) A number of public education and outreach needs and potential audiences were identified by the County staff and Stormwater Advisory Board. The development and implementation of a communications plan will allow a coordinated effort in the communication of stormwater concepts, activities and requirements, and in communicating the comprehensive vision of the program. Anticipated components of the plan are identified in rows 6 through 11. It should be noted that a number of these initiatives could be coordinated with the City of Knoxville or Town of Farragut. A general plan and schedule will be developed initially, with plan elements fleshed-out in detail as implementation occurs.</p>
6	<p>Construction site management education (new activity – program enhancement) The objective of this initiative will be to foster a measure of “self-policing” of construction site pollution issues. This initiative will target two audiences. Guidance on local requirements, BMP installation and maintenance and pollution prevention will be provided to site operators that are</p>



	responsible for management of erosion, sediment and construction site waste. Second, the public will be provided general guidance on common pollution problems associated with construction sites, what to look for, and who to call at Knox County if problems are noticed.
7	TMDL education (new activity – program enhancement) This initiative will target two audiences: government (County leaders, elected officials, and department heads); and the general public (businesses, industry and government). Information on stream impairments, TMDL impacts, consequences of non-compliance, and the County response to TMDL requirements will be provided as appropriate for the audience.
8	New ordinance/manual workshops (existing activity) Technical and regulatory workshops are planned for the local development community to advise developers and engineers of new post-construction requirements and provide guidance on water quality volume calculation, Better Site Design credits and incentives, stream buffers, and stormwater BMP selection, design and construction. Funding for these workshops has already been allocated.
9	Development community outreach/education (new activity – program enhancement) The purpose of this educational initiative is to promote water quality BMPs and low impact development techniques by providing broad technical guidance to local developers and engineers over the long-term. The existing program has begun this initiative through its Building Out of the Box workshop series. This initiative is included to support the incentives of the new ordinance/manual to lower imperviousness at the site level, thereby reducing stormwater peak discharges and volumes.
10	Stormwater 101 (new activity – program enhancement) “Stormwater 101” is defined as general information about the Knox County stormwater program that is provided to the general public and elected officials. The objective of this initiative is to generate a broad understanding of stormwater, its impacts on property and the environment, the need for stormwater services, and the stormwater services that are provided by Knox County. Information provided to elected officials will be more in-depth on key issues as appropriate, such as regulatory compliance and capital improvement projects.
11	Stormwater maintenance info for BMP owners (new activity – program enhancement) Long-term maintenance of water quality BMPs is a requirement of the NPDES Phase II permit. The new ordinance/manual requires that the property owner maintain privately-owned stormwater facilities. This initiative will provide inspection and maintenance guidance that is specific to water quality BMPs, their function, maintenance guidance, and local inspection and maintenance requirements.
Program Component: Grant Support/Administration	
12	EPA grants (existing activity) Knox County currently holds two grants from EPA for water quality related planning/modeling. These grants will continue to be supported, in accordance with the terms of the grant agreements. Funding has already been allocated for this activity.
Stormwater Quality Management	
Program Component: Regulatory Compliance	
13	NPDES Permit and TMDL Compliance (existing activity) Activities include general oversight of NPDES permit compliance BMPs and TMDLs, coordination with TDEC and other agencies, the collection and tracking of compliance and monitoring data, and the development of permit annual reports. Compliance activities (such as outfall mapping) that are not explicitly considered as a separate line item are included in this line item of the planned program.
14	Stormwater ordinance/manual adoption (existing activity) The new stormwater ordinance and manual includes the regulatory, policy, and technical guidance elements of the County’s construction site runoff control (i.e., erosion prevention and sediment control) and post-construction site runoff control (i.e., after development water quality)



	<p>programs. Adoption of the ordinance and manual by June 30, 2008 is required for compliance with the NPDES Phase II permit. Once the ordinance is adopted, post-construction compliance is largely performed under the Regulation and Enforcement functional area, through plans review, construction and post-construction inspections.</p> <p>The Phase II permit also requires that the County meet State and local public notice requirements when adopting stormwater-related ordinances. Knox County staff intend to hold at least one public meeting to take comments on the stormwater ordinance and manual prior to the two County Commission “readings” that should lead to its adoption. The timing and format of the public meeting is to be determined.</p>
15	<p>NPDES permit renewal (existing activity) The NPDES Phase II permit must be renewed every five years with the next permit cycle beginning in July 2008. Although specific modifications to the current permit requirements are not known at this time, it is likely that some permit conditions could change. It is also anticipated that the second Phase II permit cycle will bring more rigorous enforcement of the permit, given that program “ramp-up” was to occur during the current, five year permit cycle. Advance planning will be needed by the County staff to understand new permit conditions, plan for implementation, and prepare the permit application for submittal to the State.</p>
16, 17	<p>TMDL planning and implementation Implementation plans that document Knox County’s planned response to sediment and habitat alteration TMDLs must be completed in early 2007. Implementation of these plans, if accepted by TDEC, must begin in early summer 2007. It is anticipated that more TMDLs will be approved by TDEC in future years. Based on recent discussions with TDEC, compliance with the two most recently approved TMDLs will require rigorous implementation of NPDES Phase II construction site runoff requirements, stream assessments and water quality monitoring.</p>
<p>Program Component: Illicit Discharge Program</p>	
18	<p>Per requirements of the NPDES Phase II permit, the County must develop, implement and enforce a program to detect and eliminate illicit discharges (i.e., illegal, non-stormwater discharges) into the stormwater system. The past, existing and future ordinances all contained language that prohibits illicit discharges, including illegal dumping.</p> <p><u>Existing activities:</u> Currently, the County operates largely in a reactive mode for illicit discharges, responding to citizen complaints and taking corrective action or enforcing the ordinance when needed. Several of the County watershed initiatives target identification of illegal discharges (usually septic tank overflows or residential piping into creeks).</p> <p><u>New activities:</u> The TDEC audit noted that the County must develop more formalized plans and procedures for this program. Standard operating procedures will be formulated, specifically for outfall monitoring, hotspot identification and monitoring, and complaint response and enforcement.</p>
<p>Program Component: Pollution Prevention/Good Housekeeping Program</p>	
19	<p>Per requirements of the NPDES Phase II permit, the County currently has on-going implementation of a good housekeeping and pollution prevention program for County services, practices and actions.</p> <p><u>Existing activities:</u> This program includes staff training, the installation of pollution prevention measures, and implementation of pollution prevention policies.</p> <p><u>Program Improvement:</u> The TDEC audit noted that the County must provide better documentation of pollution prevention training for staff. Actions are being taken to address this program improvement.</p>



Regulation and Enforcement	
Program Component: Construction site inspection/enforcement	
20	<p>The construction site inspection/enforcement program component covers both stormwater management inspections (e.g., drainage infrastructure, water quality facilities, and flood control facilities), and grading/erosion prevention and sediment control (EPSC) inspections. EPSC inspections in accordance with permit conditions are a requirement of the NPDES Phase II permit and TMDLs issued for sedimentation and habitat alteration.</p> <p><u>Existing activities:</u> Knox County's construction site inspection program is currently performed by County subdivision and building inspectors, with oversight from the Stormwater Coordinator. These inspectors are responsible for inspection and enforcement of site grading, drainage and stormwater facilities, and EPSC measures for conformance with the stormwater management plan that was approved by Knox County for the development site.</p> <p><u>New activities:</u> Improving the effectiveness of the current construction site inspection program was identified as significant need for effective stormwater management, both by the Stormwater Advisory Board and Knox County staff. EPSC inspection/enforcement enhancements, including a number of program recommendations by TDEC, will occur with adoption of the new ordinance/manual, which provide greater clarification of grading permit and erosion control requirements, and more closely aligns the County program with the standards of the Tennessee Construction General Permit. Other changes proposed to improve the construction site inspection program are listed in items 21 and 22.</p>
21	<p>Develop EPSC SOPs (new action – program improvement)</p> <p>Development of standard operating procedures (SOPs) that, when implemented by County staff, will provide for consistent application of County requirements/activities for EPSC plans review, construction inspection, and enforcement actions. These SOPs should include formalization of procedures for receipt of information submitted by the public (e.g., complaints) regarding construction site runoff, and development of pre-determined enforcement actions for repeat offenses and serious violations. This will also address a recommendation from the TDEQ audit.</p>
22	<p>Re-organize construction inspection program (new action – program improvement)</p> <p>There are four actions associated with this improvement. The first two have no cost implications and therefore are not included as separate line items in the planned program. The last two (staff hires) comprise line 22 in the planned program.</p> <ol style="list-style-type: none"> 1. <u>Restructure inspector responsibilities.</u> Construction site inspectors (currently called subdivision inspectors) will be responsible for inspection of the following elements for all subdivision and individual lot (residential and non-residential) construction: stormwater drainage system (e.g., pipes, catchbasins, ditches); stormwater management facilities (e.g., water quality BMPs and detention/retention ponds); grading; and EPSC practices. These responsibilities are in addition to non-stormwater related duties they already perform for subdivisions, such as paving oversight and infrastructure inspection. Building codes inspectors will be relieved of EPSC inspection responsibilities, but will maintain EPSC inspection training so they can recognize and react properly to erosion control issues. 2. <u>Add grading/drainage inspections for individual lots.</u> Modifications to overall drainage patterns due to the actions of individual, residential lot owners is a problem voiced by County staff. This problem often occurs during construction of a single residential lot. To address this issue, construction site inspectors will be responsible for inspection of single lot grading to specifically identify modifications that are not in keeping with the original stormwater management plan for the larger subdivision. The stormwater ordinance will allow inspectors the authority to enforce the original plan. 3. <u>Hire new construction site inspectors to supplement current staff.</u> This action will allow a more manageable inspection workload for each inspector. A manageable workload



