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***SUPPLEMENT TO THE***  
**GEORGIA STORMWATER MANAGEMENT**  
**MANUAL**

*AUGUST 2015*

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## CHAPTER 1: PURPOSE AND APPLICABILITY

The Columbia County Engineering Services Division, specifically the Stormwater Utility Department has adopted the Georgia Stormwater Management Manual (GSMM) as the basis for the design and review of stormwater management facilities and practices in Columbia County, Georgia. The purpose of this Supplement is to clarify the guidelines set out in the GSMM for the specific management of stormwater runoff within unincorporated areas of Columbia County, Georgia. Chapter 34, Article IV Stormwater Management, of the Columbia County Code of Ordinances (the Ordinance) provides the Department with the authority to manage stormwater based on the scope of responsibilities it defines. In summary, persons wishing to develop land in Columbia County should reference the following documents for guidance:

**Chapter 34, Article IV Stormwater Management, of the Columbia County Code of Ordinance** provides the legal authority for stormwater management, definitions, and a description of the appeal / penalty processes.

**Georgia Stormwater Management Manual (GSMM)** Volume I, Chapter 4 provides guidance on implementing stormwater management requirements during development. Volume II provides specific guidance for unified stormwater sizing criteria and for methods of estimating stormwater runoff.

**Columbia County Supplement** (this document) to the GSMM provides county specific clarification and is organized into the following sections:

- *Chapter 1: Purpose and Applicability* - provides guidance on the application and exemption of these regulations to new development and redevelopment projects;
- *Chapter 2: Stormwater Hydrology- describes methods of computing runoff and generating hydrographs required in computations;*
- *Chapter 3: Stormwater Management Facilities and Practices* - describes the criteria for requiring stormwater detention, provides guidance on the design of stormwater detention facilities and practices, and other miscellaneous requirements;
- *Chapter 4: Stormwater Drainage System Design* - provides guidance on the design of stormwater conveyance facilities such as gutter flow and inlets, storm drain pipes, culverts, and small open channels and swales;
- *Chapter 5: Stormwater Management Review Requirements* - delineates the process for the design and review of stormwater management facilities for new and redevelopments, including the pre- and post-construction requirements necessary to obtain development permits; and,
- *Appendices* –provides information to meet the requirements above as well as reference information from Federal and State agencies necessary to obtain development permits.

## **1.1 Applicability**

All land development activities in Columbia County including planned construction of commercial, industrial, governmental, residential, parks, recreational, or linear type developments shall be governed by the Ordinance. Land development activities meeting any of the following criteria will be required to comply with the stormwater management standards of the Ordinance, the GSMM, and this Supplement:

1. New development that involves the creation of 5,000 square feet or more of impervious cover, or that involves other land development activities disturbing (one) 1 acre or more;
2. Redevelopment that includes the creation or addition of 5,000 square feet or more of impervious cover, or that involves other land development activity disturbing one (1) acre or more;
3. Those developments that construct improvements in phases and that meet criterion No.1 above when considering the cumulative runoff increase due to all phases; and,
4. Any development that would increase post-developed runoff more than 1.0 cubic feet per second over the pre-developed runoff.

When one of these conditions is met, the development shall be governed by the stormwater design specifications in the GSMM and Chapter 3 of this Supplement. The Columbia County Stormwater Quality Development Review Tool described in Chapter 6 should be used to determine compliance with standards for total suspended solids (TSS) reduction for the proposed development.

## **1.2 Exemptions**

The following activities are exempt from the requirements of the Ordinance:

1. Additions or modifications to existing single-family detached or duplex residential structures if they do not disturb over 5,000 square feet of land area;
1. Developments that do not disturb over 5,000 square feet of land area;
2. Individual single-family residential lots that are not part of a subdivision or phased development project;
3. Agricultural or silvicultural land management activities within areas zoned for these activities; and,
4. Repairs to any stormwater management facility or practice deemed necessary by the Stormwater Department.

## CHAPTER 2: STORMWATER HYDROLOGY

### 2.1 Methods for Estimating Stormwater Runoff

Unless otherwise noted in this Supplement, computing runoff and generating hydrographs must be done by one of the methods outlined in the GSMM. Table 2-1 summarizes the hydrologic calculation methods that will be accepted by the Stormwater Department Manager and the section reference from the GSMM that explains each. The table also provides guidelines for using the appropriate method based on the size of the drainage area. Additional information relating to the design of conveyance structures can be found in Section 4.1 of the GSMM. The Rational Formula shall only be used to design conveyance systems. The Modified Rational Method may be used to estimate storage volumes for detention calculations in accordance with Section 2.2.6 of the GSMM.

**TABLE 2-1**

Methods for Runoff Computation

Computation Task	GSMM Chapter	Rational Formula	SCS	USGS Equations	Water Quality Volume
Size Limitations for Each Method		Up to 25 acres	0 to 2,000 acres	25 acres to 25 square miles	Based on Structural Control
Water Quality Volume (WQ <sub>v</sub> )	1.3				X
Channel Protection Volume (Cp <sub>v</sub> )	1.3		X		
Overbank Flood Protection (Qp <sub>25</sub> )	1.3		X	X	
Extreme Flood Protection (Q <sub>f</sub> )	1.3		X	X	
Storage Facilities	2.2		X	X	
Outlet Structures	2.3		X	X	
Gutter Flow and Inlets	4.2	X			
Storm Drain Pipes	4.2	X	X	X	
Culverts	4.3	X	X	X	
Small Ditches	4.4	X	X	X	
Open Channels	4.4		X	X	
Energy Dissipation	4.5		X	X	

Source: Georgia Stormwater Management Manual, Volume II, p. 2.1-2.

## **CHAPTER 3: STORMWATER MANAGEMENT FACILITIES AND PRACTICES**

Stormwater management typically relies on a system of natural and constructed stormwater management facilities for the storage, treatment, and conveyance of runoff. In Columbia County, stormwater management facilities may be deeded to the County for ownership and maintenance or remain the responsibility of the property owner. Due to the necessary maintenance and operation of these systems, Columbia County recognizes its role in facilitating these activities and addressing regional stormwater planning needs.

Columbia County encourages the use of better site design practices that preserve the natural drainage system and on-site, non-structural stormwater management practices whenever practical. These practices decrease the quantity and increase the quality of stormwater discharged to lakes and streams during rain events. Columbia County also encourages the protection and enhancement of existing wetlands and floodplains, which are protected from dredging and filling by 33 CFR Part 330 of the Federal Register and Section 404 of the Clean Water Act.

### **3.1 Stormwater Design Requirements**

The GSMM has developed a set of Unified Stormwater Sizing Criteria that serves as the basis of designing stormwater management facilities in Columbia County. These criteria provide an integrated approach for meeting the stormwater runoff quality and quantity management requirements for those applicable developments identified in Section 1.1 of this Supplement. The purpose of the Unified Stormwater Sizing Criteria is to design a stormwater management system to:

1. Remove stormwater runoff pollutants and improve water quality;
2. Prevent downstream stream bank and channel erosion;
3. Reduce downstream overbank flooding; and
4. Reduce the runoff from and safely pass extreme storm events.

