

Section 6: OPTIONAL LOCAL MANAGEMENT MEASURES

OVERVIEW

This Section describes optional management measures for local jurisdictions, and is intended to be a resource for additional watershed management efforts at the local level. These measures are *not* required and therefore, are not a component of the Georgia EPD audit process for compliance with the Metro Water District Plans.

The optional local management measures are organized into functional categories similar to the local management measures in Section 5. The optional measures include:

- 6.A. **Legal Authority** – Additional model ordinances and enforcement tools
 - 6.A.1 – Local Environmental Judiciary
 - 6.A.2 – Tree Protection Ordinance
 - 6.A.3 – Conservation Subdivision/ Open Space Development Ordinance
 - 6.A.4 – Stormwater Utility Ordinance
 - 6.A.5 – Stormwater Enabling Legislation
 - 6.A.6 – Pet Waste Ordinance
- 6.B. **Watershed Planning** – Additional community-wide planning tools at the watershed scale
 - 6.B.1 – Greenspace Planning and Protection
 - 6.B.2 – Sustainable Growth Planning
 - 6.B.3 – Greener Approaches to Growth
 - 6.B.4 – Wetland and Stream Restoration Mitigation Bank
 - 6.B.5 – Stream Buffer Mapping and Map Maintenance
 - 6.B.6 – Watershed-based Planning and Implementation Approaches
- 6.C. **Land Development** – Additional measures to address the site-level impacts of development projects
 - 6.C.1 – Clearing and/or Grading Limits
 - 6.C.2 – Steep Slopes Requirements
 - 6.C.3 – Stream Crossing and Culvert Design Requirements

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6.D. **Asset Management** – Additional tools for managing stormwater system assets

6.D.1 – Private Dam Inspection Program

6.D.2 – Computerized Maintenance Management System

6.D.3 – Private Stormwater System Inspections and Maintenance

6.D.4 – Electronic As-Built Submission Guidelines

6.E. **Pollution Prevention** – Additional pollution prevention measures

6.E.1 – Street and Parking Lot Cleaning

6.E.2 – Household Hazardous Waste Collection

6.E.3 – Pet Waste Program

6.E.4 – Livestock/Agricultural Practices

6.E.5 – Mobile Car Washing Policy

6.E.6 – Swimming Pool Discharge Permits

6.A LEGAL AUTHORITY

6.A.1 LOCAL ENVIRONMENTAL JUDICIARY

To improve the enforcement of stormwater management and watershed protection regulations, communities may elect to establish a local environmental judiciary. A local environmental judiciary specializes in environmental cases, under which most stormwater management and watershed protection regulation violations and citations would be prosecuted. The authority for the environmental judiciary can be structured in one of the following methods:

- Create a separate court or court division to handle environmental cases
- Group environmental cases on one specific day of the week in an existing court, and/or assign these cases to judges familiar with these ordinances and regulations

In general terms, the steps to establish a local environmental judiciary might include:

- Determine the environmental/watershed ordinances to be heard by the environmental judiciary;
- Establish the formal organization for the court in coordination with the court solicitor;
- Determine additional funding needs, if any;
- Identify potential judges;
- Establish a system for channeling cases to the environmental court (day/time/location cases are heard);
- Train participants (judges, court recorder, clerk, attorneys); and
- Training on both the legal and technical aspects of watershed management and environmental concerns is recommended to improve consistent enforcement of local stormwater management and watershed protection regulations.

6.A.2 TREE PROTECTION ORDINANCE

Tree preservation during land development can serve many important stormwater management and watershed protection functions, including stormwater runoff quantity and quality mitigation, decreased soil erosion and sedimentation, increased groundwater recharge, water conservation, and shading of riparian habitats. Tree protection ordinances are one mechanism that a community can utilize to ensure that trees are preserved on land development projects.

An effective local tree protection ordinance should:

- Establish authority and specify the body responsible for administering the ordinance. The responsible entity may be staff, an appointed board, elected body, or a variation of all three.
- Provide the basis for the tree protection ordinance, especially as the stated purpose may vary based on community goals. The ordinance should link the requirements to stormwater mitigation, erosion prevention, water quality protection, water conservation, habitat function and protection, and avoidance of nuisance species.
- Include new development requirements for a tree plan and clear marking of “tree save” areas during construction.

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- Establish a methodology for tree retention, whether it be based on preserving tree stands, tree canopy, specific tree species, or a combination of these methods.
- Specify that the preservation of trees and native vegetation should specifically count towards minimum landscaping requirements within the local zoning code.
- Include a list of recommended native tree species that encourage diversity and habitat throughout the jurisdiction.

The enforcement of tree protection ordinances is easier during construction as there are regular site visits by erosion and sedimentation control inspectors. Communities may choose to require a stormwater facility maintenance agreement for tracks of land conserved, especially if tree save areas are counted towards stormwater management requirements. The long term maintenance agreement will provide additional support to the protection and maintenance of these important natural resources.

