

Section 3: Stormwater Task Force Process

As stated in Section 1, the Stormwater Task Force was presented with a work plan to complete the second phase of this project. The work plan included five steps: 1) Process, 2) Issues & Objectives Identification, 3) Tools & Strategies, 4) Recommendations and 5) Implementation. Section 3 of this report will summarize the identification of issues and concerns by the Task Force, the development of common objectives for the group, and the evaluation of alternative tools and strategies.

3.1 Supporting Data

Before engaging in a discussion of issues and concerns related to stormwater, the Task Force received a lesson in “Stormwater 101”. A primary focus of these early discussions was impervious surface and its relationship to the amount of runoff that flows from a site in a rainfall event. While stormwater runoff is naturally occurring on any land surface, the urbanization of this land causes a significant increase in the peak and volume of runoff. This additional flow is carried downstream and causes flooding, accelerates erosion and degradation of streams, and carries additional pollutants into waterways, thus impacting overall water quality.

3.1.1 Impervious Surface Estimates

During Meeting #3 of the Task Force process, the group requested data on the amount and location of impervious surface within the County. First, a summary of the land area breakdown in the County was provided, as shown in Figure 3-1. It should be noted that this breakdown excludes land within the water supply watersheds since those areas are governed by strict development rules and do not represent a majority of land use within the County. The pie chart shows that approximately 22 percent of the County’s land area is for residential use, approximately 8 percent is non-residential use (commercial, apartment, industrial) and another 9 percent is street right-of-way. This would seem to indicate that a large portion of the impervious surface is located in residential land use areas since it comprises nearly a quarter of the County’s land use.

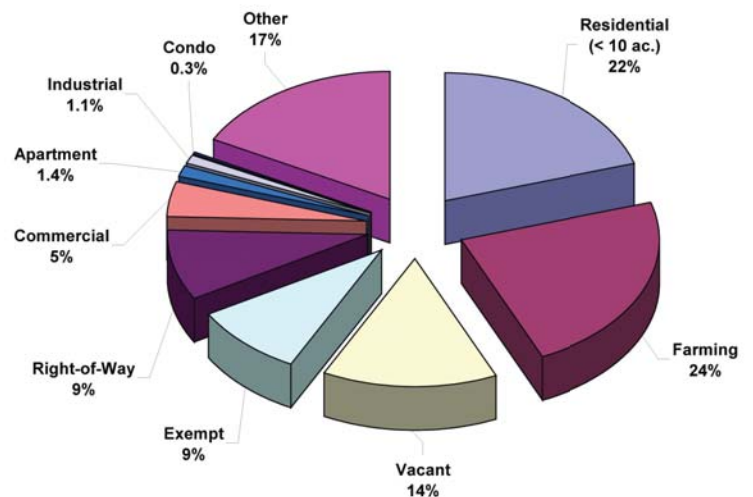


Figure 3-1
Wake County Land Use Breakdown

However, this idea did not hold true when an assessment of the impervious surface related to each of these land uses was performed. For residential land use areas, a rough estimate of impervious surface was generated for a typical single-family residential lot. For non-residential properties, it was assumed that approximately 80 percent of the property was impervious. Lastly, a typical pavement width was assumed for roadways within the right-of-way to estimated impervious surface related to roads. A summary of the amount of impervious surface related to these three land uses is presented in Figure 3-2 on the following page.

As shown in the figure, approximately 10,000 acres of the residential land use area in the County is impervious, which comprises nearly 22 percent of the total area. However, non-residential land comprises only 8 percent of the total land area in the County, but accounts for nearly double the amount of impervious area. Similarly, the right-of-way land area is only 9 percent of the total area but accounts for a similar amount of total impervious area as residential land use. This data suggested that tools should consider runoff from non-residential properties and roads.