Stormwater management facilities in Columbia County must be designed to meet the criteria in Table 3-1 using the appropriate runoff calculation methods described in Table 2-1 of Chapter 2 of this Supplement. Additional discussion of these criteria can be found in the GSMM, Volume II, Section 3.1.

Along with the criteria in Table 3-1, stormwater management facilities shall be designed such that the 50-year design storm is detained within the facility without engaging the principal spillway or riser. The principal spillway or riser should be used to pass the 100-year design storm prior to the water surface elevation reaching the elevation of the emergency spillway. The emergency spillway shall be sized to convey the 100-year design storm assuming the stormwater management facility's outfall is 100% clogged providing a minimum freeboard of 12 inches to the top of embankment. Spillways shall be adequately sized to convey runoff in accordance with the GSMM and this Supplement.

**TABLE 3-1**

Summary of the Statewide Stormwater Sizing Criteria for Stormwater Control and Mitigation

Sizing Criteria	Description
Water Quality	Treat 85% of the runoff from the storms that occur in an average year and reduce average annual post-developed total suspended solids loadings by 80%. For Georgia, these conditions equate to providing water quality treatment for the runoff resulting from the initial 1.2 inches of rainfall for every storm.
Channel Protection	Provide extended detention so that the 1-year, 24-hour storm event is released over a period of 24 hours to reduce bank full flows and protect downstream channels from erosive velocities and unstable conditions.
Overbank Flood Protection	Provide peak discharge control of the 25-year storm event such that the post-development peak rate does not exceed the predevelopment rate to reduce overbank flooding.
Extreme Flood Protection	Evaluate the effects of the 100-year storm on the stormwater management system, adjacent property, and downstream facilities and property. Manage the impacts of the extreme storm event through detention controls and/or floodplain management.

*Notes: Source: Georgia Stormwater Management Manual, Volume II, p. 1.3-1.*

### 3.2 Water Quality Performance Criteria

Total suspended solids (TSS) are a key pollutant associated with sediment runoff. It also serves as a "carrier" of other pollutants such as organics, nutrients, and metals. Thus, TSS, a measure of suspended matter-including soils and sediments-will serve as the watershed improvement guideline for managing pollutants.

Stormwater management systems (which can include both structural stormwater controls and better site design practices) must be designed to remove 80% of the average annual post-development TSS load and be able to meet any other additional watershed- or site-specific water quality requirements. All stormwater detention facilities shall be designed to control the peak flow rates associated with storms having 1-, 25-, 50- and 100- year storm frequencies as specified in Table 3-1 of this Supplement.

Columbia County will require that all sites utilizing dry detention structures discharge at 90% or less of the pre-developed rate of release. Sites using wet or regional detention structures will be allowed to release runoff at 100% of the pre-developed rate or release. It is presumed that a stormwater management system complies with this performance standard if:

1. It is sized to capture and treat the prescribed water quality treatment volume, which is defined as the runoff volume resulting from the first 1.2 inches of rainfall of every storm; and,
2. Appropriate structural stormwater controls are selected, designed, constructed, and maintained according to the specific criteria in this Supplement.

Use of the Stormwater Quality Site Development Review Tool, described in the Appendix of this Supplement, provides the developer and reviewer with a summary of the TSS reduction from each of the drainage areas and also presents the overall TSS reduction efficiency of the planned site. All runoff leaving the site shall be accounted for in the review tool. Please note that if this overall efficiency is less than 80%, then the site will fail to meet the recommendations of the Georgia Stormwater Management Manual and will not be approved.

### **3.3 Criteria for Requiring Stormwater Management**

Whenever a Stormwater Management Report indicates that adverse stormwater runoff impact is expected from the development of a property, that project shall be required to provide a stormwater management facility or facilities so that the Unified Sizing Criteria are met. The following criteria shall be evaluated by the design Engineer preparing the Stormwater Management Report and used in determining whether stormwater management facilities should be required for any portion of any site:

1. Existing land uses downstream;
2. Anticipated future land uses downstream;
3. Magnitude of increase in peak flows due to development;
4. Presence of existing drainage problems;
5. Capacity of existing and anticipated drainage systems;
6. Creation of concentrated flows where none had occurred previously;
7. Existing flows generated off-site that pass through the project site; and,
8. The nature of the receiving watercourse.

#### **3.3.1 Stormwater Management Not Required**

Stormwater management facilities shall be required for all development activities not meeting the Unified Sizing Criteria described in Section 3.1, unless the design Engineer provides certified documentation supporting the conclusion that one of the following is true and correct as applicable:

1. The uncontrolled, post-development runoff will leave the project site as sheet flow and will not have an adverse impact upon downstream properties due to dispersal of stormwater;
2. The effect of stormwater management will be to concentrate flows where sheet flow had occurred under pre-developed conditions, and any impact of increased sheet flows upon downstream properties would be less adverse than that which would result from the

concentrated flow from a stormwater management facility, even if energy dissipation devices were employed;

3. The runoff will flow directly into a flood plain without crossing off-site properties, and the post-development runoff will constitute less than five (5%) percent of the total peak flow in the watercourse, at the point where the watercourse crosses the project site's downstream property line. This condition will be referred to hereafter as the "5% rule"; and,
4. The uncontrolled flow will pass through downstream properties in drainage easements obtained by the developer to existing stormwater management facilities that have been designed to manage the upstream property's runoff, and the flow is shown not to produce adverse impacts to the downstream properties.

Should the design Engineer conclude that stormwater management facilities may not be necessary because of anticipated compliance with the foregoing items, and then rigid compliance with all of the following criteria is mandatory:

1. A Stormwater Management Report (Section 5.1.2) shall always be required whether or not stormwater management facilities are required; and,
2. If the applicant proposes to show that the detention requirements may be eliminated for all or a portion of a project, then a Pre-submittal Conference with the Stormwater Department is required prior to preparation and submittal of construction plans for the project.

At the Pre-submittal Conference with Columbia County staff and the consultant shall be prepared to discuss the downstream analysis findings as follows:

1. The affected stream must be analyzed for a distance downstream to a point where the proposed development represents less than (10%) percent of the total watershed. This analysis shall be referred to hereafter as the "10% rule." The analysis must include all culverts, obstructions, existing and potential erosion problems, existing structures, proposed structures, proposed improvements and any other pre-developed or post-developed modifications to natural conditions; and,
2. If the existing downstream conditions are overburdened within the "10% downstream point" by the pre-development flows in the stream, then stormwater management shall be required unless the developer elects to eliminate the downstream overburdened conditions at his or her expense when the development occurs.

If the 5% percent rule described above is to be used to show that the stormwater management requirements may not apply, then the following must be included in the Stormwater Management Report:

1. The 5% study point has to be at the downstream property line; and,
2. The 5% study will compare peak developed flows originating on the site against peak flows for the 1-, 25-, 50- and 100-year storm events of the major stream at the downstream property line. Comparison of the peak flows shall include the timing of the peak flows.