6.A.3 CONSERVATION SUBDIVISION / OPEN SPACE DEVELOPMENT ORDINANCE

The goal of a Conservation Subdivision/Open Space Development ordinance is to preserve open space and greenspace for watershed protection and the nonstructural management of stormwater runoff while accommodating development projects. Conservation subdivisions provide for residential designs that preserve open spaces and can also be successfully applied to other zoning categories such as commercial, industrial and institutional land uses.

Conservation design seeks to facilitate development while still maintaining the most valuable natural features and functions of the site. Under a local conservation subdivision and open space development ordinance, a project must have a minimum restricted amount of open space that encompasses a certain portion of the gross tract area. Under a model ordinance, for example, conservation subdivisions could be required to have a minimum restricted open space that encompasses at least 40 percent of the gross tract area, which includes wetlands, stream buffers, and other sensitive areas. The number of lots that may be developed on the remaining property (for a residential subdivision) is determined through a calculation method or by preparing a yield plan that identifies the maximum number of lots for the property based on a conventional subdivision design.

The ordinance may specify how the open space may be used and identify ownership and management requirements for the open space. In addition, most conservation subdivision ordinances require a legal instrument for permanent protection of open space. For instance, conservation easements are often required for open space preserved through conservation subdivisions.

In some communities, conservation subdivision ordinances face opposition due to a perceived increase in the density of these subdivisions. To minimize density-related opposition, local communities may wish to:

- Require that the total number of units allowed under conservation subdivisions does not exceed the average density for surrounding areas
- Ensure that yield plans used to calculate the number of lots allowed under a conventional subdivision design account for areas such as streams, wetlands, and steep slopes that would not normally be developed
- Include provisions to allow developers to meet with surrounding communities to solicit input

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- Encourage developers to place open space between existing neighborhoods and the conservation subdivision, if topography and site features allow

Most conservation design projects are approved through the Planned Unit Development (PUD) process. This method has both benefits and drawbacks as it allows for a Planning Commission to maintain close oversight of unconventional development projects, but is taxing for both developers and planning staff. Another route is to update local ordinances to allow conservation design by right. This strategy reduces approval time for the project. Additionally, it is important to ensure that site design standards, such as parking space requirements, street widths, and cul-de-sac dimensions, allow for environmentally-friendly alternatives.

Communities wishing to increase the use of conservation subdivisions may choose to offer incentives to developers, such as expedited plan review. Where politically viable, bonus lots or increased density for conservation subdivisions are attractive incentives to the development community. Communities may also offer reduced or no property tax assessments for the greenspace areas of conservation subdivisions. As the number of houses is identical to a traditional subdivision, the local government will still receive the appropriate tax revenue from a conservation subdivision.

A model conservation subdivision and open space development ordinance developed by the Metro Water District is available on the District website.

6.A.4 STORMWATER UTILITY ORDINANCE

A stormwater utility ordinance defines the basis and scope for a local stormwater utility and establishes the legal authority to collect fees for stormwater services. Within Georgia, the state Supreme Court has ruled that stormwater utility charges are an appropriate fee, not a tax. The ruling found a direct relationship between the stormwater utility service fee and legitimate government interest, as long as there is a correlation between the stormwater management program and the stormwater utility fee. A properly written and implemented stormwater utility ordinance can help protect a local community from legal challenges to its stormwater utility program.

Additional details on stormwater utilities and utility development are outlined in further detail in the funding discussion in Section 9 of this Plan.

6.A.5 STORMWATER AUTHORITY ENABLING LEGISLATION

A multi-jurisdictional or authority-led stormwater utility typically requires special enabling legislation through the Georgia General Assembly. Georgia statutes authorize the creation of a variety of special districts or authorities that are counted as separate government entities. Water and sewer authorities created to provide water supply or sewerage (or both) have been created by these special acts of the Georgia legislature.

Similarly, a multi-jurisdictional stormwater utility can be created through enabling legislation. In cases where an existing water and/or wastewater authority wishes to assume stormwater management responsibilities (such as Douglasville-Douglas County Water and Sewer Authority and Clayton County Water Authority), the Georgia Assembly must approve the changes to the Act that originally created the authority. In addition to enabling legislation, individual local governments under a multi-jurisdictional stormwater utility may still need to pass utility ordinances (measure 6.A.4) for their community.

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6.A.6 PET WASTE ORDINANCE

Pet waste contains fecal coliform bacteria and is high in nutrients that can lead to algae growth in receiving waters. Pet waste ordinances, better known as “pooper scooper laws” require the immediate and proper disposal of pet waste, making it illegal to leave pet waste on any property, including private property. A pet waste ordinance can provide additional support to the local illicit discharge and illegal connection ordinance.

6.B WATERSHED PLANNING

6.B.1 GREENSPACE PLANNING AND PROTECTION

Greenspace includes open space and natural areas that have been preserved for a variety of reasons ranging from habitat preservation to recreation. Greenspace planning and protection provides a number of watershed management benefits including water supply watershed protection, floodplain management, wetlands protection, groundwater recharge, and riparian wildlife habitat.