	<p>Proper workload distribution will boost the effectiveness of the inspection/enforcement program and better ensure compliance with NPDES and TMDL requirements by allowing each inspector adequate time to inspect sites, communicate with contractors, and follow-through with enforcement actions. This will also allow cross-site coverage between inspectors when normal inspection schedules are impacted by paving activities, difficult enforcement actions, or personal issues (sick days, vacation, etc.).</p> <p>4. <u>Hire Construction Inspection Supervisor(s) that are dedicated to this program component and relieve the Stormwater Coordinator (who has numerous other program responsibilities) of this duty.</u> One or more Inspection Supervisors that are dedicated solely to this program component can better provide for inspector consistency of inspections and enforcement on an on-going, County-wide basis. For effective supervision, one Supervisor will be needed for every 10 to 15 inspectors. Responsibilities of a Supervisor will include: supervision of construction inspection staff; coordinating inspection logistics (workloads, County-wide coverage, construction schedules vs. inspection schedules); staff training and/or training oversight; oversight of inspector implementation of inspection SOPs; quality control/quality assurance reviews; assisting inspectors with technical issues; guiding difficult or special enforcement actions through the system; and maintaining County compliance with construction inspection requirements of NPDES Phase II and TMDLs.</p> <p>The additional staff proposed above will be hired as soon as funding becomes available.</p>
23	<p>EPSC Inspector Training (existing activity) Per the requirements of the NPDES Phase II permit, County erosion control inspectors must have completed the TDEC EPSC training courses.</p>
<p>Program Component: Post-construction inspection/enforcement</p>	
24, 25	<p>Post-construction program activities (new activity) Developing, implementing and enforcing a program to reduce pollutants in stormwater runoff after development is a significant piece of the NPDES Phase II permit. This program will begin upon adoption of the new stormwater ordinance/manual. The basic County requirements are design, construction and maintenance in accordance County water quality standards and criteria. Activities will include inspector training, inspection of water quality BMPs during construction for compliance with approved design plans, long-term (e.g., annual) inspection of BMPs after construction for compliance with BMP maintenance requirements, enforcement of the post-construction provisions of the stormwater ordinance, and documentation and tracking of BMP locations, inspections, and enforcement actions.</p>
<p>Program Component: Development plans review</p>	
26, 27, 28	<p>Development plans review activities (existing activity) Development plans review is an important function of the stormwater program because it impacts so many components of the program. Rigorous review and approval of development plans is necessary to enforce the erosion control, post-construction, flood protection, and floodplain management provisions of the stormwater ordinance.</p> <p><u>Existing activities</u> include review and approval of concept plans, grading plans, and development plans for compliance with Knox County stormwater management requirements, and providing assistance to developers, engineers and site contractors with regards to Knox County requirements. Plan reviewers are also required to receive TDEC erosion control training, per the NPDES Phase II permit.</p> <p><u>New activities:</u> It is anticipated that the complexity and workload of the County plans review staff will increase with the adoption of the new stormwater ordinance/manual. This is due to the increased number of potential water quality designs that are allowed, and the detailed calculations for water quality-related BMPs and developments that incorporate LID approaches. Plans review staff should receive regular training on the latest trends in water quality BMPs and</p>

	LID, in order to maintain a high level of understanding of design requirements and criteria.
Program Component: Floodplain management program	
29	Floodplain management program (existing activity) The County currently participates in the National Flood Insurance Program (NFIP) and FEMA's Community Rating System (CRS) program. The County will continue proactive management of County floodplains through effective flood protection/floodplain management regulations, plans review and construction site inspections.
Engineering and Planning	
Program Component: Stormwater system inventory/assessment	
30	Outfall mapping (existing activity) Per the requirements of the NPDES Phase II permit, a map of all outfalls of the municipal separate stormwater system must be completed by June 30, 2008.
31	Public system and private facilities inventory/prioritization (new activity) An understanding of the location and condition of the system of pipes, ditches, catchbasins and other components of the public stormwater system is key to ensuring proactive maintenance and capital improvement programs. With regards to mapping the system, the County's first priority must be outfall mapping, as stated in line item 30. Outfall location information can be used as the basis (i.e., the starting point) for mapping the system upstream of outfalls. System inventory data are key to development of watershed master plans, discussed in line items 32 and 33.
Program Component: Watershed master planning	
32, 33	Watershed master planning (new activity) Watershed master planning can be an extremely useful tool to help the County move to a proactive maintenance and capital improvement program to address system needs. Only two of Knox County's watersheds have master plans for flood protection purposes. Initial planning is needed to determine what information is needed from watershed master planning efforts, determine master planning methods and standards, prioritize County watersheds planning needs and develop a long-term master planning schedule. Master planning will then begin on priority watersheds, and will gradually cover all County watersheds in accordance with the plan and as funding allows.
Program Component: WQ BMP and LID concepts oversight	
34, 35, 36	The new ordinance/manual requires the use of water quality BMPs to treat stormwater runoff, and provides incentives for the use of Low Impact Development (LID) approaches to reduce runoff volumes and peak discharges. A number of activities will be needed to ensure that these concepts are implemented in an effective manner, including: <ul style="list-style-type: none"> ✓ resolution of conflicts between LID approaches and the current subdivision, zoning and other regulations; ✓ data management of buffer and water quality "credit" areas (as defined in the Knox County Stormwater Management Manual); and, ✓ long-term planning of resources, tools and additional incentives that promotes or eases the use of LID approaches.
Program Component: Data management improvements	
37, 38, 39	Data management improvements (new activity) The County will maintain effective data management tools that support the long-term goals of the stormwater program including system data, mapping of outfalls, tracking of regulatory compliance actions, and maintenance activities on the drainage system. A detailed examination of existing data, needs and uses, existing data management systems and processes, and County computer capabilities/needs is a necessary first step. This will result in the development



	<p>of a Data Management Action Plan that makes recommendations regarding data management improvements, and provides estimated costs for equipment, software, training and other data management needs. Implementation of the plan will follow soon afterward.</p> <p>The effectiveness of many high priority actions can be impacted by a lack of data management planning. Knox County staff cited data management as one of their greatest needs. This need will increase significantly as stormwater inventory and master planning efforts begin. To bridge the gap between current needs and the planned program, data management planning is proposed at the beginning of the third year, with implementation to follow as soon as recommendations are approved by the County. As well, hiring a Stormwater Data Manager is proposed for the first year of the planned program in order to manage existing data management needs. The Data Manager will be responsible for guiding the County's data management efforts, through implementation of the data management plan.</p>
Operations and Maintenance	
Program Component: Stormwater Maintenance	
40	<p>Remedial (reactive) maintenance (existing activity) Knox County will continue to provide remedial maintenance to correct local drainage problems as these issues arise, based on prioritization using the level-of-service (LOS) process.</p>
41, 42, 43	<p>Routine (proactive) maintenance (new activity) Knox County will ensure the integrity of the drainage system by moving to a proactive maintenance program County-wide. The stormwater system inventory (lines 30/31) and watershed master planning (lines 32/33) are key to an effective proactive program, providing the data to anticipate drainage problems, and to prioritize and plan maintenance activities.</p> <p>It is anticipated that a new, dedicated stormwater maintenance crew will be needed, should the inventory and master planning result in the identification of a significant number of stormwater maintenance issues. The crew is shown on line 43. Costs will include pay and benefits for the crew and associated supervisor, and associated vehicles and equipment. As the master planning and system inventory efforts progress, the need for a second stormwater maintenance crew will be assessed.</p>
Capital Improvement Projects	
Program Component: Capital improvement projects	
44	<p>Currently planned capital projects (existing activity) Knox County will continue to perform known and prioritized capital projects as funding becomes available, using existing CIP Project Managers and CIP Construction Inspectors.</p>
45-47	<p>New CIP assessment, prioritization, planning and implementation (new activity) Knox County will ensure the integrity of the drainage system by moving to a proactive capital projects program to address system needs. Capital projects will be recognized, assessed and prioritized based on the currently used level-of-service process (line 45), stormwater system inventory (lines 30/31), and watershed master planning (lines 32/33). New projects will be scheduled and implemented based on priority and funding availability.</p> <p>Should this process result in the identification of a significant number of new capital projects, there may be a need to hire additional CIP Project Managers and CIP Construction Inspectors. CIP Project Managers are responsible for scoping CIPs, receiving bids and establishing contracts with consultants and subcontractors, managing the design and construction project (through consultants and contractors), and ensuring design compliance with applicable regulatory requirements for new construction. CIP Construction Inspectors are responsible for ensuring that the construction project is in compliance with design plans and regulatory requirements for construction sites.</p>