### 3.3.2 Special Provisions for Redevelopment

Urban redevelopment has numerous advantages. It reduces the loss of natural areas and open space, revitalizes older neighborhoods, and avoids the need to build infrastructure to support new development. However, space limitations sometimes preclude the application of the stormwater management criteria specified above. In these cases, alternate stormwater management requirements can be applied for redevelopment projects.

Redevelopment projects that are shown to be unable to meet the stormwater criteria above are required to implement one of the following options:

1. Reduce existing site imperviousness by 20%;
2. Provide water quality treatment for 20% of the site's imperviousness; or,
3. A combination of 1 and 2.

Some techniques that may be used to achieve the 20% imperviousness reduction are green roofs, smaller parking areas, or landscaping. Water quality treatment can be implemented through the application of bioretention facilities, stormwater planters, rainwater capture devices, and sand filters.

### 3.4 Structural BMP Specifications

Table 3-2 provides an overview of the structural BMPs that can be used for stormwater control in Columbia County. For specific design criteria and examples refer to Volume II, Section 3 of the GSMM. These BMPs are for general application and can be designed for use in a variety of situations.

Other structural controls, including proprietary hydrodynamic separation systems and others listed in the GSMM as "limited application structural controls," are recommended for limited use with particular land uses and densities or as one part of a larger stormwater management design and will only be allowed by the Director of the Engineering Department where appropriate.

**TABLE 3-2**  
General Application Structural Best Management Practices

Structural Control	Examples	Description
Stormwater Ponds	Wet Pond Wet Extended Detention Pond Micropool Extended Detention Pond Multiple Pond Systems	Stormwater ponds are constructed stormwater detention basins that have a permanent pool of water. Runoff from rain events is detained and treated in the pool.

Stormwater Wetlands	Shallow Wetland Extended Detention Shallow Wetland Pond/Wetland Systems Pocket Wetland	Stormwater wetlands are constructed wetland systems used for stormwater management. Stormwater wetlands consist of a combination of shallow marsh areas, open water and semi-wet areas above the permanent water surface.
Bioretention Areas	Bioretention facilities (rain gardens) Stormwater planters	Bioretention areas are shallow stormwater basins or landscaped areas that utilize engineered soils and vegetation to capture and treat stormwater runoff. Runoff may be returned to the conveyance system, or allowed to partially exfiltrate into the soil.
Sand Filters	Surface Sand Filter Perimeter Sand Filter	Sand filters are multi-chamber structures designed to treat stormwater runoff through filtration, using a sand bed as its primary filter media. Filtered runoff may be returned to the conveyance system, or allowed to partially infiltrate into the soil.
Infiltration Trenches		An infiltration trench is an excavated trench filled with stone aggregate used to capture and allow infiltration of stormwater runoff into the surrounding soils from the bottom and sides of the trench.
Enhanced Swales	Dry Swale Wet Swale/Wetland Channel	Enhanced swales are vegetated open channels that are explicitly designed and constructed to capture and treat stormwater runoff within dry or wet cells formed by check dams or other means.

Source: Georgia Stormwater Management Manual, Volume II, P. 3.1-2.

### 3.5 Miscellaneous Requirements for Stormwater Facilities and Practices

The following criteria shall be required for public and private stormwater facilities unless waived by the Director of Engineering Services Division.

#### 3.5.1 Stormwater Management Facility Access

All stormwater management facilities shall be on one parcel to include a 30-foot minimum access from a public street. The access shall be a minimum width of 12 feet and be hard surface such as gravel with a geotextile or asphalt pavement, depending on slope. Configuration and type shall be approved by the Stormwater Department. Access for maintenance shall be provided to the pond bottom, outlet structure, and outfall.

### 3.5.2 Stormwater Management Facility Fencing

When a stormwater management pond is over four (4) feet deep and in a location that constitutes a danger to humans, access shall be restricted by a permanent fence or barrier and warning signs. Fences shall be six (6) feet high chain link with 3 strands of barbed wire or other approved material with a sixteen (16) foot wide gate. Fences shall be located on the property lines. Fences and gates may be located away from the right-of-way if approved by the Stormwater Department.

### 3.5.3 Silt Gauge

A silt gauge will be installed on all dry detention ponds and sediment forebays consisting of a durable weather-resistant post. The post will be embedded a minimum of 2 feet and extend a minimum of 5 feet above ground. Numbers and adjacent tick marks must be on the post beginning with the number "1" at 1 foot above the ground elevation and thereafter a number tick mark for each corresponding foot. Numbers and tick marks must be clear, readable, weather resistant, and durable. A comparable alternative may be used upon approval by the Stormwater Department.

### 3.5.4 State Waters Regulated by the Georgia EPD

Stormwater management facilities are not allowed in any classified State Water that requires a buffer (i.e. perennial and intermittent streams). However, stormwater management facilities are allowed in State Waters that do not require buffers (i.e. ephemeral streams) provided that sediment storage is not included.

## **CHAPTER 4: STORMWATER DRAINAGE SYSTEM DESIGN**

In every location, there are two stormwater drainage systems, the minor and major system. Three considerations largely shape the design of these systems: flooding, public safety, and water quality. Additional discussion of these criteria can be found in the GSMM, Volume II, Chapter 4.

### **4.1 Minor Drainage System Design**

This section is intended to provide design criteria for the design of minor drainage system components including:

- Street and roadway gutters;
- Stormwater inlets; and,
- Storm drain pipe systems.

#### **4.1.1 Street and Roadway Gutters**

Catch basins shall be spaced so that the spread in the street for the 25-year design flow shall not exceed the following as measured from the face of the curb:

- Spread of one-half of the travel lane or 7-feet, whichever is less; or,
- 4-inches in depth within the gutter section.

All driveways tying into the curb and gutter section shall be a height equal to or greater than the height of the curb at the right-of-way.

#### **4.1.2 Catch Basins and Inlets**

Catch basins shall be constructed in accordance with Georgia DOT specifications. Additional discussion of design criteria can be found in the GSMM, Volume II, Section 4.2.

#### **4.1.3 Storm Drain Pipe Design**

Piped drainage structures shall be designed to meet the following criteria:

1. Street catch basins, inlets, cross drains, and longitudinal piping shall be designed to be full or practically full but not under pressure head during the 25-year storm and shall have a minimum size of 18 inches in diameter;
2. The 100-year storm frequency shall be used on live streams, cross drains serving tributary areas of 10 acres or larger and any other drainage system receiving and/ or transferring offsite drainage flow with 20% of the pipe to be embedded per U.S. Corps of Engineers standards;
3. Velocities for all pipes should be kept to a minimum of 2.5 feet per second and a maximum of 15 feet per second. Outlet velocities, if practical, shall not exceed four (4) feet per second when flowing full. However, if outlet velocities exceed (5) feet per second then energy dissipation devices and/ or channel protection must be provided;
4. The downstream end of all storm drain pipe shall be located at a minimum of fifty (50) feet past the building line or to the property line, whichever is less, for pipe sizes up to and including thirty-six (36) inches in diameter, unless the storm drainage is on a live stream;
5. For all pipe design, the design Engineer shall check the 100-year hydraulic grade line to determine that no building structures or property will be flooded; and,

6. Easements suitable for the construction and maintenance of the drainage system shall be provided for drainage pipe to be deeded to Columbia County. Easement widths shall be calculated as  $((2 * \text{depth}) + \text{pipe diameter})$  and rounded up to the nearest 5 foot distance (i.e. 23 feet minimum width should be rounded to 25 feet). Easements shall be located on only one parcel and not split along property lines. No obstruction shall be built; constructed or planted that would inhibit proper function of the drainage system. No permanent structures or equipment may be placed within a piped drainage easement, unless an Indemnification Agreement is approved by Columbia County.