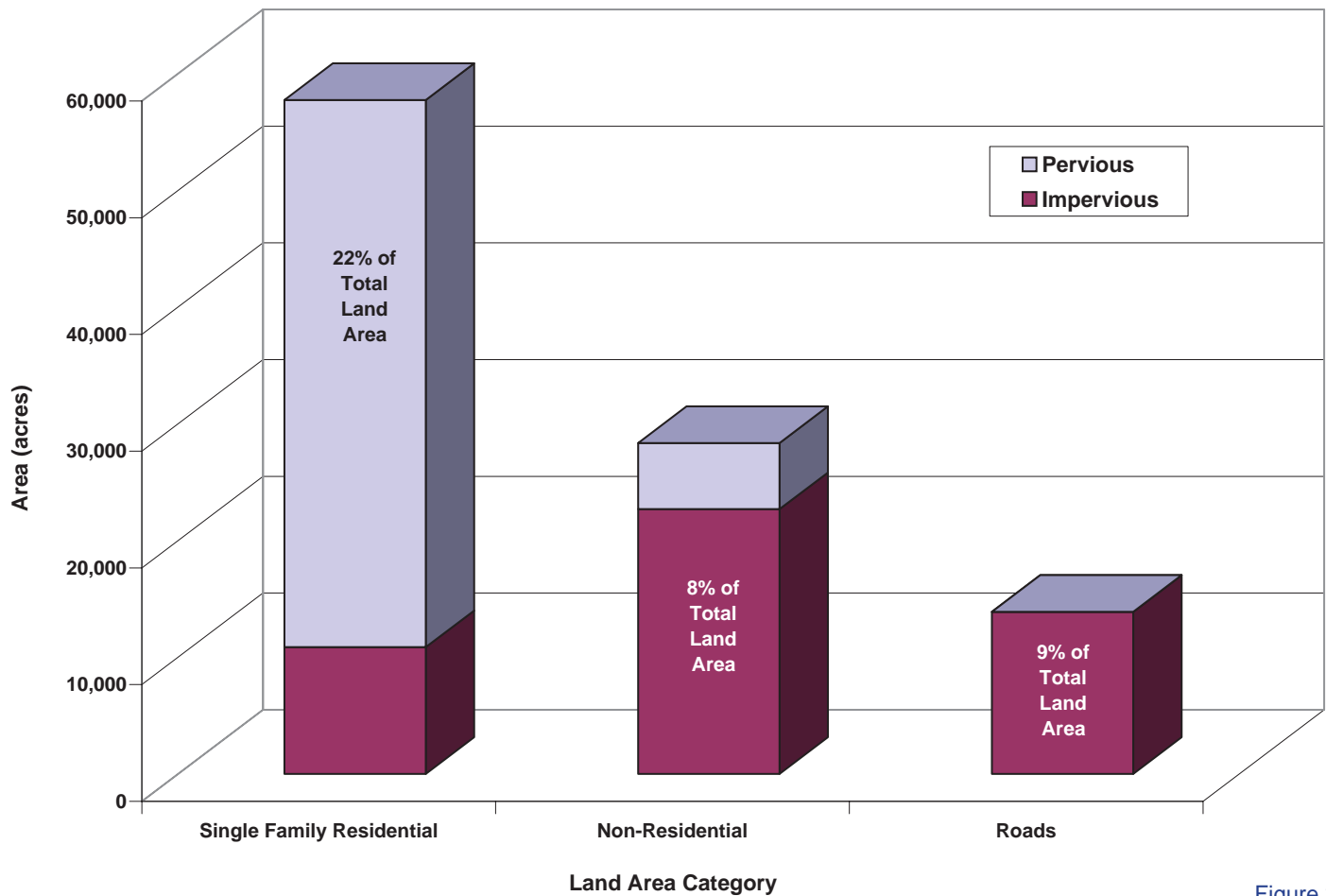


Figure 3-2
Summary of Impervious Area for Major Land Use Categories

3.1.2 Customer Complaints

Throughout the process, the local stormwater managers also provided valuable information to the Task Force regarding current stormwater issues facing local governments in the County. One such piece of information that helped identify issues and concerns for the group were customer complaints. An evaluation of the customer complaint database for each of the local jurisdictions, where available, helped to identify the types of issues that the citizens of Wake County find troublesome and also indicate where the local governments may need to increase the current level of service to meet customer expectations.

Figure 3-3 on the following page shows a summary of customer complaints received by the local governments. The highest percentage of calls received is categorized as “nuisance flooding”. These calls tend to include localized flooding, ponding in yards, standing water in the street, etc. Yard/structural flooding also represented a large percentage of customer complaints. These calls typically

Local stormwater managers receive frequent calls regarding “nuisance flooding”, but have limited resources to address them.