4.0 MEETING PREPARATION

Please review the preliminary planned program and come prepared to meeting 5 to discuss it. The objective of the meeting will be to review the preliminary planned program to ensure it addresses the vision, mission and priorities established to date. We will also begin discussion of potential funding methods, such as tax-based funding and stormwater user fees. These discussions, if completed, will lead to a reiteration of the planned program in meeting 6, with an analysis of program costs, both existing and new.

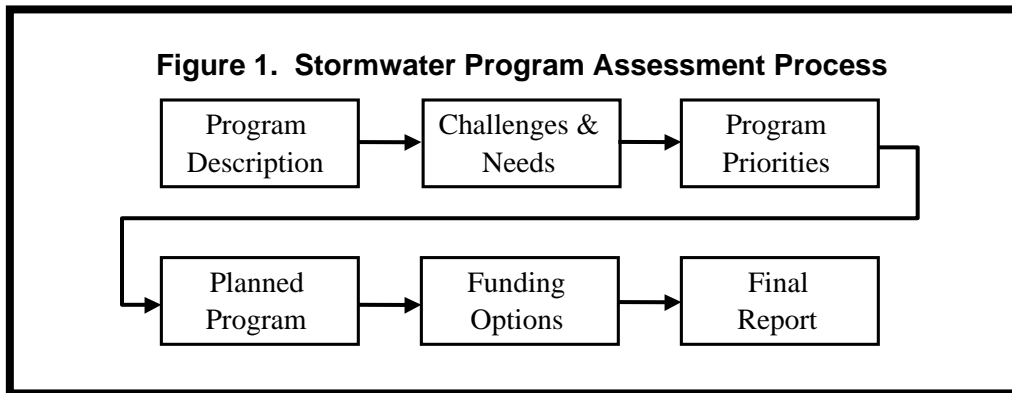


Advisory Board Meeting 6

Stormwater Program: Current Program and Comprehensive Program Costs

1.0 INTRODUCTION

The Stormwater Advisory Board has been following the stormwater assessment process that is shown in Figure 1. In meeting 5, we talked about the future stormwater program, organization and activities. Presented below is a summary of existing costs for current services provided by Knox County as well as a cost projection for the comprehensive program discussed with the Board in Meeting 5. In addition to the overall costs of the planned program, the funding options will be considered. A separate background paper discusses the funding options available to Knox County for its stormwater management program.



2.0 CURRENT PROGRAM COSTS

2.1 Background

In meeting #1 of the Advisory Board, an overview was presented of the current services provided by the County to address drainage and stormwater management. The County stormwater program addresses the impacts of stormwater runoff from developed land and human activities. These impacts include increased runoff volumes, runoff velocity, and pollutants that have an impact on the overall environment. The programs include activities that address stormwater quality including NPDES permit compliance, engineering and planning, regulation and enforcement, operation and maintenance of the infrastructure, capital improvements and general administration.

2.2 Summary of Overall Current Program Costs

Table 1 provides a summary of the current program by operational activities. This is based on the FY 06-07 budget for stormwater management which is funded primarily through resources in the Highway Fund. (The sources of funding are presented in the background paper on Funding



Options that the Board will receive prior to meeting 6.) The full-time-equivalent (FTE) personnel count is also present in the table. The total FTE directed to providing stormwater services is estimated at 35.8. In actuality, stormwater responsibilities are carried out by more numerous staff, some of which have full-time (i.e., 40 hours per week) stormwater responsibilities (e.g., the Stormwater Management Coordinator) and many of which do not perform stormwater duties on a full-time basis (e.g., the district maintenance crews). When stormwater responsibilities for all staff are added-up, this staff time results in an FTE of 35.8.

Table 1. Summary of Existing Stormwater Costs

Knox County/ FY 2006-07 Stormwater Program Cost Allocation		
Functional Cost Center	Budget Costs	Personnel FTE
Administration	\$ 169,101	2.40
Special Programs	\$ 333,466	2.60
Billing and Finance	\$ -	0.00
SW Quality Management	\$ 427,513	2.55
Engineering & Planning	\$ 531,341	1.05
Operations & Maintenance	\$ 1,158,714	16.80
Regulation & Enforcement	\$ 628,630	9.00
Capital Improvements	\$ 1,460,645	1.40
TOTAL	\$ 4,709,410	35.8

3.0 3.0 PLANNED PROGRAM COSTS

3.1 Summary of Planned Program by Functional Area

The Planned Program presented in Meeting 5 addresses the priorities established by the Advisory Board and will lead to a more comprehensive stormwater program that will work to achieve the vision, mission and goals of the program. The program is summarized for each functional area. More details can be found in the preparatory paper that was presented prior to Meeting 5.

Administration:

New or expanded activities in this functional area includes the general administration of the program, securing adequate funding and resource support as well as on-going coordination and support for a citizen-based advisory committee. Addition of an administrative assistant is recommended to provide needed services for internal operations.

Knox Future Program Projections STORMWATER PROGRAM COST ALLOCATION											
Line	Program Element	FY 08-09		FY 09-10		FY 10-11		FY 11-12		FY 12-13	
		Costs	FTE	Costs	FTE	Costs	FTE	Costs	FTE	Costs	FTE
1	Administration	\$ 262,660	1	\$ 178,660	1	\$ 178,660	1	\$ 180,160	1	\$ 178,660	1



Special Support Programs:

To address the need for education of various targeted audiences as well as general public education, resources are included in the proposed program for production of video and print media as well as development and publication of training materials and supplies. No new staff is included in this functional area.

Knox Future Program Projections STORMWATER PROGRAM COST ALLOCATION											
Line	Program Element	FY 08-09		FY 09-10		FY 10-11		FY 11-12		FY 12-13	
		Costs	FTE	Costs	FTE	Costs	FTE	Costs	FTE	Costs	FTE
2	Special Supporting Programs	\$ 171,000		\$ 171,000		\$ 171,000		\$ 171,000		\$ 171,000	

Stormwater Quality Management:

Activities in this area will address regulatory compliance, illicit discharge, pollution prevention and good housekeeping programs. The second permit cycle for NPDES Phase II is anticipated to expand the permit requirements as well as address additional TMDL conditions on area streams. Two additional staff positions are recommended, a Water Quality Specialist and a Compliance Coordinator who will oversee TMDL and NPDES compliance activities that are performed by other staff and provide hands-on management of the Illicit Detection Program, the pollution prevention program for county facilities/activities and the TMDL monitoring program.

Knox Future Program Projections STORMWATER PROGRAM COST ALLOCATION											
Line	Program Element	FY 08-09		FY 09-10		FY 10-11		FY 11-12		FY 12-13	
		Costs	FTE	Costs	FTE	Costs	FTE	Costs	FTE	Costs	FTE
3	SW Water Quality Management	\$ 216,530	2	\$ 138,815	2	\$ 138,815	2	\$ 178,815	2	\$ 176,530	2

Engineering and Master Planning:

One new position, a Data Manager, is included in this functional area to manage the overall stormwater program information resources, coordinating with the Knoxville GIS program, as well as facilitating improved data management for all areas of the stormwater program. A data assessment will be completed in year 3, with initiation of improvements identified in the assessment beginning in year 4. In addition, new resources will be directed to master planning of all watersheds through the county for both water quantity and water quality goals. An inventory of the stormwater infrastructure will be completed over a three year period, beginning in year one. This information will be used in master planning, infrastructure maintenance scheduling and capital improvement prioritization.