The type of pipe required shall be reinforced concrete pipe (RCP); high density polyethylene pipe (HDPE); or alternative pipe material approved by the Director of Engineering Services Division. The construction standards and design criteria for each type of pipe may be obtained from the Engineering Services Division. RCP will be required under the following conditions:

1. When the storm drain pipe will be placed in a live stream and a more economical solution is not a viable alternative as determined by the Director of Engineering Services;
2. When the storm drain pipe will have over fifteen (15) feet of cover; and,
3. All storm drain pipe under County owned roads and within rights-of-ways.

The storm drain pipe designs and related plans and specifications shall be prepared by a Professional Civil Engineer currently registered in the State of Georgia. The computations must be dated, project identified, signed and sealed by the Engineer. The design Engineer's seal and signature shall be on all residential and commercial subdivision plans that involve new public improvements.

Plans, specifications and computations must be complete in detail sufficient to enable an engineer to fully check and verify the results and computations. The plans used for construction must contain basic design data, a project narrative, schedule of construction, name and address of person responsible for construction, and the design Engineer's seal, signature and address. After construction and before acceptance for occupancy or final plat approval, the design Engineer must certify with their seal and signature that the "as-built" conditions of the storm drains will meet the requirements of this Supplement.

## **4.2 Culvert Design**

All culverts shall be designed to convey the 25-year design storm and the conditions below shall be checked for the 100-year design storm to ensure building structures and properties are not flooded or damaged. All culverts shall be constructed of concrete with a minimum size of 18 inches. Culverts shall not skew more than 45 degrees as measured from perpendicular to the roadway. Inlet and outlet headwalls are required for all culverts.

### **4.2.1 Velocity**

The maximum velocity should be consistent with the channel stability downstream from the culvert outlet for the 25-year design storm. The minimum velocity shall be 2.5 feet per second for the 2-year design storm to ensure the culvert will be self cleaning.

#### 4.2.2 Length and Slope

The culvert inverts should be aligned with the channel bottom and alignment should match the angle of the stream. Pipe restraining methods must be used if the maximum slope exceeds 10%. The maximum drop between the inlet and outlet inverts of a culvert is 5 feet.

#### 4.2.3 Headwater Limitations

The allowable headwater shall:

1. Not adversely affect upstream properties; and,
2. Provide 18 inches of freeboard from low point in the roadway or where flow diverts around culvert.

### **4.3 Open Channel Design**

The following criteria should be followed for open channel design:

1. Channel side slopes shall be stable throughout the entire length and side slope shall depend on the channel material. A maximum of 2:1 should be used for channel side slopes, unless otherwise justified by calculations. Roadside ditches should have a maximum front slope of 4:1 and back slope of 2:1;
2. Trapezoidal or parabolic cross sections are preferred over triangular shapes;
3. For vegetative channels, flow velocities within the channel should not exceed the maximum permissible velocities given in Tables 4.4-2 and 4.4-3 in the GSMM, Volume II;
4. If relocation of a stream channel is unavoidable, the cross-sectional shape, meander, pattern, roughness, sediment transport, and slope should conform to the existing conditions insofar as practicable. Some means of energy dissipation may be necessary when existing conditions cannot be duplicated;
5. Stream bank stabilization should be provided, when appropriate, as a result of any stream disturbance such as encroachment and should include both upstream and downstream banks as well as the local site; and,
6. Open channel drainage systems are sized to handle a 25-year design storm. The 100-year design storm should be routed through the channel system to determine if the 100-year plus applicable building elevation restrictions are exceeded, structures are flooded, or flood damages increased.

#### 4.3.1 Velocity Limitations

The final design of artificial open channels should be consistent with the velocity limitations for the selected channel lining. Maximum velocity values for selected lining categories are presented in Table 4.4-2 in the GSMM, Volume II. Seeding and mulch should only be used when the design value does not exceed the allowable value for bare soil. Velocity limitations for vegetative linings are reported in Table 4.4-3 in the GSMM, Volume II. Vegetative lining calculations are presented in Section 4.4.7 and riprap procedures are presented in Section 4.4.8 in the GSMM, Volume II.

#### **4.4 Residential Lot Drainage**

The following criteria are required for all proposed residential developments which will be mass graded and considered for all other lots:

1. A minimum 5-foot side yard drainage easement and a minimum 10-foot rear yard drainage easement shall be located on the downhill side of all lots to convey runoff to a minor or major drainage system, or natural water course;
2. Finished floor elevations shall be provided for all lots and building structures;
3. Swales used in residential drainage easements to convey runoff through properties to storm drain pipe systems shall have maximum side slopes of 5:1. All portions of the residential lot shall have positive drainage to a residential drainage easement;
4. Swales shall be designed with a minimum longitudinal slope of 2% or be enhanced by the use of french drains;
5. Swales are required to discharge into a minor drainage system per Chapter 4 of this Supplement or by level spreader into a natural water course once calculations show that the channel reaches or exceeds 50% of its capacity;
6. Swales shall be constructed and covered in final stabilization before acceptance of the proposed development for occupation or final plat approval;
7. Lot drainage and swales shall be rough graded for the development and fine grading with enhancements will be required during home construction; and,
8. Home construction shall comply with elevations and drainage shown on approved Development Plans. Any variation from the Development Plan will require a Grading Permit or a revision to the Development Plan prior to land disturbance.

## **CHAPTER 5 : STORMWATER MANAGEMENT REVIEW REQUIREMENTS**

This section provides guidance on the process for the design and review of stormwater management facilities for new and redevelopments in Columbia County, including the pre- and post-construction requirements necessary to obtain development permits.

### **5.1 Pre-Construction Requirements**

#### **5.1.1 Stormwater Quality Site Development Review Tool**

An automated spreadsheet tool was specifically designed to meet the unified sizing and water quality performance criteria outlined in the Georgia Stormwater Management Manual. The overall goal is to provide an effective tool for both Columbia County review staff and the development community to quickly evaluate the water quality performance of stormwater management plans for development sites. It allows the developer to use a variety of BMPs and provides incentives for leaving key areas, particularly riparian buffers, undisturbed.

Columbia County currently requires every project, unless otherwise exempt, to use this tool. Additional information and instructions for using the Stormwater Quality Site Development Review Tool are provided in Chapter 6 of this Supplement.