Communities trying to encourage greenspace protection may choose to adopt a formalized green infrastructure plan. A formal green infrastructure plan creates a road map for greenspace protection and prioritizes strategic greenspace acquisition activities by identifying key resources and critical habitats before they are developed. Steps for communities to consider when creating a green infrastructure plan include:

- Consult with surrounding communities, state entities, and federal efforts to identify existing natural assets and linkages to existing greenspace;
- Identify “priority conservation areas” for the purposes of watershed protection, including but not limited to drinking water supply watershed critical areas, groundwater recharge areas, wetland habitats, steep slopes, and riparian buffer zones. The acting entity may want to target these areas for a conservation easement or acquisition before development as restoration is often more difficult;
- Map the formalized green infrastructure plan (including desired connections and future acquisitions) with Geographic Information Systems (GIS);
- Focus the green infrastructure plan on existing parks within a community, to serve as anchors for the green infrastructure network; and
- Coordinate with all relevant local departments on the green infrastructure plan to maximize opportunities for protection of priority conservation areas.

Some regional and state resources available to communities who are initiating a green infrastructure plan include:

Atlanta Regional Commission’s Green Infrastructure Toolkit – This interactive toolkit provides information specific to Georgia on green infrastructure including successful tools and strategies.

Georgia Greenspace GIS Mapping for Priority Ecological Locations – The Georgia Institute of Technology at the Center for Geographic Information Systems provides GIS data sets for free. The program has identified, prioritized, and mapped locations of ecological importance within the region.

Georgia DNR Wildlife Comprehensive Wildlife Conservation Strategy – This program was developed by the Georgia DNR to identify, prioritize, and map critical habitats and locations for wildlife throughout the state. The program primarily focuses on wildlife, but is still useful for identifying critical wetland and riparian areas.

U.S. Environmental Protection Agency’s (US EPA) Southeast Ecological Framework – The EPA has developed a GIS-based tool that maps the critically important ecological habitats in the southeastern United States.

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Many communities in the Metro Water District have programs to acquire and protect greenspace. One of the biggest deterrents for communities trying to acquire greenspace is the large up-front cost and the prospect of slow return on the investment, given that funds generated by greenspace often are minor or non-existent. Alternatives to purchasing greenspace, or fee-simple ownership of greenspace, include conservation easements and transfer of development rights. All three acquisition techniques are outlined below, with an understanding that a blend of these techniques will probably be required in most communities.

Conservation Easements – Conservation easements involve acquisition of development rights by a local government or a non-profit entity such as a land trust. These can be volunteered by local land owners or mandated during the zoning and land development process. Typically, the maintenance responsibility stays with the property owner with opportunities for decreased property taxes. Conservation easements are often required for open space preserved through conservation subdivisions.

Fee-simple Ownership of Greenspace – The benefit of fee-simple ownership is that the local government owns the land and therefore it is permanently protected. Challenges of local government fee-simple ownership include the maintenance costs associated with land preserved in perpetuity. Fee-simple ownership is often used to protect drinking water supply reservoirs from future development.

Transfer of Development Rights (TDR) – TDRs protect certain areas from development without requiring major expenditures of public funds to purchase these lands. TDR programs allow land owners in certain protected areas (“sending” areas) to sell their development rights to be used or ‘transferred’ to support more intensive development in certain target areas (“receiving” areas). TDRs may be used to protect sensitive environmental resources, farmlands, or greenspace. The selling landowner must enter into a conservation easement permanently restricting development of the sending parcel. The Georgia DCA and the Georgia Quality Growth Partnership have developed resources for TDRs in Georgia.

6.B.2 SUSTAINABLE GROWTH PLANNING

Local land use decisions have a significant influence on water management and protection, and local infrastructure needs. Planning entities including the Georgia Department of Community Affairs, the Atlanta Regional Commission, and the Georgia Quality Growth Partnership have led the way in promoting a more integrated approach to local land use decisions through the use of sustainable growth tools. Tools such as livable communities concepts have advanced efforts to guide development activity to desired growth areas.

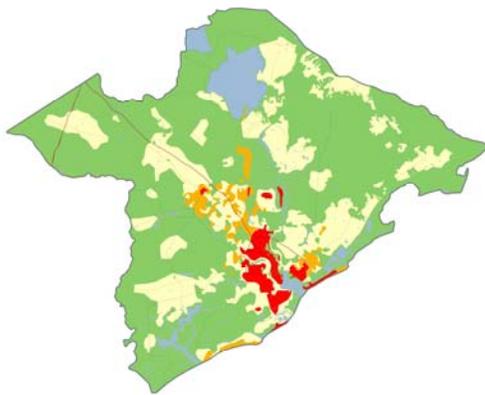
Sustainable growth measures promote a compact, efficient, and environmentally sensitive pattern of development that influences travel, housing, and employment choices by directing new development away from rural or naturally sensitive areas and toward existing or planned activity centers and public facilities.

As part of watershed planning, communities may choose to designate target areas for growth based on the greenspace/sensitive lands targeted for preservation. Tools for sustainable growth planning may include establishing nodal development patterns, infill and redevelopment of city centers, and planning capital improvement projects for desired growth areas. Each of these planning concepts focuses growth on areas that can support the growth without impacting watershed health.