Knox Future Program Projections STORMWATER PROGRAM COST ALLOCATION											
Line	Program Element	FY 08-09		FY 09-10		FY 10-11		FY 11-12		FY 12-13	
		Costs	FTE	Costs	FTE	Costs	FTE	Costs	FTE	Costs	FTE
4	Engineering and Master Planning	\$ 512,340	1	\$ 1,560,840	1	\$ 3,015,240	1	\$ 2,562,340	1	\$ 2,560,840	1



Operations and Maintenance:

Expanding the capability of the County to move to a more proactive program for remedial and routine maintenance is addressed by the addition of a new maintenance crew (staff of 6), including new equipment and construction supplies. As the inventory of the system is completed (under Engineering and Master Planning above), a better understanding of resources needed to address existing system conditions will be in place. It is recommended that the County reassess its resources to ensure that sufficient attention is placed on creating a proactive service level for maintenance.

Knox Future Program Projections STORMWATER PROGRAM COST ALLOCATION											
Line	Program Element	FY 08-09		FY 09-10		FY 10-11		FY 11-12		FY 12-13	
		Costs	FTE	Costs	FTE	Costs	FTE	Costs	FTE	Costs	FTE
5	Operations and Maintenance	\$ 493,182	6	\$ 249,032	6	\$ 249,032	6	\$ 283,182	6	\$ 207,740	6

Plans Review and Regulatory Enforcement:

This functional area includes the addition of 17 to 25 new staff over the time period. These individuals will be focused on two regulatory program areas: construction site management and post-construction site controls. In addition, new resources will be dedicated to maintaining training for all plans review, inspectors and other staff on water quality BMPs, LID design, and construction site compliance. The cost center includes the necessary equipment support for the new personnel.

Knox Future Program Projections STORMWATER PROGRAM COST ALLOCATION											
Line	Program Element	FY 08-09		FY 09-10		FY 10-11		FY 11-12		FY 12-13	
		Costs	FTE	Costs	FTE	Costs	FTE	Costs	FTE	Costs	FTE
6	Plans Review and Regulatory Enforcement	\$ 1,589,410	17	\$ 1,298,390	18	\$ 1,672,960	22	\$ 2,031,290	23	\$ 1,862,600	25

Capital Improvements:

Like the operations and maintenance program, the Capital Improvements program will be driven by the system inventory and by the master planning efforts under the Engineering and Master Planning functional area. The County will continue to utilize its Level of Service process for prioritization of projects and will address existing backlog in the first year of the Planned Program. Growth in capital investments will likely drive the need for more project managers and construction inspectors and this should be evaluated as needed. The targeted resources identified in this Planned Program can be used to fund capital on a “pay as you go” basis or can be used to pay principal and interest for the issuance of bonds, or any combination thereof. Large projects could require multiple millions of dollars and could best be funded in one fiscal year through the issues of revenue or general obligation bonds. Two new positions are recommended in year one, a new project manager and a new construction inspector. Two additional positions are shown for Year 4, but the need for these positions should be assessed in Year 3.



Knox Future Program Projections STORMWATER PROGRAM COST ALLOCATION											
Line	Program Element	FY 08-09		FY 09-10		FY 10-11		FY 11-12		FY 12-13	
		Costs	FTE	Costs	FTE	Costs	FTE	Costs	FTE	Costs	FTE
7	Capital Improvements	\$ 2,741,140	2	\$ 5,102,140	2	\$ 7,602,140	2	\$ 10,354,280	4	\$ 15,204,280	4

Summary of Planned Program Costs – New Services:

The table below provides a cost summary of new services, categorized by program element.

Knox Future Program Projections STORMWATER PROGRAM COST ALLOCATION											
Line	Program Element	FY 08-09		FY 09-10		FY 10-11		FY 11-12		FY 12-13	
		Costs	FTE	Costs	FTE	Costs	FTE	Costs	FTE	Costs	FTE
1	Administration	\$ 262,660	1	\$ 178,660	1	\$ 178,660	1	\$ 180,160	1	\$ 178,660	1
2	Special Supporting Programs	\$ 171,000		\$ 171,000		\$ 171,000		\$ 171,000		\$ 171,000	
3	SW Water Quality Management	\$ 216,530	2	\$ 138,815	2	\$ 138,815	2	\$ 178,815	2	\$ 176,530	2
4	Engineering and Master Planning	\$ 512,340	1	\$ 1,560,840	1	\$ 3,015,240	1	\$ 2,562,340	1	\$ 2,560,840	1
5	Operations and Maintenance	\$ 493,182	6	\$ 249,032	6	\$ 249,032	6	\$ 283,182	6	\$ 207,740	6
6	Plans Review and Regulatory Enforcement	\$ 1,589,410	17	\$ 1,298,390	18	\$ 1,672,960	22	\$ 2,031,290	23	\$ 1,862,600	25
7	Capital Improvements	\$ 2,741,140	2	\$ 5,102,140	2	\$ 7,602,140	2	\$ 10,354,280	4	\$ 15,204,280	4
8	Total New Program Estimated Costs	\$ 5,986,262	29	\$ 8,698,877	30	\$ 13,027,847	34	\$ 15,761,067	37	\$ 20,361,650	39

Combined Current and New Planned Program Cost Summary:

The table below provides a combined cost summary of existing and new services, categorized by program element.

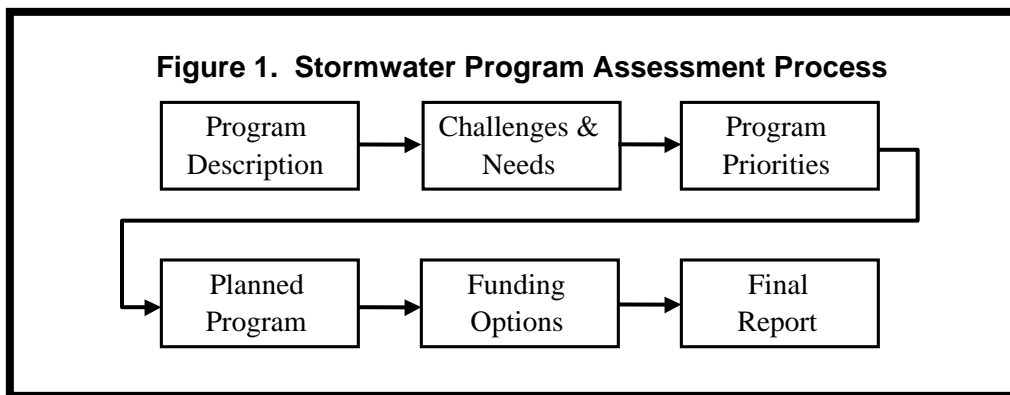
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Advisory Board Meeting 6 Stormwater Program Funding Options

1.0 INTRODUCTION

The Knox County Stormwater Advisory Board has been following the stormwater assessment process that is shown in Figure 1. Currently, the Board is in the process of developing a planned stormwater management program that addresses the problems, issues and needs of the current program in a gradual, yet comprehensive, fashion. Estimates of the annual costs of the planned program will be presented and discussed in the next meeting (meeting 6). The planned program, regardless of final form and magnitude, must be adequately funded to be effective. For this reason, the County Mayor has charged the Stormwater Advisory Board with examining this issue and providing broad recommendations for stormwater funding. This paper was prepared for the purpose of providing the Board with the necessary information on potential funding options to provide such a recommendation.



2.0 BACKGROUND

This paper examines the funding mechanisms available to Knox 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 paper highlights issues of funding equity (linking revenue sources with revenue beneficiaries) and funding adequacy (the ability of a potential source to produce sufficient and stable revenue). The paper also divides revenue into those sources that have the capacity to fund an entire program (primary sources), and those with the capacity to fund specific program elements (secondary sources).

While there are several potential secondary sources of revenue discussed in this paper, there are only two commonly recognized primary sources of revenue for stormwater management that are at the County's disposal. These are: (1) the overall general resources of the County that are created by real property taxes, sales taxes, fees and charges, distributed State revenues and grant; or, (2) a stormwater user-fee. 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;
- shift existing resources from other programs to stormwater management;
- raise real property taxes or other taxes (some of which may require State legislative action) and dedicate a portion to stormwater management;
- implement a dedicated stormwater user-fee.

3.0 OVERVIEW OF STORMWATER FUNDING MECHANISMS

Knox County has several funding options available by Tennessee statute. However, standards and limitations exist that influence the viability of these different funding mechanisms for use as a stable funding mechanism for the County's stormwater management program. Stormwater funding mechanisms commonly used by local governments in the United States include taxes (e.g., on property, retail sales, real property sales, income of interest earnings, and business gross or net profits taxes), exactions, special assessments, and service fees (sometimes also termed user-fees or service charges).

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.

Common stormwater funding mechanisms are summarized in Table 1. The table shows that each has a different underlying philosophy that guides the structure of the funding mechanism and the use of the revenues.