#### **5.1.2 Stormwater Management Report**

For every project, a Stormwater Management Report shall be prepared and sealed by a Professional Civil Engineer currently registered in the State of Georgia. The purpose of this report shall be to formulate a plan to manage stormwater, so that stormwater runoff hazards are not created, existing runoff-related problems are not exacerbated, and stormwater quality is not adversely affected, either upstream or downstream from or within the boundaries of the property being developed. Nevertheless, a Stormwater Management Report shall be prepared regardless of whether the project requires stormwater management.

At a minimum, the Stormwater Management Report shall address the following issues and analyze compliance with the water quantity and water quality performance indicators noted in Chapter 1 of this Supplement if the design Engineer determines that stormwater management facility(s) is/are not required per section 3.3.1 of this Supplement:

1. A brief narrative description of the project;
2. Geotechnical investigations including soil maps, borings, site specific recommendations, and any additional information necessary for the proposed stormwater management design;
3. Site plan that depicts all streams, lakes, wetlands and other bodies of water. Include letter from Columbia County staff acting as the Local Issuing Authority acknowledging the presence or lack thereof of State Waters;
4. Additionally, the plan shall depict relevant boundaries of the 100-year floodplain for ultimate build-out conditions. The floodplain boundary must be calculated using Federal Emergency Management Agency (FEMA) methodologies for delineating floodplains;
5. Hydrologic computations, including drainage area maps depicting pre-development and post-development runoff flow paths and land use, including the locations and quantities of

stormwater runoff entering and exiting the site for both pre-developed and post-developed conditions. Analysis of the off-site properties shall anticipate future development in addition to addressing existing conditions;

6. Drainage area delineation maps and other exhibits at a satisfactory scale and sufficient in quantity and scope to define the boundaries of the site relative to any applicable water courses, drainage divides, drainage structures and other pertinent features;
7. Soils map depicting soil types and delineation per USDA-NRCS and indicate any jurisdictional wetlands, if present;
8. Estimates of the stormwater quality in terms of total suspended solids for both pre-developed and post-developed conditions using the Stormwater Quality Site Development Tool described in Appendix of this Supplement;
9. Hydraulic computations for all open channels and closed piped drainage systems;
10. Structural computations, as required;
11. Unified sizing criteria volume computations in accordance with this Supplement;
12. Analysis of downstream conditions at each and every point or area along the project site boundaries at which runoff will exit the property; and,

Whenever adverse stormwater runoff related impacts are expected to result from the development of a property, stormwater management facility(s) shall be required. The Stormwater Management Report shall describe in detail the proposed stormwater management facility(s). Plans, specifications and computations must be complete in detail sufficient to enable another engineer to fully check and verify the results and computations. The plans used for construction must contain design data, a project narrative, schedule of construction, name and address or person responsible for construction and the design Engineer's seal, signature and address on the engineering drawings required for the project construction.

This section of the Stormwater Management Report shall include the following items:

1. Description of the overall stormwater management strategy;
2. Topographic maps showing all on-site and off-site contributing drainage areas;
3. Basis for determining runoff coefficients and times of concentration;
4. Inflow and outflow hydrographs with peak flows for the 1-, 25-, 50- and 100-year storm frequencies;
5. Hydraulic performance properties for all stormwater management facilities (e.g., stage/storage/ discharge curves, infiltration capacities, overflow relationships);
6. Details and calculations for all outlet control structures, including buoyancy calculations and principal and emergency spillways;
7. Configuration of the stormwater management facilities, including outflow and overflow control devices, shall be clearly described in Report with cross-sections depicted on all construction drawings; and,
8. Temporary sediment basins or forebays are required for all dry detention sites and major drainage exits unless located on State Waters.

Proposed developments with underground detention facilities with details that provide:

1. The location and type of access protection for the detention facility;
2. Safety requirements for the site;
3. Outline of the maintenance procedure to be filed with Columbia County for all components of the stormwater management report; and,
4. Summary of the proposed stormwater management approach and the expected performance.

### **5.1.3 Drainage Plans and Details**

Construction drawings submitted for stormwater management plan approval shall include the following:

1. A vicinity map showing the site in relation to the Stormwater Service Area;
2. Topography survey showing existing and proposed terrain, including the area to be included in the downstream analyses;
3. Any proposed improvements including location and finished floor elevations of buildings or other structures, impervious surfaces, storm drainage facilities, and all grading;
4. The location of existing and proposed structures and utilities;
5. Any easements and rights-of-way;
6. The delineation, if applicable, of the 100-year administrative floodplain, any on site wetlands, and State Waters with buffer (if applicable);
7. Structural and construction details for all components of the proposed drainage system or systems, and stormwater management facilities;
8. Stormwater management facility cross section detail showing outfall, outlet control structure, and pond profile. Show all elevations including proposed water surface elevations for all design storms.
9. All necessary construction specifications;
10. A sequence of construction;
11. Data for total site area, disturbed area, new impervious area, and total impervious area;
12. A table showing the unified sizing criteria volumes required in this Supplement;
13. A table of materials to be used for storm water management facility planting;
14. All soil boring logs and locations;
15. A maintenance schedule; and,
16. Certification statement signed by the Owner, Developer, and Contractor stating "I have reviewed the approved Grading and Drainage Plan for this project and understand that drainage patterns shown on the approved Development Plan cannot be altered without approval by Columbia County. Any alterations to the Development Plan without prior approval may result in delays of the Final Plat approval."

## **5.2 Post-Construction Requirements**

### **5.2.1 As-Built Certification of Stormwater Management Facilities**

Certification statement on the As-Built Plans submitted to Columbia County for Final Plat approval to be signed by the Design Engineer stating "I have visited this project and certify that direction of drainage complies with the approved Grading and Drainage Plan."

### 5.2.2 Inspection and Maintenance

Prior to the issuance of any permit of occupancy or final plat approval, the developer must execute an Inspection and Maintenance Agreement, and/ or a conservation easement, if applicable, that shall be binding on all subsequent owners of the site, by reference in the Property Deed. A copy of this agreement is provided in the Appendix. The Inspection and Maintenance Agreement shall identify by name or official title the person(s) responsible for carrying out the inspection and maintenance. Responsibility for the operation and maintenance of the stormwater management facility or practice shall remain with the property owner and shall pass to any successor owner. If portions of the land are sold or otherwise transferred, legally binding arrangements shall be made to pass the inspection and maintenance responsibility to the appropriate successors in title. These arrangements shall designate for each portion of the site, the person to be permanently responsible for its inspection and maintenance.

As part of the Inspection and Maintenance Agreement, a schedule shall be developed for routine inspection and maintenance to ensure proper function of the stormwater management facility or practice. The agreement shall also include plans for annual inspections to ensure proper performance of the facility between scheduled maintenance events and shall also include remedies for the default thereof.

Columbia County will only be responsible for the operation and maintenance of stormwater management facilities deeded to Columbia County. Columbia County does not maintain privately owned drainage easements or stormwater management facilities.

### 5.2.3 Maintenance by Private Parties

On all commercial sites and on residential property where private stormwater management facilities exist, the maintenance is the responsibility of the owner or operator of the property. Columbia County Stormwater Department personnel may perform periodic inspections of existing and new private stormwater management facilities to determine whether they are maintained properly. Deficiencies will be noted to the owner or operator in writing. It shall be the responsibility of the owner or operator to repair deficiencies in a timely manner. Failure on the part of the owner or operator to repair deficient stormwater management facilities will be a violation of the Ordinance and will be punishable according to Section 34-162, Violations; penalties.