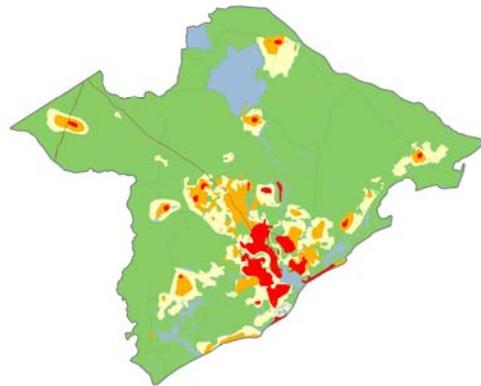
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Development Node Planning – Scattered, low-density development tends to spread growth uniformly across the landscape, consuming more greenspace, eroding rural character and disrupting natural systems and habitat. A nodal pattern in contrast promotes more concentrated growth in areas suitable for development, such as land with limited environmental sensitivity, strong transportation and transit access, and proximity to existing infrastructure.

Nodal development can enhance the overall environmental quality of communities by accommodating the same level of activity in a smaller footprint, thus reducing the amount of land that is disturbed and eventually converted into impervious surfaces. More concentrated forms of development can also produce associated social and economic benefits related to more walkable, attractive, and vital settings. The graphic below demonstrates the ability of node-based planning to protect more open space by directing growth closer to established areas or within defined, denser cores.



Sprawl development



Nodal development

Infill and Redevelopment – Adopting infill development codes promotes a more efficient and intensive use of existing infrastructure and suburban/urban sites and thus reduces development pressure on greenfields. Redevelopment of brownfield and greyfield sites provides more efficient use of existing infrastructure and has economic development benefits.

Brownfields are abandoned or underutilized industrial and commercial facilities that have real or perceived environmental contamination. Greyfield developments are abandoned or underutilized properties, such as regional shopping malls and strip malls. Encouraging infill and redevelopment can maintain growth in areas that already have services (water, sewer, transportation) and revitalize underutilized areas of the city or county.

Capital Improvement Plans & Service Delivery Areas – A community’s capital improvement plan (CIP) can be utilized as a valuable tool in sustainable growth planning. Beyond the stormwater CIP requirements in Measure 5.D.5, an expanded CIP and/or the creation of “service delivery areas” can help to prioritize public facilities and projects and guide infrastructure priorities across multiple departments to support community development goals and programs. Some potential uses and benefits of using CIPs and service delivery areas include:

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- Directing growth towards the most suitable lands while discouraging growth on environmentally sensitive lands. By focusing public infrastructure dollars on areas targeted for development or redevelopment, local governments can promote development in these desired locations.
- Infrastructure extensions including water, sewer, and transportation are limited to the service delivery area plan to encourage denser development and infill in those areas that can support it versus facilitating sprawling development patterns.
- Interjurisdictional cooperation and coordination through agreements related to service delivery, zoning and infrastructure improvement.

Another related policy that local governments can consider is a “repair first” policy for infrastructure. A repair first policy ensures that existing residents benefit from the taxes they pay to maintain the quality and adequacy of their infrastructure before infrastructure is extended to benefit new development.

6.B.3 GREENER APPROACHES TO GROWTH

Stormwater better site design, sustainable site design, Low Impact Development (LID), and Green Infrastructure are overlapping approaches that seek to reduce the impact a development site has on a watershed by attempting to preserve the hydrologic functions of the site. Encouraging these site planning and design techniques can reduce contributions to the stormwater system and have a positive benefit on local watershed health. In addition, many of these greener development approaches can reduce the costs of construction and need for infrastructure while creating more sustainable development and more livable communities.

Stormwater Better Site Design – Stormwater better site design, as outlined in the Georgia Stormwater Management Manual, is a set of site design techniques intended to reduce the environmental impact “footprint” of a land development project. These techniques include preserving natural features and resources, effectively laying out the site elements to reduce impact, reducing the amount of impervious surfaces, and utilizing natural features on the site for stormwater management.

Sustainable Site Design – Sustainable design attempts to reduce the amount of impervious area to minimize impact on native vegetation, and maintain recharge capacity. The management of stormwater is close to the source where it is generated with a strong emphasis on beneficial reuse where practicable. Sustainable site design provides multiple benefits for water quality, cooling, energy conservation, property enhancement and recreation.

Low Impact Development (LID) – The basic principle for LID sites is to model natural systems: manage rainfall at the source using uniformly distributed smaller stormwater management features at the lot level. LID's goal is to mimic a site's predevelopment hydrology as closely as possible. LID is a versatile approach that can be applied to new development, urban retrofits, and redevelopment/revitalization projects.

Green Infrastructure – Green infrastructure approaches focus on the capture, infiltration, evapotranspiration, and reuse of stormwater to maintain or restore the natural hydrology. Preservation and restoration of natural landscape features and more natural methods of stormwater conveyance and storage are important elements of green infrastructure.