Table 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	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



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 User-Fee	A stormwater service fee, often referred to as a stormwater user-fee, is funded primarily through service 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 Knox 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. Table 2 provides a listing of the primary and secondary funding options that may be available to Knox County for the purpose of funding stormwater management. 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 2: Primary and Secondary Stormwater Funding Mechanisms

Primary Funding Methods	Secondary Funding Methods
General Fund Appropriations Highway Fund Appropriations Stormwater User Fees	Other Service Fees Special Assessments 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 listed in Table 2 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 Tennessee. Where applicable, each synopsis provides a description of how the revenue source has been used in Knox County to support the stormwater program.

4.0 PRIMARY FUNDING METHODS

4.1 General Fund Appropriations

The majority of General Fund revenues in most Tennessee localities are derived primarily from real property taxes and sales taxes. This is true in Knox County as well where approximately 65% of Fund revenues are from property taxes. Other major sources of General Fund revenues in Knox County include County local Option Taxes, the Wheel Tax and Services Charges and Fees. The Highway Fund is a Special Revenue Fund and is primarily supported by Local Option Sales Taxes, Wholesale Beer Tax, and Redistributed State Taxes on Gasoline/Petroleum.

The foundations upon which General Fund revenues are based include property values or business sales activity levels. When considered from the perspective of stormwater management, these foundations have little relationship to the demands on the stormwater system placed by a specific parcel. 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 and Highway Fund are based on a "taxation" philosophy – the purpose of which is simply to raise revenue. General Fund sources do not require that there be any association or relationship between the source of revenue and the purpose to which it is applied.

Using such funds produces a level of inequity in that some properties that place demands on the system may be exempt from property, sales or business taxes. As a result, non-profits (e.g., fraternal organizations, other governments, churches) do not participate in funding stormwater management through tax-based revenues. 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 tax levies than they would through funding methods based on the actual demands the property places on the system.

Special and General Fund appropriations can also be highly uncertain from year to year as shifts in the economy can impact revenue stability. In addition, 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 Fairfax County, Virginia which taxes real property at a rate of \$0.01 per \$100 of assessed value for stormwater management. It is important to note that the funding generated by this tax is tracked in a fund dedicated to stormwater.

Knox County's existing stormwater management program is largely funded through the Highway Fund appropriations, which is generated by three major sources: Sales Tax, Beer Tax and State Gasoline/Petroleum Taxes. It could potentially support an increase in spending on stormwater programs through reallocation of current resources. Reductions in other services funded from the Highway Fund to avoid an increase in other tax resources may or may not be publicly acceptable.

4.2 Stormwater Service Fees (Stormwater User Fees)

Service fees are becoming an increasingly popular source of dedicated stormwater funding, with close to 1000 such fees in existence throughout the United States. These fees, and the organizational elements and programs funded by them, are often referred to as "stormwater utilities". Within the context of the discussion of funding mechanisms, this paper will continue to use the terms "service fee" or "user fee". Tennessee Code, Title 68 Health, Safety and Environmental Protection, Chapter 221 Water and Sewerage, Part 11 Storm Water Management, enable localities to regulate stormwater discharges, to establish a system of drainage facilities, and to fix and require payment of fees for the privilege of discharging storm water. This legislation is presented in Table 3.

Table 3: Stormwater Utility Enabling Legislation

68-221-1107. Facilities user's fee.

(a) All municipalities constructing, operating, or maintaining storm water or flood control facilities are authorized to establish a graduated storm water user's fee which may be assessed and collected from each user of the storm water facilities provided by the municipality.

These fees shall be reasonable in amount and used exclusively by the municipality for purposes set forth in this part. Such a graduated storm water user's fee shall be based on actual or estimated use of the storm water and/or flood control facilities of the municipality, and each user or user class shall only be required to pay its proportionate share of the construction, administration, operation and maintenance including replacement costs of such facilities based on the user's actual or estimated proportionate contribution to the total storm water runoff from all users or user classes.

To ensure a proportionate distribution of all costs to each user or user class, the user's contribution shall be based on factors such as the amount of impervious area utilized by the user, the water quality of user's storm water runoff or the volume or rate of storm water runoff. Users whose storm water runoff is not discharged into or through the storm water and/or flood control facilities of the municipality shall be exempted from payment of the graduated storm water user fee authorized by this section.

The fee structure shall provide adjustments for users who construct facilities to retain and control the quantity of storm water runoff. Prior to establishing or amending such user's fees, the municipality shall advertise its intent to do so by notice published in a newspaper of general circulation in such municipality at least thirty (30) days in advance of the meeting of the governing body which shall consider such adoption or amendment.

(b) The municipality providing such service is authorized to enter into a contract for the collection of such storm water facilities fees with any public or private corporation or municipal utilities board or commission operating a water, gas, or electric system other than an electric cooperative incorporated under the provisions of the "Electric Cooperative Law," title 65, chapter 25, part 2, in the area of the storm water facilities or to make contracts with any other city, town, or utility district to bill and collect storm water fees as a designated item on its utility bill.

The contract may provide for the discontinuance of utility service to storm water facility users who fail or refuse to pay storm water facility user charges, including the right not to accept payment of the utility bill from

any user without receiving at the same time payment of any storm water facility charges owed by such user and not to re-establish utility services until such time as all past due storm water facility service charges owed by such user have been paid and/or the user of the storm water facility has performed all acts and discharged all obligations required by the ordinances or resolutions of the municipality.

68-221-1108. Financing of facilities

A municipal legislative body may finance storm water facilities under the provisions of the Local Government Public Obligations Act of 1986, as amended, compiled in title 9, chapter 21. To protect the public health and to assure payment of bonds issued for storm water facilities, the municipality may by appropriate ordinance or resolution use the procedures set forth in §§ 68-221-208 and 68-221-209, for payment and collection of charges.

The general standard applied to user 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 user-fee 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 (i.e., discriminates on the basis of age, race, religion, etc.).

Stormwater user 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 other sources, providing an opportunity to reallocate those resources previously dedicated to stormwater management programs. 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 user fee nation-wide is \$3.05 per month. Table 4 provides information on existing stormwater utilities in Tennessee.

The revenue generation capacity of a stormwater user fee is similar to that of the real property tax, except that the user fee is directly linked to impervious surface cover or another measurable characteristic that can be rationally linked to stormwater demand and/or services, rather than an assessed property value, which typically does not have such rational linkage. 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 user-fee rate study.” During this study, important policy decisions are made that can have significant implications for the selected rate. In addition to technical determinations for the basis of the fee, the County must address a range of policy questions that ultimately impact the structure of the utility, as well as the stormwater utility rate. Some of the major policies questions that would be addressed as part of the user-fee rate study are presented in Table 5.



Table 4: Data on Stormwater Utilities in Tennessee

Locality	NPDES Permit Type	Single-Family Residential Stormwater Fee (per month)	Commercial Stormwater Fee (per month)	Total Annual Revenue Generated ¹
Chattanooga	Phase I	Per year: \$24.00 (<10,000 ft ² lot size) \$36.00 (>10,000 ft ² lot size)	Per year: Ranges from \$0.00000 to \$0.00816 per square foot of lot area, depending upon land use type.	\$5,000,000
Franklin	Phase II	\$2.74 (< 3,350 ft ² imperv. area) \$4.38 (> 3,350 ft ² imperv. area)	\$3.65 per 3,350 ft ² of impervious area	\$1,800,000
Johnson City ²	Phase II	\$1.50 in June 2007, escalating to \$3.00 by June 2009. 51% of fee (<1690 ft ² imp area) 168% of fee (>5575 ft ² imp area)	\$1.50 per 3,315 ft ² of impervious area, escalating to \$3.00 in 2009.	\$930,000 escalating to \$1,860,000 In 2009
La Vergne	Phase II	\$3.50	\$3.50 per 3,181 ft ² of impervious area	Unknown
Maryville	Phase II	\$3.97	\$3.97 per 2,400 ft ² of impervious area	\$1,600,000

1 – approximate value; 2 – Johnson City will begin user-fee billing in July 2007

Table 5: Policy Decisions Affecting User Fee 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/Highway Fund:** Will the stormwater program fund pay for services received from the General Fund such as general overhead? (Indirect Cost Allocation for staff services such as Human Relations, Legal, Accounting, etc.)
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 stormwater fund credited to that 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?
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 amount of customer service costs will be needed?

- | |
|--|
| <p>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?</p> <p>12. Bill Receipt: Who will receive the bill, owners or tenants (such as renters and leasers)?</p> |
|--|

A stormwater user fee has not been implemented in Knox County. This is an important consideration in the current program assessment being performed via the Stormwater Advisory Board. All of the policy decisions identified above will need to be considered as part of a rate study should the County decide to pursue the implementation of a stormwater utility.

5.0 SECONDARY FUNDING METHODS

5.1 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.

5.2 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.