### 5.2.4 Maintenance by Property or Homeowners Associations

When a subdivision or industrial/commercial park has a legally created property or homeowners association, the association will be responsible for maintenance of all drainage easements and all private stormwater facilities within the entire development. The association may be required to apply larvicides, stock mosquito fish or take other measures, as required by the Engineering Division, to protect the health, safety and welfare of the public. The association will have to be formed prior to final plat approval. Any emergency maintenance required by Columbia County will be done or subcontracted and the charge will be assessed to the association. Columbia County Stormwater Department personnel may perform periodic inspections of existing and new private stormwater management facilities to determine whether they are maintained properly. Deficiencies will be noted to the association in

writing. It shall be the responsibility of the association to repair deficiencies in a timely manner. Failure on the part of the association to repair deficient stormwater management facilities will be a violation of the Ordinance and will be punishable according to Section 34-162, Violations; penalties.

**APPENDICES**

**Appendix #1: Stormwater Quality Site Development Review Tool Instructions**



# Georgia Stormwater Management Manual

## Stormwater Quality Site Development Review Tool

Version 1.1

# INSTRUCTION GUIDE

## Introduction

The Site Development Review Tool is an automated Excel spreadsheet tool that was developed by the Metropolitan North Georgia Water Planning District to facilitate the evaluation of development projects in accordance with recommendations in the Georgia Stormwater Management Manual. This tool allows both developers and local government review staff to quickly evaluate the water quality performance of stormwater management plans for proposed land development projects.

## Using the Site Development Review Tool Spreadsheet

The Site Development Review Tool is used to evaluate the expected stormwater runoff quality from a proposed site design. It can be used for both residential and commercial developments, and allows site designers to easily perform “what if” analyses using different design scenarios. The Tool gives the site designer the option of utilizing a number of stormwater management approaches including nonstructural “site design” methods as well as the structural stormwater controls included in the Georgia Stormwater Management Manual.

The goal of using the Site Development Review Tool is to prepare a stormwater management system design that achieves the goal of an 80% reduction in the average annual total suspended solids (TSS) loading leaving the site. This can be achieved through any combination of nonstructural or structural approaches.

The Site Development Review Tool assumes that all of the runoff leaving the site is going to a common downstream drainage area, stream or other water body. *For a development that lies in two or more distinct watersheds, the site should be divided up and a separate copy of the Tool be run and submitted for each watershed.*

# Overview of the Site Development Review Tool

The Site Development Review Tool spreadsheet has four main components:

- (1) Main Form
- (2) Drainage Area Worksheets  
(each drainage area has its own individual sheet)
- (3) Structural Stormwater Control TSS Removal Efficiencies
- (4) Supplemental Information on Other Pollutants of Concern

When working with the Tool, the following fields will require input:

- All cells highlighted in yellow require user input
- All dropdown menus require user input
- All cells highlighted in blue require input from the local review staff

All other cells within the Tool are password-protected and cannot be changed.

## Main Form (Summary Sheet)

The Main Form has five sections (see Figure 1):

### Section 1: General Information

The first section requires the user to fill out general site information. This includes the Name of Developer, Name of Development, Site Location and Address, Type of Development or Land Use Category (to be selected from a pull-down list), Area of Development (in acres), Date Submitted, Permit Number (if applicable), Contact Name and Phone Number, Name of Engineer, and Party for Long-Term Stormwater Maintenance Responsibility.

### Section 2: Land Use Distribution

The second section shows the land use distribution for the entire site, which is based upon the data provided for each drainage area. This includes the amount of Impervious Area (IA), Disturbed Pervious Area (DP) and Natural Conservation Area (NC). If the *Sum of Drainage Areas* does not equal the *Area of Development* entered in Section 1, then the message "Land Use Distribution Error" will appear. Simply ensure that the proper information has been entered for each drainage area.

### Section 3: Structural Control Information

The third section is a summary of all the structural controls chosen for the site, which is based upon the selections provided for each drainage area. The "Generate Tracking Forms" button located within this section allows the user to generate tracking forms for each structural control proposed on the site (see Figure 2). This information can be used for long-term maintenance tracking.

## Section 4: TSS Reduction Summary

The fourth section is a summary of the total suspended solids (TSS) reduction from each of the drainage areas as well as the overall TSS reduction efficiency of the entire proposed site. The overall TSS reduction for the entire site must be at least 80% to meet the recommendations of the Georgia Stormwater Management Manual.

## Section 5: Comments

The fifth section is used for comments and tracking purposes by local review staff. Leave this blank unless given instructions by the local review authority.

Georgia Stormwater Management Manual Stormwater Quality Site Development Review Tool																								
<b>General Information</b>																								
Name of Developer:	<b>Shake Properties</b>																							
Development Name:	<b>Clear Creek Apartments</b>																							
Site Location / Address:	<b>3111 Cloverhurst Circle East Park, GA</b>																							
Development Type:	Medium Density Residential																							
Area of Development (acres):	<b>50.00</b>																							
Date Submitted:	<b>1/26/2004</b>																							
Permit Number:	<b>12345</b>																							
Engineer Contact:	<b>Jack Jones</b>																							
Phone Number:	<b>678-123-4567</b>																							
Name of Engineer(s):	<b>David Hansen, PE</b>																							
Maintenance Responsibility:	<b>Home Owners Association</b>																							
<b>Summary of Site and Structural Control Information</b>																								
Number of Drainage Areas: <b>3</b>	<b>Land Use Distribution Pie</b> 	<b>Total # of Structural Controls Used: 3</b> <a href="#">Generate Tracking Forms</a>																						
Sum of Drainage Areas (ac): <b>50.00</b>		<table border="1"> <thead> <tr> <th>General Application Structural Stormwater Controls</th> <th>Limited Application Structural Stormwater Controls</th> </tr> </thead> <tbody> <tr> <td>Stormwater Pond: 1</td> <td>Filter Strip: 1</td> </tr> <tr> <td>Stormwater Wetland: 0</td> <td>Grass Channel: 0</td> </tr> <tr> <td>Bioretention Area: 0</td> <td>Sand Filter: 0</td> </tr> <tr> <td>Sand Filter: 0</td> <td>Submerged Gravel Wetland: 0</td> </tr> <tr> <td>Infiltration Trench: 0</td> <td>Gravity (Oil-Grit) Separator: 0</td> </tr> <tr> <td>Enhanced Swales: 0</td> <td>Porous Concrete**: 0</td> </tr> <tr> <td><b>Detection Structural Stormwater Controls</b></td> <td>Modular Porous Paver System**: 0</td> </tr> <tr> <td>Dry Detention / Dry ED Basin: 0</td> <td>Alum Treatment System: 0</td> </tr> <tr> <td>Multi-Purpose Detention Area: 0</td> <td>Proprietary Structural Control***: 0</td> </tr> <tr> <td>Underground Detention: 0</td> <td></td> </tr> </tbody> </table>	General Application Structural Stormwater Controls	Limited Application Structural Stormwater Controls	Stormwater Pond: 1	Filter Strip: 1	Stormwater Wetland: 0	Grass Channel: 0	Bioretention Area: 0	Sand Filter: 0	Sand Filter: 0	Submerged Gravel Wetland: 0	Infiltration Trench: 0	Gravity (Oil-Grit) Separator: 0	Enhanced Swales: 0	Porous Concrete**: 0	<b>Detection Structural Stormwater Controls</b>	Modular Porous Paver System**: 0	Dry Detention / Dry ED Basin: 0	Alum Treatment System: 0	Multi-Purpose Detention Area: 0	Proprietary Structural Control***: 0	Underground Detention: 0	
General Application Structural Stormwater Controls		Limited Application Structural Stormwater Controls																						
Stormwater Pond: 1		Filter Strip: 1																						
Stormwater Wetland: 0	Grass Channel: 0																							
Bioretention Area: 0	Sand Filter: 0																							
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Dry Detention / Dry ED Basin: 0	Alum Treatment System: 0																							
Multi-Purpose Detention Area: 0	Proprietary Structural Control***: 0																							
Underground Detention: 0																								
Total (IA) Impervious Area (ac): <b>10.50</b>																								
Total (DP) Disturbed Pervious Area (ac): <b>26.00</b>																								
Total (NC) Natural Conservation Area (ac): <b>13.50</b>																								
Percent Imperviousness (%): <b>21%</b>																								
<b>TSS Reduction</b>																								
<b>Total TSS Reduction (%) : 81%</b>		<b>Official Use Only</b>																						
	Tracking #:	<b>Section 5</b>																						
	Reviewed By:																							
	Date Approved:																							
	Conditions of Approval:																							
CH2MHILL																								