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A thorough review of local practices and policies to identify those that discourage stormwater-friendly design approaches may lead to a more sustainable local development practices. The Center for Watershed Protection has a list of 22 model development principles and conducts local Site Planning Roundtables that focus on identifying opportunities for local policy changes to protect watershed health. Communities interested in promoting sustainable growth concepts may choose to use this checklist and process to modify local development requirements.

In addition to reviewing the practices that discourage desired land use patterns, it may be beneficial to work with the development community to identify incentives, which may be helpful in some communities to increase interest from engineers, designers, and contractors in greener design approaches. Incentives might include expedited plan review, recognition as “green communities”, provisions for infrastructure, financial/tax incentives, or bonus lots. In some areas, financial/tax incentives may already exist to encourage redevelopment activities for economic development purposes and could be modified to provide watershed protection benefits.

6.B.4 WETLAND AND STREAM RESTORATION MITIGATION BANK

Wetland mitigation and stream restoration are required by the U.S. Army Corps of Engineers (Corps) to offset impacts to wetlands and streams authorized under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. The goal of restoration activities is to replace lost wetland functions which provide benefits including water quality protection, flood storage, fish and wildlife habitat, and groundwater recharge.

A mitigation bank may be set up for a wetland or stream that has been “restored, established, enhanced, or (in certain circumstances) preserved for the purpose of providing compensation for unavoidable impacts to aquatic resources permitted under Section 404 or a similar state or local wetland regulation. Wetlands or streams restored for a mitigation bank serve as credits that can be sold to permit applicants or used by the bank to offset other wetland and stream impacts.

The value of a mitigation bank is founded upon compensatory mitigation credits, which are credits available for sale. Based on an ecological assessment, the earned credits from each restoration project vary based on the ecological function provided by the project. Post-construction monitoring and maintenance is required to ensure the ecological functions have been replaced by the project.

Several jurisdictions in the Metro Water District have developed mitigation banks as a method of advancing watershed improvements. A jurisdiction may choose to identify impaired waters and complete restoration as part of their watershed improvement program. The sale of credits from the restoration project can then be used to fund additional restoration efforts.

6.B.5 STREAM BUFFER MAPPING AND MAP MAINTENANCE

There are a number of different stream buffer requirements that affect communities within the Metro Water District, including the Georgia Erosion and Sedimentation Control Act (ESCA) buffers for streams and trout streams, the small drinking water supply watershed buffer requirements under the Georgia Planning Act, the Metropolitan River Protection Act, and the Metro Water District’s stream buffer protection ordinance. Communities may wish to create maps that clearly identify the appropriate stream buffers within their jurisdiction. It is recommended that these stream buffer maps be incorporated into the community’s zoning maps and other community planning efforts wherever possible.

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Local issuing authorities under the ESCA are responsible for making stream determinations for new development and re-development sites in order to determine the appropriate buffer widths, as discussed in Section 5 (measure 5.B.3). Developing a map of known streams and their associated stream buffers may help ensure that all local staff, the development community, and private citizens are aware of the stream buffer requirements. Local governments do have the responsibility for making stream determinations based on state guidelines for smaller, unmapped streams within their jurisdiction.

Communities should note on the map that additional streams and stream buffers may exist that are not indicated on the map. Communities may elect to color-code watersheds according to stream buffer requirements, to avoid confusion that the map does not show all streams with buffers within the jurisdiction.

6.B.6 WATERSHED-BASED PLANNING & IMPLEMENTATION PROGRAMS

Local stormwater programs and watershed management activities generally taken place within the political boundaries of a local jurisdiction, not within the overall context of a watershed. Some communities may elect to develop and implement watershed-based detailed investigations and implementation programs, either on their own or in conjunction with neighboring jurisdictions that share a watershed. For example, a jurisdiction may choose to perform their asset management, pollution prevention, and resource-specific management activities all within a specific watershed, which would rotate from watershed to watershed within the community on an annual basis.

6.C LAND DEVELOPMENT

6.C.1 CLEARING AND/OR GRADING LIMITS

Unnecessary clearing and grading of large areas of land often results in water quality and water quantity problems. There are a number of alternatives that local governments may consider to control the extent of clearing and grading associated with new development sites.

- Require fully-phased projects by establishing the maximum acreage of land that may be exposed to erosion and sedimentation at any given time. One phase must be completed and stabilized before clearing/grading the next phase.
- Limiting the area that a developer may clear and/or grade during construction to retain minimum lot coverage of native vegetation and topsoil, in addition to the required buffer zones adjacent to waterbodies and other sensitive resources.
- Only issue grading permits to sites with a proposed or approved grading plan, reducing the practice of clearing and grading properties to make sale more marketable.
- Limit initial clearing and grading to only road construction and utility installation until building permits are issued for individual residential lots.
- Delay construction activity for sites that have been commercially logged by establishing a wait time between logging activities and issuance of a land disturbance permit. These timelines are typically 2 years or greater.