5.3 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 amount 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.

5.4 Special 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. 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.

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.

Recent examples of state/Federal funding utilized by Knox County include Environmental Protection Agency grants that have been made available for very specific activities, such as the Beaver Creek Eco-Trading model currently under development in the County.

5.5 General Obligation and Revenue Bonding

Tennessee statutes 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. 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.

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.



6.0 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.

AREA OF APPLICABILITY									
Revenue Source	Generating Capacity			Ability of Source to Finance Stormwater Equitably			Stability of the Source		
	High	Medium	Low	High	Medium	Low	High	Medium	Low
Real Property Tax, Sales Tax, State Funds (General Fund/Highway Fund)									
	Revenues can provide for the full cost of service to the community.			Owners of real property pay regardless of contribution to stormwater infrastructure. Sales and business taxes are paid by all who conduct business in unincorporated areas of the County.			Stability for stormwater dependent on other annual budget priorities and overall economic conditions.		
Stormwater User Fee									
	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 program to address stormwater system needs, including water quality and water quantity issues.		
Inspection/ Review Fees									
	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									
	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 for specific project.		
In-Lieu-of-Construction Fee									
	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.		
State/Federal	High	Medium	Low	High	Medium	Low	High	Medium	Low

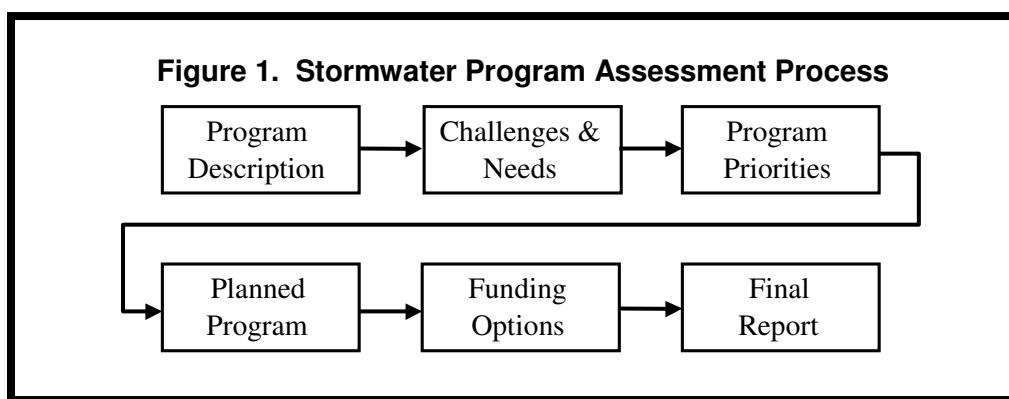


AREA OF APPLICABILITY									
Revenue Source	Generating Capacity			Ability of Source to Finance Stormwater Equitably			Stability of the Source		
Grants	Good for special activities when resources are made available. Must have project in development or concept state to ensure timely response to announcement.			Use is dictated by the grant source.			Used for specific demonstration projects, not a stable source of revenue.		
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 unless a user-fee is in place to repay bond debt.			Applicable for one-time capital expenses. Not meant as a source of revenue for ongoing expenses.		

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1.0 INTRODUCTION

The Knox County Stormwater Advisory Board has been following the stormwater assessment process that is shown in Figure 1. In Meeting 8, we talked about the proposed program enhancements with specific focus on the issues of Level and Extent of Service Policies. In prior meetings, the Board identified the challenges, issues and needs of the facing the County, framed goals and defined priority statements to move the County to a more proactive stormwater management strategy that will ensure effective regulatory compliance while protecting public welfare. This paper provides the framework for making final recommendations to the Mayor based on the program assessment process that has been followed.



2.0 LEVEL AND EXTENT OF SERVICE

During Meeting 8, the Board discussed the critical issue of a potential change in public policy regarding the extent of the physical system that should be directly operated and maintained by the County staff. This issue focused on the long-term maintenance and effective operation of privately owned stormwater management facilities, with specific emphasis on residential, privately owned ponds.

Four potential strategies that would impact the existing County Extent and Level of Service were identified in the discussion, as follows:

1. Increase program responsibilities by expanding the definition within the Extent of Service Policy to provide assistance to all private property owners of stormwater facilities to manage the maintenance and long-term operation of the facility.
2. Share the responsibility for the maintenance of privately owned facilities, with the County providing major maintenance (such as sediment removal, dam maintenance or outlet structure repair) while the property owner is responsible for providing routine maintenance and operational inspections (such as mowing, pruning/landscaping, maintaining vegetative cover, and clearing debris from inlets and outlets).
3. Provide assistance for future maintenance only once the facility is inspected and deemed to be operational based on original design standards under which it was built.



Once an evaluation is completed and the facility certified as meeting design functionality, the County will take over operation and maintenance.

4. The County is not responsible for maintenance services of private facilities, except through the Environmental Stewardship Program. The County will be responsible for regulatory oversight to see that the private facility owner brings the facility up to standards and provides long-term maintenance.

During Meeting 8, there were many pros and cons identified for each of these options, including recognition of the financial implications of these recommendations, and the potential need to accomplish certain objectives with a user-fee revenue approach. It is important to note that strategy #4 is the option that is currently included in the projected five-year program plan that was presented to the Board in Meeting 6 and reviewed in Meeting 8.

During Meeting 9, the Board will be asked to come to conclusion on this issue and to initiate final recommendations for a report to the Mayor. Table 1 is a consolidation of Board material that has been developed from previous discussions and papers. Table 1 does not include any new information. Please review this table and come prepared to begin the process of finalization of your recommendations to the Mayor.

Recommendations should be structured to answer:

1. What priorities are recommended for the stormwater program?
2. What services should be changed, enhanced, or newly initiated to address priorities?
3. What will it cost over the next five years to implement such recommended service changes?
4. How can the community fund changes in the stormwater management program that is recommended?



Table 1. Consolidation of Key Information Generated by the Knox County Stormwater Advisory Board

Goals Addressed	Challenge, Issue, Need	#	Identified Priorities Potential Actions	Recommended Priorities	Recommended Program Elements
Administration					
All long-term goals of the program.	Adoption of the proposed ordinance is crucial to regulatory compliance, special programs and enforcement.	1a	<p><u>Priority:</u> Need for comprehensive vision above County staff levels. Need for proactive educational approaches. Need for greater political and public support.</p> <p><u>Action:</u> County adopts new ordinance and design manual in early 2007.</p>	<p>Create comprehensive vision that is embraced and supported by County leadership and the community. Obtain appropriate resources through fair and equitable funding to carry out the vision and mission.</p>	<p><u>General Activities:</u></p> <ol style="list-style-type: none"> Secure stable, equitable funding. Create Stormwater Advisory Board/Roundtable Provide oversight and general administration including increased administrative support and logistics. <p><u>New Resources:</u></p> <ol style="list-style-type: none"> One additional staff (Adm. Asst.) Leased space for staff of stormwater program General supplies and support equipment <p><u>Year One Estimated Costs:</u></p> <p>New Costs = \$262,660 Existing Costs: \$170,000 Total (Year One): 432,660</p>
All long-term goals for the program.	The organizational responsibilities and priorities of the stormwater program should be clarified to meet the needs of the public.	1b	<p><u>Priority:</u> Need for a comprehensive vision with political and public support.</p> <p><u>Action:</u> Board will define community-based priorities which will be incorporated with the staff-driven priorities and presented as recommendations for action to the Mayor.</p> <p>Key policies will be reviewed by the Board and staff such as the Extent and Level of Service, five-year program strategies, and funding methods.</p>		
All long-term goals for the program.	<p>Adequate funding and other resources for stormwater services and maintenance are difficult to obtain.</p> <p>Current resource allocations (funding, manpower, etc.) do not meet increasing stormwater service and regulatory (NPDES and TMDL) demands.</p> <p>Financing the stormwater program should be equitable for all parties.</p>	1c	<p><u>Priority:</u> Need to address increasing demands for system maintenance as well as increasing regulatory mandates in a manner that is financed equitably, providing for long-term planning of system improvements and ensuring effective regulatory compliance.</p> <p><u>Action:</u> Funding analysis should be completed and will be in this study process. The Board should specifically relate the criteria for any recommended funding methodology presented in this study.</p>		



Table 1. Consolidation of Key Information Generated by the Knox County Stormwater Advisory Board