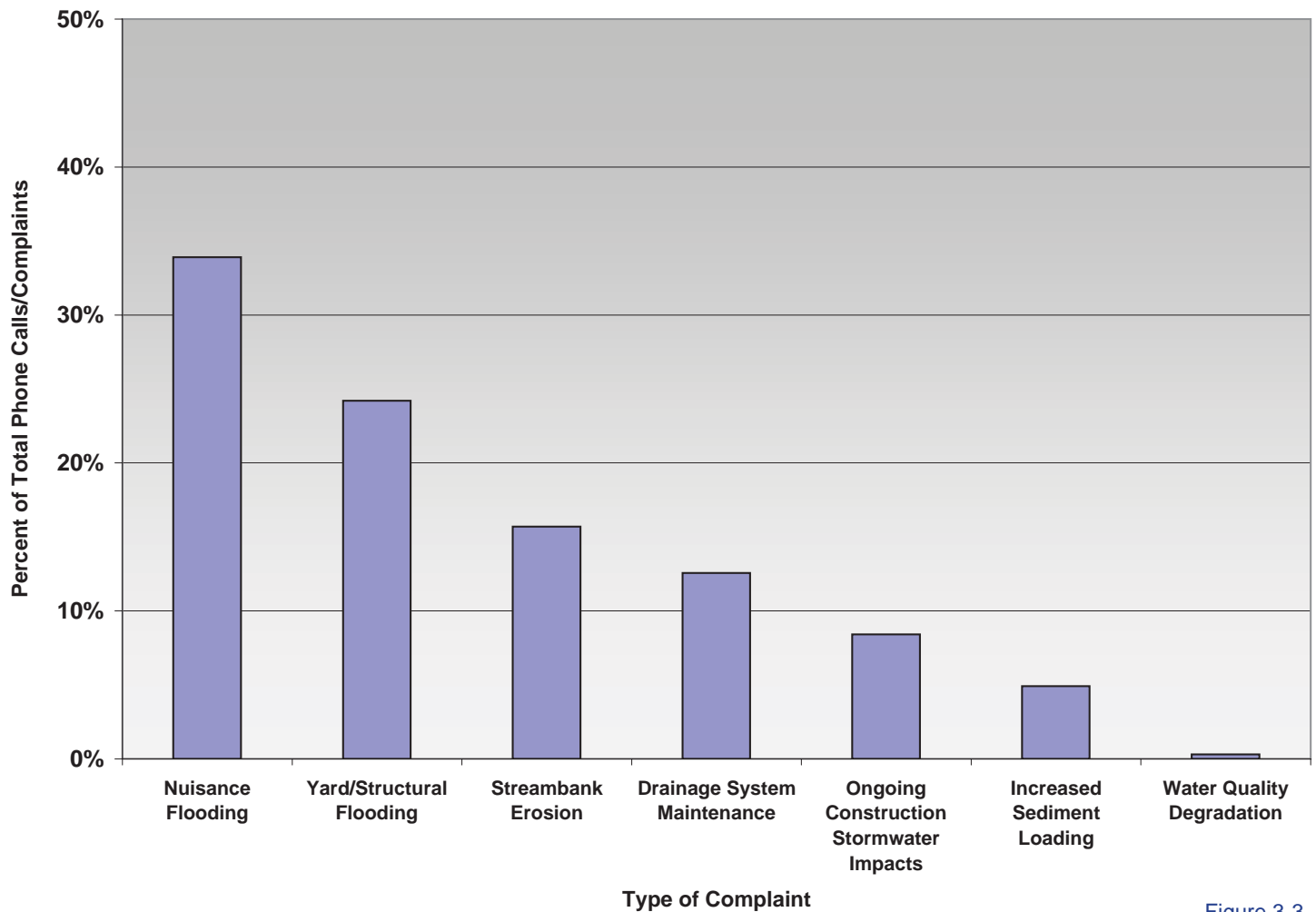


Figure 3-3
Summary of Customer Calls/Complaints

include flooding that reaches the basement or finished floor of residential structures, which could be safety concerns for residents. Alternatively, water quality degradation represented the smallest category of complaints.