6.C.2 STEEP SLOPES REQUIREMENTS

The threat of erosion and sedimentation increases as the slope of the land increases, especially if steep slopes are intended to be graded during construction. Several communities have initiated local requirements that restrict the development of steep slopes, requiring additional erosion and sedimentation control, or both to protect watershed health. Some requirements are based solely on the steepness of the slope while others are related to both the slope and proximity to streams. Examples for local governments in the Metro Water District to consider include:

- Prohibit development activity on all slopes greater than 40%;
- Require a steep slopes analysis for any development activity on slopes greater than 25% but less than 40% that outlines mitigation measure to prevent erosion;
- Require mitigation measures such as increased stream buffer width or additional erosion and sediment control measures; and
- Require a more detailed construction phasing plan that shows the installation of erosion and sediment control measures and adequate drainage measures during each phase of construction.

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6.C.3 STREAM CROSSING AND CULVERT DESIGN REQUIREMENTS

Traditional pipe and box culvert stream crossings can cause negative impacts to fish migration and also may cause erosion upstream and sedimentation downstream of the crossing. To minimize the negative habitat impacts of traditional crossings, local governments may consider implementing a stream crossing and culvert design policy that is more stringent than the Corps requirements under Section 404 of the Clean Water Act for stream crossings.

A typical stream crossing and culvert design policy for fish migration and erosion prevention would provide for:

- Bridges (especially clear span bridges) which are the preferred option for stream crossings.
- Bottomless or embedded culverts which are preferred for smaller streams. Bottomless culverts (arch culverts) are essentially spans on top of poured-in-place footings with a natural surface bottom. Profiles may be arched, rectangular or round and materials may be corrugated metal, pre-cast concrete, cast-in-place concrete, or HDPE. Like a span bridge, bottomless culverts allow the stream to maintain its natural flow and sediment transport functions.
- Embedded culverts are closed bottom structures that consist typically of round or elliptical arch pipes with a simulated stream bed of natural stream bed materials. A round pipe in an embedded culvert will need to be larger to accommodate flood flows and to account for the sediment in the bottom of the pipe to simulate natural stream conditions. Current U.S. Fish and Wildlife Service's design manual does allow perched culverts when used in combination with embedded culverts.

Example requirements include:

- Bridges are required for any stream with a drainage area equal to or greater than 20 square-miles. Clear span bridges are the preferred option for smaller streams, but other alternatives will be acceptable if constructed according to specific guidelines.
- For streams smaller than 20 square-miles and greater than 0.2 square-miles in drainage area, bridges, bottomless culverts or embedded box or pipe culverts are recommended. It is preferable that box culverts be constructed using prefabricated materials to minimize the duration of in-stream construction activities. Single-barrel designs should be used whenever pipe culverts are used. Pipes are not acceptable for use in the design of multi-barrel culverts. Multi-barrel culverts should be designed using box culverts, and it is preferable that the center barrel(s) be made bottomless. Under no circumstances shall non-embedded or perched culverts (box or pipe) be used.

The U.S. Fish and Wildlife Service's stream crossing design manual for Georgia and additional information is available on their website:

http://www.fws.gov/athens/stream_crossing/index.htm

6.D ASSET MANAGEMENT

6.D.1 PRIVATE DAM INSPECTION PROGRAM

The Georgia Safe Dam Program covers dams greater than 25 feet tall or that impound more than 100 acre-feet of water. Dams associated with small retention and neighborhood ponds are therefore not inspected by Georgia EPD. While the threat of loss of life and property damage is lower from these smaller impoundments, the breach of a dam can still have a catastrophic impact on watershed health and the local community.

Local governments may choose to inspect these private dams either as part of a calendar-based or criticality-based asset management program. Since most local governments do not have staff certified in dam inspections, the inspections are focused on visual concerns. Features for the visual inspections may include:

- Upstream and downstream slopes for sinkholes or signs of erosion or seepage;
- Upstream and downstream slopes for vegetation, such as trees, that should be removed;
- Outlet structure for visible clogs or damage;
- Toe of slope for seepage and properly functioning toe drains;
- Primary spillway and settling basin for erosion or cracks depending on the dam type;
- Emergency spillway for obstructions or damage; and
- Outlet flow should be visible depending on the water level in the impoundment.

If the routine inspection uncovers any potential concerns, the private property owner should be instructed to hire a qualified dam engineer to perform a thorough assessment and correct any deficiencies. Before initiating a private dam inspection program, it is important to communicate the program goals with the legal department to ensure the proper enforcement mechanism exists for dams of concern.

A common maintenance concern with dams is the presence of trees and vegetation that compromise the structural integrity of dams. FEMA has published a Technical Manual for Dam Owners on the impacts of plants on earthen dams that is available for download on their website. This manual may help educate private dam owners on their responsibilities.

6.D.2 COMPUTERIZED MAINTENANCE MANAGEMENT SYSTEM

A computerized maintenance management system (CMMS) is a type of database-derived software that performs functions in support of management and tracking of operations and maintenance (O&M) activities. A CMMS may be a valuable tool to communities in the Metro Water District creating an asset management-based approach to infrastructure inspections and maintenance. The functionality of CMMS varies greatly, but some of the more common features include:

- Work order generation, prioritization, and tracking by equipment/component;
- Historical tracking of all work orders generated that can be sorted by equipment, date, person responding, etc;
- Tracking of scheduled and unscheduled maintenance activities;

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- Storing of maintenance procedures as well as all warranty information by component;
- Storing of all technical documentation or procedures by component;
- Real-time reports of ongoing work activity;
- Calendar-based or criticality-based preventive maintenance work order generation;
- Capital and labor cost tracking by component as well as shortest, median, and longest times to close a work order by component;
- Complete parts and materials inventory control with automated reorder capability;
- Handheld device interface to streamline input and work order generation; and
- Outside service call/dispatch capabilities.