Goals Addressed	Challenge, Issue, Need	#	Identified Priorities Potential Actions	Recommended Priorities	Recommended Program Elements
Special Programs					
Regulatory compliance, regional cooperation, environmental protection and enhancement	The general public does not understand stormwater, and the County's regulations and level/extent of service.	2a	<p><u>Priority:</u> Knox County should provide the public as well as specific targeted audiences (e.g., general public, development community, engineering community) with information on water quantity and water quality to increase understanding of services and of individual actions that can contribute to effective stormwater management.</p> <p><u>Action:</u> Knox County already has active public education and involvement initiatives in the Beaver Creek and Stock Creek watersheds, and with several local schools. A specific communications plan should be developed with assistance of internal and external stakeholders with the goal of implementation in the next fiscal year.</p>	<p>Create comprehensive vision that is embraced and supported by County leadership and the community.</p> <p>The County stormwater program will effectively comply with regulatory mandates, including specific TMDL and NPDES requirements.</p>	<p><u>General Activities:</u></p> <ol style="list-style-type: none"> 1. Maintain on-going public education activities required by NDPES Phase II permit. 2. Develop Communications Plan 3. Expand current efforts and Implement the "construction site management" education program 4. Development TMDL education program as part of Communication Plan and implement 5. Maintain education effort on regulatory program and design manual 6. Expand education program for development community 7. Create a "Stormwater 101" education program for all stakeholders 8. Create/expand stormwater maintenance information program for BMP owners 9. Maintain on-going Grant activities. <p><u>New Resources:</u></p> <ol style="list-style-type: none"> 1. Two new staff; 2. TMDL Monitoring services; 3. Supplies and Equipment; 4. Vehicle; 5. Training Materials. <p><u>Year One Estimated Costs:</u> New Costs: \$171,000 Existing Costs: \$333,460 Total (Year One): \$504,460</p>



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Goals Addressed	Challenge, Issue, Need	#	Identified Priorities Potential Actions	Recommended Priorities	Recommended Program Elements
Stormwater Quality Management					
Regulatory compliance	Outfall maps must be completed by June 2008 to maintain compliance with NPDES permit.	3a	<p><u>Priority:</u> The County will ensure effective compliance with regulatory mandates.</p> <p><u>Action:</u> County staff will initiate necessary external assistance to complete the outfall mapping by June 2008. Budget is already allocated for this effort in fiscal year 2006/2007. Continued funding/resources will need to be in-place in the future to ensure that the data is maintained over the compliance period of the County's permit.</p>	<p>The County stormwater program will effectively comply with regulatory mandates, including specific TMDL and NPDES requirements.</p>	<p><u>General Activities:</u></p> <ol style="list-style-type: none"> 1. Compliance activities for TMDLs and NPDES permit 2. Adoption of new ordinance and design manual 3. Renewal of NPDES permit 4. TMDL planning and implementation 5. Maintain and expand Illicit Discharge Program 6. Maintain and expand as required Pollution Prevention and Good Housekeeping program
Regulatory compliance, environmental protection and enhancement	Adequate funding and resources will be needed to support continued compliance with NPDES and TMDL requirements.	3b	<p><u>Priority:</u> The County will comply with all regulatory mandates established through the NPDES and TMDL programs.</p> <p><u>Actions:</u> County staff will finalize TMDL plans in early 2007, which will include enforcement of NPDES Phase II requirements for construction sites (see item 5b below) and water quality monitoring. The County will ensure that adequate funding is allocated to support NPDES compliance and TMDL plans. Among other needs, it is anticipated that additional manpower/funding will be needed to meet future state expectations for construction inspections, enhancement of construction site runoff enforcement program to meet local qualifying program status (once defined by TDEC), and TMDL and any future NPDES-related monitoring that may be required by TDEC.</p>	<p>The County will reasonably ensure the highest protection of both public and private property from the negative impacts of stormwater runoff.</p> <p>The County will be proactive in addressing stormwater issues including use of low impact development techniques, water quality best management practices and mitigation methods for runoff volume and flow rates.</p>	<p><u>New Resources:</u></p> <ol style="list-style-type: none"> 1. Two new staff; 2. TMDL Monitoring services; 3. Supplies and Equipment; 4. Vehicle; 5. Training Materials. <p><u>Year One Estimated Costs:</u> New Costs: \$216,520 Existing Costs: \$427,510 Total (Year One): \$644,030</p>



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Goals Addressed	Challenge, Issue, Need	#	Identified Priorities Potential Actions	Recommended Priorities	Recommended Program Elements
Engineering and Planning					
All long-term goals for the program.	Existing data management systems need review and possible improvement and consolidation.	4a	<p><u>Priority:</u> County will maintain effective data management tools that support the long-term goals of the stormwater program including system data, mapping of outfalls, tracking of regulatory compliance actions, and maintenance activities on the drainage system.</p> <p><u>Actions:</u> A detailed examination of existing data, needs and uses, existing data management systems and processes, and County computer capabilities/needs is a necessary first step. Upon gaining this information, recommendations will be made regarding data management improvements and data/process consolidation.</p>	<p>The County will reasonably ensure the highest protection of both public and private property from the negative impacts of stormwater runoff.</p> <p>The County will maintain critical data in an efficient and effective environment that supports optimal system performance and regulatory compliance.</p> <p>The County will be proactive in addressing stormwater issues including use of low impact development techniques, water quality best management practices and mitigation methods for runoff volume and flow rates.</p> <p>The County must ensure the integrity of the drainage system by moving to a proactive maintenance program and a proactive capital improvement program county-wide to address system needs.</p>	<p><u>General Activities:</u></p> <ol style="list-style-type: none"> 1. Completion of outfall map by June 30, 2008 2. Inventory of public and private stormwater system 3. Master plan all watersheds 4. Resolve any conflicts between LID practices in design manual and existing ordinances, etc. 5. Establish long range plan for tools and resources to support emerging BMPs such as LID practices. 6. Development data management plan and implement <p><u>New Resources:</u></p> <ol style="list-style-type: none"> 1. One new position; 2. Inventory of System; 3. Master Planning of all Watersheds; 4. Data Management Assessment Plan; and, 5. Data Plan Implementation. <p><u>Year One Estimated Costs:</u> New Costs: \$512,340 Existing Costs: \$531,240 Total (Year One): \$1,043,580</p>
Addresses public safety, protection of the roadway network, environmental protection and enhancement and regulatory compliance.	<p>As-built information needs to be correctly referenced to topographic data.</p> <p>System data should be effectively maintained to support maintenance and capital program.</p> <p>County stormwater information should be maximized through submittals from the public.</p>	4b	<p><u>Priority:</u> The County should ensure effective installation of stormwater infrastructure.</p> <p><u>Action:</u> County should determine most effective manner for submittal of as-built drawings and for the long-term management of design drawings, maintenance requests and work orders to provide a long-term data management strategy. Data submittal and management issues will be handled through actions implemented via 4a.</p>	<p>The County will be proactive in addressing stormwater issues including use of low impact development techniques, water quality best management practices and mitigation methods for runoff volume and flow rates.</p> <p>The County must ensure the integrity of the drainage system by moving to a proactive maintenance program and a proactive capital improvement program county-wide to address system needs.</p>	<p><u>New Resources:</u></p> <ol style="list-style-type: none"> 1. One new position; 2. Inventory of System; 3. Master Planning of all Watersheds; 4. Data Management Assessment Plan; and, 5. Data Plan Implementation. <p><u>Year One Estimated Costs:</u> New Costs: \$512,340 Existing Costs: \$531,240 Total (Year One): \$1,043,580</p>



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Goals Addressed	Challenge, Issue, Need	#	Identified Priorities Potential Actions	Recommended Priorities	Recommended Program Elements
Regulation and Enforcement					
Addresses public safety, environmental protection.	Individual lot construction and landscaping practices are a common cause of drainage problems because they do not follow the drainage plan for the larger subdivision.	5a	<p><u>Priority:</u> The County should ensure highest protection to private property through effective regulation, public education and construction oversight of the stormwater system for both water quality and water quantity controls.</p> <p><u>Actions:</u> (1) Inspection during construction will be enhanced through additional resources that place increased emphasis on individual lot issues. (2) An effective method for ensuring post-construction maintenance, including County inspections, should be added to County responsibilities. (3) Property owners need additional education on drainage issues and regulations – this should be a focus of the communications plan discussed in 2a.</p>	<p>The County stormwater program will effectively comply with regulatory mandates, including specific TMDL and NPDES requirements.</p> <p>The County will provide construction oversight, including regulatory framework including enforcement and engineering plans review that ensure effective installation of stormwater infrastructure throughout the unincorporated area.</p>	<p><u>General Activities:</u></p> <ol style="list-style-type: none"> 1. Develop SOPs for water quality initiatives 2. Reorganize and implement program enhancement for construction site inspection program 3. Maintain EPSC Inspector Training 4. Maintain existing support services for Inspection Program 5. Develop and implement Post Construction activities as required by NPDES, 6. Maintain current resource and increase for Plans Review as appropriate 7. Maintain floodplain management program including the National Flood Insurance Program and Community Rating System efforts.
Addresses all long-term goals for the program.	The County's construction site regulatory program and associated initiatives must have adequate resources and staff and be consistently applied and enforced.	5b	<p><u>Priority:</u> The County will provide construction site regulation and oversight, including plans review, inspection and enforcement strategies.</p> <p><u>Action:</u> (1) A consistent set of processes and procedures will be implemented by all County inspectors and plans reviewers. (2) Additional staff are needed to keep up with increasing development pressures. (3) The County's public education program, identified in the communications plan discussed in 2a above, will target construction site issues and be targeted to developers and citizens who can often self-police potential issues, either alerting County inspectors to potential problems, or</p>	<p>The County will reasonably ensure the highest protection of both public and private property from the negative impacts of stormwater runoff.</p> <p>The County will be proactive in addressing stormwater issues including use of low impact development techniques, water quality best management practices and mitigation methods for runoff volume and flow rates.</p> <p>(continued on next page)</p>	<p><u>New Resources:</u></p> <ol style="list-style-type: none"> 1. New Inspectors and Supervisors – 17 staff; 2. New Plan Reviewer – Year 3; 3. New Post Construction Inspectors (2) – Yr 3; 4. Training costs; and, 5. Vehicles and supplies. <p><u>Year One Estimated Costs:</u> New Costs: \$1,589,400 Existing Costs: \$628,600 Total (Year One): \$2,218,000</p>