3.2 Identification of Issues and Concerns

During Meeting #4 of the Task Force process, the group was presented with four case studies to show the potential impacts of increased runoff from urbanization as they relate to some of the typical issues concerning local citizens. These case studies were divided into four categories of "issues", which included 1) structural flooding, 2) nuisance flooding, 3) stream quality and 4) sediment. For each case study, the Task Force completed a questionnaire. Data from these questionnaires was used to more clearly define the scope and scale of stormwater issues for Wake County and its local governments.

Following the meeting, CDM and Wake County staff compiled and reviewed the results of the questionnaires. These results were presented to the Task Force at Meeting #5. At this meeting, the Task Force participated in work groups representing each of the four case studies. For each case, the group was asked to answer the following three questions:

1. Why do you believe this issue is important to our community?
2. What are the primary causes of this issue?
3. How would you define a level of service expectation for this issue?

The first question was intended to develop a list of reasons why a particular issue was important to the community, which would represent a set of criteria for judg-

ing one issue against another. The second question was intended to develop a master list of stormwater causes and problems related to each topic or issue. The final question was intended to begin building the framework for level of service targets for various issues.

Once all of the responses were compiled, CDM and County staff performed a key word analysis on the responses to determine the most common issues and concerns expressed by the Task Force members. These concerns were consolidated into four major categories, as identified below:

1. **Economics** – prevent, avoid, reduce or eliminate property damage or loss, disruption of business, loss of revenue, loss of property value, and repair costs.
2. **Health and Safety** – prevent, eliminate, or protect against health concerns, impacts to personal safety, dangerous conditions, sickness/illness or threats to water supplies.
3. **Environment** – enhance and/or restore water quality, stream habitat, the ecosystem, and the Neuse River Basin.
4. **Aesthetics/Quality of Life** – protect or avoid disturbance of aesthetics, recreational opportunities, quality of life and property values.

3.3 Development of Objectives

Building from the key word analysis in the prior step, CDM and Wake County staff reviewed the themes, actions and issues identified by the Task Force and determined from the analysis what the group might want to do regarding the concerns. A list of eight objective statements were drafted and presented to the Task Force at Meeting #6. These draft objectives were grouped into the four cat-

egories of concerns identified above. It was stated that these objectives would provide the criteria by which the Task Force would evaluate the tools and strategies in the next step of the process. Tools that did not meet these objectives would not be favorable whereas tools that did

meet a majority of these objectives would be given a higher priority.

Following a presentation of the draft objectives and their purpose within the process, the Task Force was divided into work groups to review, modify, and edit the objectives to ensure that they match the objectives of the Task Force. The list of objectives was expanded and modified several times until a final list was accepted by the Task Force. Table 3-1 shows a list of the 14 Task Force objective statements, which provided the link between issues identified by

the group and a “measuring stick” for the tools that were discussed in the next step.

3.4 Alternative Tools Evaluation

The Task Force began the alternative tools evaluation process at Meeting #7. The group was presented with a “working” list of tools and strategies to be considered. The list included a total of 35 tools, as shown in Table 3-2.

To provide a better understanding of how the tool may be used, the tools were subdivided into six categories that represent the timing of when the tool may be applied to a particular problem or project. The following is a brief listing and description of these six categories:

1. **Public Education** – tools used to increase public awareness and influence changes in the behavior of both individuals and specific groups of people (i.e. advertisements, how-to manuals, and staff training).



Addressing stormwater management concerns can reduce the risk to public health and safety.

Table 3-1: Stormwater Task Force Objective Statements

Economic Concerns	
1	Reduce losses in property value resulting from structural flooding and nuisance flooding
2	Reduce property damage resulting from both existing and future structural flooding, nuisance flooding, and erosion occurrences
3	Reduce the cost impacts and disruptions to individuals, business and local governments resulting from structural, nuisance, and roadway flooding
4	Reduce long-term environmental restoration costs
5	Eliminate legal liability due to non-compliance with environmental and drainage regulations
6	Stormwater pollution should not cause secondary and cumulative impacts that limit development
7	Comply with state and federal regulations
Health and Safety Concerns	
8	Reduce hazardous conditions resulting from structural or roadway flooding that threatens public safety
9	Reduce the potential for illness from contact with local waters
10	Protect local waters and supply sources from contamination and degradation to reduce treatment costs and to protect public health
11	Reduce need for additional water supplies
12	Ensure maintenance of existing stormwater infrastructure
Environmental Concerns	
13	Minimize degradation or loss of aquatic habitat and disruption of stream ecosystems resulting from increased runoff, water pollution, and sediment loading to streams and restore streams on the 303(d) list
Aesthetics / Quality of Life Concerns	
14	Protect and improve the aesthetic appearance and increase accessibility for recreational activities associated with local waters in order to preserve a high quality of life