CMMS may be a valuable support tool when moving from a reactive to a proactive operations and maintenance (O&M) program. Scheduling routine maintenance and tracking inventory supplies may create more efficient stormwater operations. Communities interested in implementing a CMMS may select from a wide range of both “out of the box” and customized solutions. The level of sophistication and cost of these systems differs greatly and many will integrate with an existing GIS platform. In some communities, it may be possible to share a CMMS system with the local wastewater provider.

6.D.3 PRIVATE STORMWATER SYSTEM INSPECTIONS AND MAINTENANCE

Local governments under the mandatory local management measures in Section 5 are responsible for developing a local inspections and maintenance program (Measures 5.D.3 and 5.D.4). Most communities will focus inspections and maintenance efforts on public property and publicly-maintained right-of-way. Some communities with dedicated funding sources or communities with specific private property concerns may choose to perform inspections and/or maintenance for stormwater structures on private property that are beyond the scope of the mandatory local management measures.

It is important to clarify that under the mandatory local management measure for local stormwater system inspections (Measure 5.D.3), communities must inspect private structural stormwater controls constructed since the adoption of their post-development stormwater management ordinance. These structural controls should have maintenance agreements filed with the local government and must be periodically inspected for compliance with the maintenance agreements.

Inspection of legacy stormwater controls is optional under the Watershed Management Plan, but may be helpful in areas with water quality or flooding challenges. The acceptance of maintenance responsibilities for private facilities should be outlined in the local extent of service/ level of service (EOS/LOS) policy (Measure 5.D.2).

Some local governments in the Metro Water District have agreed to accept maintenance responsibility for private detention ponds that meet certain minimum criteria. This program was in response to poor local maintenance of these structures by homeowners groups. Some communities with dedicated stormwater funding mechanisms may also choose to accept responsibility for certain residential stormwater facilities. If a community elects to accept maintenance responsibility, it is recommended that the property owner perform any necessary remedial maintenance prior to deeding maintenance responsibility to the local government.

Section 6: OPTIONAL LOCAL MANAGEMENT MEASURES

6.D.4 ELECTRONIC AS-BUILT SUBMISSION GUIDELINES

To ensure that stormwater infrastructure inventories remain up-to-date, communities may choose to require electronic as-built submissions in either an AutoCAD or GIS format. The electronic standards can specify the line size, color, and style required for each feature in the as-built to allow seamless integration with the jurisdiction's local AutoCAD and/or GIS maps.

Submissions may be required in both paper and electronic format and may be requested through a secure website or other electronic media. Currently, most local governments must digitize all new development features based on the paper as-built drawings. Importing electronic as-built records can result in a significant time savings. Staff will need to check the detail and accuracy of the electronic submissions, including use of correct reference locations.

6.E POLLUTION PREVENTION

6.E.1 STREET AND PARKING LOT CLEANING

Street and parking lot cleaning programs can reduce nonpoint source pollutant loading to local waterways through the mechanical sweeping and vacuuming of roadway and parking lot debris using heavy equipment. Street sweeping and vacuuming helps proactively minimize water quality degradation of receiving waters by reducing the amount of sediment, metal particles, litter, paper, leaves and other debris discharged into urban waterways. Street and parking lot cleaning may also reduce localized flooding by removing vegetative and other debris that might otherwise clog the conveyance system during a storm event. Many communities in the Metro Water District have street cleaning programs for the aesthetic benefits of litter removal as well as water quality benefits.

Advances in street sweeping and vacuuming equipment have increased the ability to remove pollutants, especially finer sediment particles, from roadways. A recent Terrene Institute study concluded that new vacuum assisted dry street sweeper equipment may reduce annual sediment loading by 50-88% for residential streets depending on sweeping frequency. Regenerative-air sweepers, which blast air on to pavement surfaces to loosen particles to be vacuumed, have also proven to be effective for capturing fine sediment particles from roadways. Vacuum-assisted sweepers have additional benefits as they may also be used to clean clogged stormwater catch basins. Pressure washing or hosing down streets, parking lots, or sidewalks without a wash water collection system creates an illicit discharge and should not be performed.

6.E.2 HOUSEHOLD HAZARDOUS WASTE COLLECTION

A variety of hazardous and potentially harmful chemicals and materials are improperly used and disposed of by residential homeowners. Materials such as paints and thinners, cleaning products, wood preservatives, driveway sealants, and a variety of other miscellaneous household chemicals can enter stormwater if improperly used, stored, or disposed. Many household waste items pose potential water quality threats if disposed of improperly.