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Goals Addressed	Challenge, Issue, Need	#	Identified Priorities Potential Actions	Recommended Priorities	Recommended Program Elements
			mitigating problems prior to off-site sediment discharges. (4) The Beaver Creek Task Force has begun preliminary planning for an educational program for site contractors and developers. Funding should be provided for this and potential other developer/contractor related education initiatives.	The County will maintain critical data in an efficient and effective environment that supports optimal system performance and regulatory compliance.	
Addresses all long-term goals for the program.	<p>The County should work proactively to mitigate the negative impacts of runoff volume and flow rate.</p> <p>County stormwater staff need training on the water quality best management practices (BMPs) and low impact development (LID) approaches listed in proposed stormwater manual.</p>	5c	<p><u>Priority:</u> The County should be proactive in addressing stormwater issues, including use of low impact development techniques, water quality best management practices and mitigation methods for runoff volume and flow rates.</p> <p><u>Action:</u> (1) Adopt new ordinance and design manual. (2) Continue to educate County staff on design strategies and enforcement standards. (3) Educate the development and engineering community annually on stormwater requirements. (4) Though volume controls are not a standard requirement, it should be encouraged. (5) Provide adequate staff to enforce standards and regulations. Work from a “preventative position” – focusing on potential problems to mitigate. (6) The County will take the lead in outreach education on LID and BMP practices, partnering with the City and other appropriate agencies and organizations.</p>		



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Goals Addressed	Challenge, Issue, Need	#	Identified Priorities Potential Actions	Recommended Priorities	Recommended Program Elements
Goals					
Operations and Maintenance					
Addresses all long-term goals of the program.	An inventory of the stormwater system is needed for O&M and capital planning.	6a	<p><u>Priority:</u> The County will maintain drainage system data in support of the regulatory compliance, system maintenance and capital improvement programs. Such data will be geo-referenced, continuously updated, and made available to the public.</p> <p><u>Action:</u> An inventory and mapping of the drainage infrastructure system will be undertaken as the first step. Preliminary planning will be needed to identify the data users and uses, thus ensuring the most effective collection and management of the data with other public submittals. As well, such planning can determine the technical (i.e., computer) tools, training, and potential staff that may be needed for the most appropriate use of the data.</p> <p>Through KGIS, Knox County has access to sufficient technical expertise to support a detailed geo-spatial database of the stormwater system.</p>	<p>The County will be proactive in addressing stormwater issues including use of low impact development techniques, water quality best management practices and mitigation methods for runoff volume and flow rates.</p> <p>The County must ensure the integrity of the drainage system by moving to a proactive maintenance program and a proactive capital improvement program county-wide to address system needs.</p>	<p><u>General Activities:</u></p> <ol style="list-style-type: none"> 1. Current level of service will be maintained for the extent of the system found in the public right-of-way, with the exception of emergency issues that impact public safety and/or health. 2. Over time, the County will increase resources to proactively maintain the public drainage system using new tools of master plans and prioritization system. <p><u>New Resources:</u></p> <ol style="list-style-type: none"> 1. New Maintenance Crew – 6 people; 2. Equipment for Crew; 3. Supplies for construction activities/repairs; and, 4. Supplies and training for safety and construction site management. <p><u>Year One Estimated Cost:</u> New Cost: \$493,180 Existing Cost: \$1,158,715 Total (Year One): \$1,651,895</p>
Addresses public safety, protection of roadway network, environmental protection and regulatory compliance.	<p>As-built certifications and processes must allow the County to effectively enforce post-construction maintenance requirements.</p> <p>Residential property owners need help maintaining stormwater facilities.</p> <p>Property owners need to be educated about easements</p>	6b	<p><u>Priority:</u> The County must ensure the integrity of the drainage system using post-construction regulation and enforcement strategies as well as public education.</p> <p><u>Action:</u> (1) As-builts must clearly indicate the location, identification and as-constructed details of stormwater facilities and the County should ensure their accuracy. Enforcement actions where non-compliance is noted should be clearly defined and actively undertaken. (2) The</p>	<p>The County will reasonably ensure the highest protection of both public and private property from the negative impacts of stormwater runoff.</p>	<p><u>Year One Estimated Cost:</u> New Cost: \$493,180 Existing Cost: \$1,158,715 Total (Year One): \$1,651,895</p>



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Goals Addressed	Challenge, Issue, Need	#	Identified Priorities Potential Actions	Recommended Priorities	Recommended Program Elements
	and stormwater facility maintenance, especially as property changes ownership.		County will need to clearly define maintenance enforcement processes and procedures and identify manpower needs to effectively enforce post-construction maintenance. (3) The County should recoup maintenance costs from non-compliant property owners when County action is required to address failed post-construction efforts. (4) An effective public education campaign that targets property owner maintenance must be established.		



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Goals Addressed	Challenge, Issue, Need	#	Identified Priorities Potential Actions	Recommended Priorities	Recommended Program Elements
Addresses public safety, protection of roadway network, environmental and regulatory compliance.	Existing or near-future stormwater maintenance issues should be identified and prioritized for repair or mitigation. Who will maintain/repair existing stormwater facilities that are already problematic and/or do not have as-built data?	6c	<u>Priority:</u> The County will move to a proactive maintenance program County-wide. <u>Action:</u> The County should develop a long-term system maintenance program based on an assessment of actual need. The program should clearly define maintenance policies, priorities and actions for privately owner facilities that were constructed prior to adoption of the current stormwater ordinance. Policies and procedures to obtain easements for problematic facilities on private property must be defined.		
Capital Improvements					
Addresses public safety, public health, protection of roadway network, regional cooperation, and environmental protection.	The current approach for long-range capital improvement planning should be enhanced, with clear identification of prioritization criteria for capital improvement projects.	7a	<u>Priority:</u> The County will move to a proactive capital improvement program to address system needs. <u>Action:</u> (1) The County will complete master plans on all watersheds, partnering with appropriate agencies, by 2012. (2) The Capital Improvement Program for stormwater projects will be driven by the	The County will be proactive in addressing stormwater issues including use of low impact development techniques, water quality best management practices and mitigation methods for runoff volume and flow rates.	<u>General Activities:</u> 1. County will continue to perform construction of capital projects using existing CIP managers and inspectors. 2. County will develop prioritization plan as master plans and system inventory are completed, moving to a proactive approach



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Goals Addressed	Challenge, Issue, Need	#	Identified Priorities Potential Actions	Recommended Priorities	Recommended Program Elements
			establishment of a rating system to ensure effective system performance. CIPs identified through master plans are prioritized into the CIP program along with construction projects identified through complaints and system failures. (3) An effective capital improvement program has the ability to identify and acquire land, easements, and rights-of-entry. Properties and easements necessary for the stormwater program should be acquired as soon as funds become available, especially in areas likely to be subject to development or redevelopment in the near future.	The County must ensure the integrity of the drainage system by moving to a proactive maintenance program and a proactive capital improvement program county-wide to address system needs. The County will reasonably ensure the highest protection of both public and private property from the negative impacts of stormwater runoff.	to system management. <u>New Resources:</u> 1. New Project Manager and an Inspector – 2 staff; 2. Vehicles and supplies; and, 3. New Capital Project implementation. <u>Year One Estimated Cost:</u> First Year: \$2,741,140 Existing Cost: \$1,460,645 Total (Year One): \$4,201,785