Table 3-2: Original List of Tools and Strategies
Public Education
Public Education for Good Housekeeping (residential, non-residential & municipal)
Real Estate Disclosure
Stream Stewardship
Assessment and Forecasting
Hydrologic and hydraulic modeling of drainage system (volume, velocity, elevation, etc.)
Water quality modeling for watershed (pollutant loadings)
Development and Redevelopment Standards
Minimize changes to the existing FEMA floodplain
Strategies to reduce impervious surfaces required for new development
Strategies to reduce impervious surfaces for existing development
Reducing impervious surfaces with zoning restrictions
Site-Level Flood Controls
Site-Level Water Quality Controls
Development or Watershed-Level Flood Controls
Development or Watershed-Level Water Quality Controls
Protection of sensitive and valuable natural areas
Planning and layout of development (cluster, etc.)
Inspections, Operations, and Maintenance
Inspection and maintenance for stormwater facilities
Monitoring requirements for stormwater facility performance and operations
Material use, exposure, and disposal for municipal operations
Material use, exposure, and disposal for non-municipal operations
Hazardous material spill prevention/containment and enforcement
Hazardous material spill response and clean-up
Illicit discharge detection and elimination
Site Construction Controls
Design and maintenance standards for sedimentation and erosion control devices
Inspection and enforcement for sedimentation and erosion control devices
Application of S&E for agricultural operations
Preservation, Restoration, Rehabilitation, and Replacement
Inspect, maintain, and rehabilitate the sanitary sewer system
Rehabilitate the stormwater drainage system to address age and condition
Replace the stormwater drainage system to address capacity issues
Restore in-stream habitat and stream banks
Restore wetlands
Preserve stream buffers
Purchase properties located in the flood plain and remove from flood plain
Raise the finished floor of properties in the flood plain to above flood elevations
Preserve land through open space acquisition, conservation easements, etc.
Reduce the quantity of impervious surface area through retrofit projects

2. **Assessment & Forecasting** – tools used to assess current demands on the stormwater system and to predict future demands based on new development (e.g. current and future floodplain mapping, capacity analysis for infrastructure, and predictive water quality models).
3. **Development & Redevelopment Standards** – tools that prescribe the character, form, and quality of development activities, commonly codified in a uniform development ordinance (e.g. roadway widths, open space requirements, impervious limits, buffer requirements, or stormwater controls).
4. **Sediment and Erosion Controls** – tools used to size, locate, install, and maintain sedimentation and erosion control practices during land disturbance activities and agricultural operations (e.g. design of devices, inspection and enforcement, and maintenance standards).
5. **Preservation, Restoration, Rehabilitation and Replacement** – tools used to preserve or restore the function and capacity of both natural and man-made systems (e.g. culvert replacements, stream and wetland restoration, structural flood proofing, and open space acquisition).
6. **Inspection, Operations, and Maintenance** – tools used to ensure that the stormwater system is free of debris and maintained to provide the level of service intended in the original design (e.g. water quality monitoring, street-sweeping, illicit discharge detection, and elimination and culvert cleaning).

3.4.1 Screening Criteria for Tools

Following the tools presentation, CDM staff presented a set of screening criteria that would be used to narrow down the proposed list of tools into a manageable list that would be considered, in detail, by the Task Force. The criteria are listed in Table 3-3 on the following page.

There are four broad sets of criteria that were used to evaluate the tools. The first criterion was “compliance with goals and objectives.” This criterion is simply an assessment of how each tool addressed the list of 14 objectives. The second criterion was “cost.” Under the cost criterion, the tools were evaluated on capital costs,

operations and maintenance costs, administrative costs, and economies of scale. The third criterion was “ease of implementation.” This criterion considered whether an ordinance was in place for the tool, whether the tool was currently used in the county, and if the tool required new staff or organizational changes to implement. The last criterion was “equity.” This criterion considered whether the tool could be applied to both new and existing development, if the tool addressed various sources of stormwater, if the tool was proactive vs. reactive, and if the tool affected the use of personal property.