Local governments may choose to provide accessible recycling programs for hazardous/toxic household waste to assure proper disposal of these items. Several local governments have elected to hold household hazardous waste amnesty days with a great deal of success. The Georgia Pollution Prevention Assistance Division (P2AD) has information on proper disposal techniques for a number of household wastes on their website.

6.E.3 PET WASTE PROGRAM

When pet waste is not properly disposed, it can wash into nearby waterbodies or can be carried by runoff into storm drains. It is recommended that multi-family dwellings and high-density mixed-use developments be encouraged to participate in a voluntary program to install animal waste stations or “pet posts” for their residents. These stations provide plastic bags and instructions for disposing of pet wastes.

Pet-specific park areas are one way to involve neighborhood residents and community organizations to ensure that owners are picking up after their pets and properly disposing of the waste. It is recommended that new parks also have pet posts. As opportunities arise, existing recreational areas may be retrofitted with these structures.

6.E.4 LIVESTOCK / AGRICULTURAL PRACTICES

The primary function of an animal waste management system is to improve water quality by providing stormwater mitigation to store and handle livestock and poultry waste to minimize pollution and to provide information to producers about the value of keeping livestock out of streams. Collection and proper treatment of animal wastes, fertilizers, and pesticides can significantly reduce nutrient and bacteria runoff associated with confined or concentrated livestock feeding areas and cattle and chicken processing facilities.

As potential animal waste issues are identified through monitoring programs, local governments may encourage landowners to work with the local office of the Natural Resources Conservation Service (NRCS) to address these issues. Local governments with a significant level of agriculture/livestock operations may encourage periodic or ongoing interaction among farmers/operators and the local NRCS office to maintain effective and current BMPs for farming activities and livestock waste management. Grant programs may be available through the NRCS to implement best practices.

6.E.5 MOBILE CAR WASHING POLICY

Mobile car washing activities may be a concern to some jurisdictions in the Metro Water District due to the number of car washing charity events or entrepreneurs who set up mobile carwashes in uncontrolled environments. To mitigate the stormwater pollution effects from mobile car washing activities, some communities may elect to establish policies and permitting mechanisms for these activities.

Mobile car washing is distinct from commercial car washing activities in that cleaning is not conducted in a fixed location with drainage conveyed to the sanitary sewer system but rather in a variety of areas where the discharge is usually conveyed in to the storm sewer system.

Local governments may wish to regulate mobile car washing activities through permits to reduce the potential negative impact. The permit system may also be coordinated with outdoor watering restrictions to ensure all local rules are followed. Through the permit, local governments may require use of appropriate best management practices such as:

- Wash pads or absorbents to capture waste water from the washing activities;
- Washing vehicles on grassed or gravel (permeable) surfaces, not paved surfaces;
- Use of spill response kits to soak spilled chemicals or detergents;
- Use of biodegradable and non-toxic soaps and phosphorus-free detergents;
- Sealing or buffering storm sewer drains using absorbent booms near the wash activity so wastewater is not introduced into receiving streams but instead vacuumed up with a wet vacuum; and
- Routing flows to the sanitary sewer collection system.

Local governments may wish to implement outreach programs that could include the distribution of “water friendly” car wash kits to charity organizers or other operators of mobile car washing, as well as training and education videos and literature explaining the link between stormwater pollution and car washing activities. Alternatively, local governments that issue mobile car washing permits may choose to collect a fee from the mobile wash operator that could contribute funding to the jurisdiction’s watershed protection program, such as their watershed education campaign.

Section 6: OPTIONAL LOCAL MANAGEMENT MEASURES

6.E.6 SWIMMING POOL DISCHARGE PERMITS

The discharge of swimming pool water often contains elevated levels of chlorine (approximately 2 to 4 parts per million of chlorine) and other chemicals used to reduce bacteria and algae and control pH. The average in-ground swimming pool has a capacity of about 20,000 gallons of water.

Public pools, including city/county-owned, hotel pools, and some residential neighborhood pools fall under the jurisdiction of the County Board of Health. However, there are no requirements that preclude a community in the Metro Water District implementing a permit requirement. Since 2000, all pools regulated by the County Board of Health are required to be connected to sanitary sewer or a septic system. Older pools and some residential pools may not be connected to sanitary sewer or a septic system, so may pose a risk to watershed health. Depending on the prevalence of pools and their age, local governments within the Metro Water District may choose to require swimming pool discharge permits as a mechanism to ensure that pools are emptied according to local requirements.

Discharging chlorinated pool water to stormwater drains can pollute receiving surface waters. The best methods for discharging pool water include discharging the water to the sanitary sewer or de-chlorinating pool water and then discharging it over a grassed or permeable area. Holding pool water in a pool for about a week after stopping chlorination practices allows the chlorine levels to break down due to sunlight exposure. Therefore, holding pool water before discharging the water on to permeable surfaces may be a desirable pollution prevention practice. Similarly, pH levels of pool water to be discharged onto pervious surfaces should be between 6.5 and 8.5. Discharge permits could require pool owners to obtain the chlorination and pH levels and ensure a proper discharge method to protect local waterbodies.