The list of criteria was used to calculate a “score” for each of the tools on the proposed list. Groups of tools that scored the highest (a total of 15 tools from the original list of 35) were brought back to the Task Force and discussed in detail throughout meetings #8 through #11. The screened list of 15 tools that received further evaluation by the Task Force are shown in Table 3-4.

3.4.2 Prioritization and Selection of Tools & Strategies

Throughout each of the four meetings on Tools and Strategies, Task Force members were provided with information and data on the important issues surrounding each of the 15 tools under consideration. The detailed evaluation of these tools also considered possible specific activities, case studies, level of service options, costs/benefits, and program structure options.

At the conclusion of each meeting, the Task Force members participated in a voting exercise related to the tools discussed. The members were asked to consider their 14 objectives as they made their votes. The voting ballots were designed to identify the preferred strategies and activities of the group to address the areas of concern in an effective and cost conscious manner. The voting results, combined with Task Force feedback throughout the meetings to that point in the process, were used to develop a draft list of recommendations to be considered for future implementation. The development of the final nine recommendations is discussed in Section 4.

Table 3-3: Proposed Tools and Strategies Screening Criteria

Screening Criteria	Considerations	Scoring Methodology
Compliance with Goals and Objectives	Goals and Objectives	To what extent (how many) does the tool address the goal and objective statements established by the Task Force?
Cost	Capital Costs	Does the tool require the construction of new facilities, structures or other improvements, or the purchase of real property?
	Operations and Maintenance Costs	Does the tool require a new, or an increased, annual budget allocation for field staff, equipment and resources for operations and maintenance?
	Administrative Costs	Does the tool require a new, or an increased, annual budget allocation for management and administration staff and resources?
	Economies of Scale	Can the tool be implemented through intergovernmental cooperation, and will the cooperation result in improved level of service, reduced costs, or both?
Ease of Implementation	Ordinance	Does the tool require a new ordinance, or modifications to an existing ordinance, in order to be implemented by local governments in Wake County?
	Use in County	To what extent (how many local governments) is the tool currently used by local governments in Wake County?
	Organization	Does the tool require new staff or organizational changes to accommodate implementation?
Equity	New and Existing Development	Can the tool be applied to new and existing development?
	Sources of Stormwater	Does the tool address multiple sources of stormwater - specifically, non-residential, residential, and roadways?
	Proactive Versus Reactive	Does the tool address stormwater concerns after problem has been made evident, or does the tool address stormwater concerns before the problem has been made evident?
	Personal Property	Does the tool affect the use of real property?

Table 3-4: Final List of Tools (15) for Evaluation

Tools and Strategies	Category	Total Score
Public Education for Good Housekeeping (residential, non-residential, and municipal)	Public Education	18.0
Hydrologic and hydraulic modeling of drainage system (volume, velocity, elevation, etc.)	Assessment and Forecasting	16.5
Design and maintenance standards for sedimentation and erosion control devices	Sediment and Erosion Controls	15.5
Inspection and enforcement for sedimentation and erosion control devices	Sediment and Erosion Controls	15.0
Conserve land through open space acquisition, buffers, conservation easements, etc.	Preservation, Restoration, Rehabilitation, and Replacement	15.0
Monitoring requirements for stormwater facility performance and operations	Inspections, Operations, and Maintenance	15.0
Material use, exposure, and disposal for municipal operations	Inspections, Operations, and Maintenance	14.5
Inspection and maintenance for stormwater facilities	Inspections, Operations, and Maintenance	14.5
Strategies to reduce impervious surfaces required for new development	Development and Redevelopment Standards	14.5
Water quality modeling for watershed (pollutant loadings)	Assessment and Forecasting	14.5
Illicit discharge detection and elimination**	Inspections, Operations, and Maintenance	13.0
Inspect, maintain, and rehabilitate the sanitary sewer system**	Preservation, Restoration, Rehabilitation, and Replacement	13.0
Real estate disclosure of structural flooding**	Public Education	11.0
Site-level flood controls**	Development and Redevelopment Standards	11.0
Development or watershed-level water quality controls**	Development and Redevelopment Standards	10.5

Note:

** designates tools that were added at the suggestion of the task force