Figure 1. Summary Sheet



## Drainage Area Worksheets

The Drainage Area Worksheets are used to provide the land use and stormwater management information for the proposed site. On many sites, there is more than one drainage outlet from the site or it may not be physically possible to treat the runoff from the entire site at a single location. In these cases, the proposed site needs to be evaluated as two or more separate drainage areas, with the information for each area provided on a separate Drainage Area Worksheet. This tool allows a proposed development to be split into 10 drainage areas.

The Drainage Area Worksheet includes sections for land use information, areas treated by non-structural controls (site design credits), structural control selection and downstream treatment. It graphically calculates and displays the Water Quality Volume (WQv) and TSS Reduction for the structural control(s) and the entire drainage area (which includes both structural controls and the non-structural controls).

The Drainage Area Worksheet has six sections (see Figure 3):

### Section 1: Land Use Distribution

The first section requires the user to provide the size of the drainage area as well as the proposed land use (in acres). The three choices include:

- Impervious Area (IA) – The planned impervious (paved or covered) area. This includes streets and roadways, sidewalks, buildings, parking areas and structures, homes, driveways, walkways, patios, and all other surfaces that do not allow the infiltration of rainwater.
- Disturbed Pervious Area (DP) -- All other areas that will be cleared/graded and revegetated.
- Natural Conservation Area (NC) – The area that will be left in an undisturbed natural vegetated state in perpetuity.

After entering the land use areas, the imperviousness of the drainage area will be calculated and a graphical distribution of the land use will be displayed. [NOTE: *The “Total Area for check” field will turn red if the sum of land use areas does not equal the value input at the top*]

### Section 2: Non-Structural Controls (Site Design Credits) and Water Quality Volume

The second section allows the site designer to take credit for the use of nonstructural controls, also known as “Stormwater Better Site Design Credits” in the Georgia Stormwater Management Manual. These credits include:

- Natural Conservation Area – Undisturbed natural area(s) in the drainage area that are conserved and protected in their existing vegetated state. In order to count as a credit, these areas *must* have a minimum contiguous area of 10,000 square feet (0.23 acres) and cannot be disturbed during project construction. Natural conservation areas are subtracted from the total drainage area when computing the water quality volume and provide 100% TSS removal in the area-based TSS reduction calculation. The natural conservation area from Section 1 is carried down and displayed as long as it meets the minimum 10,000 square foot requirement.

Drainage Area 01		
Land Use Distribution (acres)		
Enter Total Area :	12.60	
Enter Impervious Area (IA) :	5.91	
Enter Disturbed Pervious Area (DP) :	4.54	
Enter Natural Conservation Area (NC) :	2.15	
<b>Total Area for check :</b>	<b>12.60</b>	
<b>Percent Imperviousness (%) :</b>	<b>47%</b>	
Non-Structural Controls (Site Design Credits)		Water Quality Volume (WQ <sub>V</sub> )
Natural Conservation Area (acres):	2.15	WQ <sub>V</sub> (ac-ft) w/o Credits = 0.595
Enter Area (acres) Treated by (if applicable):		WQ <sub>V</sub> w/ Non-Struc. Credits = 0.400
Undisturbed Stream Buffers :	1.74	
Vegetated Channels :		
Overland Flow Filtration / Recharge :	0.23	
<b>Total Area receiving Credits (acres):</b>	<b>4.12</b>	
Structural Controls		TSS Reduction Chart
<b>Select Structural Control(s)</b>	<b>Control ID</b>	TSS Reduction from Structural Controls: 80%
Control 1 Stormwater Pond	STP-01-1	
Control 2 NONE	NONE	
Control 3 NONE	NONE	
Control 4 NONE	NONE	
Control 5 NONE	NONE	
Additional Downstream Treatment		
If the runoff leaving this area is treated by one or more additional structural controls downstream, please specify the appropriate drainage area(s) below:		
<input type="checkbox"/> DA 2	<input type="checkbox"/> DA 3	<input type="checkbox"/> DA 4
<input type="checkbox"/> DA 5	<input type="checkbox"/> DA 6	<input type="checkbox"/> DA 7
<input type="checkbox"/> DA 8	<input type="checkbox"/> DA 9	<input type="checkbox"/> DA 10
<b>Total TSS Reduction Using Non-Structural Controls (Site Design Credits), Structural Controls, and Additional Downstream Treatment (if applicable):</b>		<b>83%</b>
Local Government Specific Information (fill in only if required)		Review Department)
Watershed Basin:	District/LL/Parcel:	Comm. District:

Figure 3. Drainage Area Worksheet

- Undisturbed Stream Buffers – Portion(s) of the drainage area *treated* by a naturally vegetated or forested riparian buffer. [NOTE: *The buffer itself should be counted as a natural conservation area*] The *minimum* buffer width required for this credit is 50 feet, and the *maximum* contributing drainage length allowed –to- the buffer is 150 feet for pervious areas and 75 feet for impervious areas. In addition, the average slope of the contributing drainage area *must* be 3% or less (unless a flow spreader is used) and the runoff *must* enter the buffer as overland sheet flow. Areas treated by undisturbed stream buffers are subtracted from the total drainage area when computing the water quality volume and provide 80% TSS removal in the area-based TSS reduction calculation.
- Vegetated Channels – Portion(s) of the drainage area treated by vegetated (grass) channels. This credit can *only* be applied to moderate- to low-density residential land uses (3 dwelling units per acre maximum) with channels slopes of 3% or less. The maximum flow velocity for the water quality design storm *must* be less than or equal to 1.0 feet per second. Areas treated by vegetated channels (as a site design credit) are subtracted from the total drainage area when computing the water quality volume and provide 80% TSS removal in the area-based TSS reduction calculation. [NOTE: *This credit cannot be taken if grass channels are being used as a structural control in Section 3 for the same portion of the drainage area*]
- Overland Flow Filtration / Recharge – Portion(s) of the drainage area (impervious areas) such as rooftops, driveways or small parking lots that drain to pervious vegetated areas. The *maximum* impervious surface area for any given overland flow discharge is 5,000 square feet (0.115 acres). The receiving area *must* have relatively pervious soils (hydrologic soil groups A or B) and have a slope of 3% or less. In addition, the *maximum* contributing impervious drainage length is 75 feet, and the length of the flow path across the pervious area must be equal to or greater than the contributing length. Areas treated by overland flow filtration are subtracted from the total drainage area when computing the water quality volume and provide 80% TSS removal in the area-based TSS reduction calculation.

After entering the site design credits, the tool calculates and graphically displays the Water Quality Volume (WQv) for the drainage area before and after site design credits are applied. The latter volume is the *adjusted* WQv that must be adequately treated to achieve an overall site TSS reduction of 80%. Structural controls must be sized and designed to treat this volume. [NOTE: *Structural control designs must also take into account the additional runoff from site design credit areas if these drain to the structural control*]

The tool does not have an explicit entry for the Environmentally Sensitive Large Lot Subdivision site design credit in the Georgia Stormwater Management Manual. However, if the site design follows the criteria for this credit (2 acre minimum lot size, total impervious cover less than 15%, use of grass channels instead of curb and gutter, and disconnected rooftop runoff as overland flow filtration), then adjust one or more of the non-structural credits (stream buffers, vegetated channels, and overland flow filtration) until the adjusted WQv is reduced to zero.

### Section 3: Structural Controls and TSS Reduction Chart

The third section allows the site designer to specify the structural control(s) that will be used to treat the adjusted WQv calculated in Section 2. The dropdown menus include General and Limited Application and Detention structural controls from the Georgia Stormwater Management Manual. The tool automatically assigns a Control ID for each structural control. This ID should be used to identify the facilities on the proposed development site and stormwater management plans.

Multiple controls can be specified if more than one structural control is used in a “treatment train” process. The first control in the treatment train would be Control 1, the second would be Control 2, etc. [NOTE: *Structural controls in downstream drainage areas should be specified in Section 4*]

The tool then automatically calculates the combined pollutant removal efficiency for multiple structural stormwater controls in a treatment train, and graphically displays the cumulative TSS reduction efficiency for the multiple controls in the treatment train. The cumulative efficiency can be easily compared against the 80% TSS reduction target.

An overview of pollutant removal calculations for structural controls in series is found in the Appendix.

### Section 4: Additional Downstream Treatment

The fourth section allows the user to specify whether the runoff from the current drainage area is treated by additional structural controls in drainage areas downstream. The site designer should use the check boxes to denote all downstream drainage areas that will treat 100% of the runoff leaving the current drainage area. [NOTE: *If only a portion of this runoff will be treated downstream then leave the box unchecked*] The adjusted pollutant removal efficiency will be applied to the runoff of the current drainage area after the information for the downstream drainage areas are entered.

### Section 5: Total TSS Reduction

The fifth section calculates the overall TSS reduction efficiency for the given drainage area after applying the site design credits, structural control removal efficiencies, and treatment by downstream drainage areas (if applicable).

### Section 6: Local Government Specific Information

If required, the user will use this section to provide watershed- and parcel-specific information regarding the drainage area for tracking purposes. Leave this blank unless given instructions by the local review authority.

## **Structural Control TSS Removal Efficiencies**

This sheet contains the pollutant reduction efficiencies for total suspended solids (TSS) for each structural control based on the Georgia Stormwater Management Manual. Please refer to the Manual for more information.

## **Supplemental Information on Other Pollutants of Concern (Total Phosphorus, BOD, and Lead)**

The Georgia Stormwater Management Manual does not include target reduction goals for other pollutants, though it does provide design removal efficiencies for several other pollutants of concern. This component provides estimates of the reduction in total phosphorus (TP), biochemical oxygen demand (BOD) and lead to assist local governments in assessing the performance of stormwater control. This sheet presents summaries for TP, BOD and lead by drainage area. The algorithms described for TSS in the sections above are used to compute the pollutant reduction efficiencies.

Default reduction efficiency information for TP, BOD, and lead is provided in this component based on the Georgia Stormwater Management Manual and other sources. If literature data were not available, "NA" is listed.

## APPENDIX -- Calculating Pollutant Removal for Structural Controls in Series

Pollutant removal calculations for structural stormwater controls in series (also known as a “treatment train”) take into account that the majority of the heavy (easily removed) suspended pollutants and particulate matter will be removed by the first structural control in a treatment train. Therefore, the runoff leaving the first structural control contains much smaller pollutant particles. As these smaller particles are much harder to remove, the *effective* removal efficiency of the subsequent downstream structural control(s) is significantly reduced.

To estimate the pollutant removal rate of structural controls in series, the effective removal efficiency of a downstream structural control is reduced to account for the pollutant removal of the upstream control(s). The following two cases are used:

### Case 1. Two structural controls in series, with the more efficient control downstream -or- both controls having the same removal efficiency

In these cases, the following equation applies:

$$TRR = R_d + 0.5 R_u^2(1-R_d)/R_d$$

Where: TRR = total removal rate (fraction)  
R<sub>u</sub> = upstream removal rate (fraction)  
R<sub>d</sub> = downstream removal rate (fraction)

*Example 1* - Two structural controls in series, both have a TSS removal efficiency of 80%. The total removal rate would be:

$$TRR = 0.80 + [0.5 * 0.80^2 * (1-.80)]/0.80 = 0.88 \quad \text{or} \quad 88\%$$

*Example 2* - An upstream structural control has a removal rate of 40%, the downstream control has a removal rate of 70%. The total removal rate would be:

$$TRR = 0.70 + [0.5 * 0.40^2 * (1-0.70)]/0.70 = 0.734 \quad \text{or} \quad 73.4\%$$

### Case 2. Two structural controls in series, with the more efficient control upstream

In this case, the following equation applies:

$$TRR = R_u + (0.57 R_d/R_u - 0.07) (1-R_u) R_d$$

Where: TRR = total removal rate (fraction)  
R<sub>u</sub> = upstream removal rate (fraction)  
R<sub>d</sub> = downstream removal rate (fraction)

*Example* - An upstream control has a 70% removal rate, the downstream control has a 40% removal rate. The total removal rate would be:

$$TRR = 0.70 + [0.57 * (0.40/0.70) - 0.07] * (1 - 0.70) * 0.40 = 0.731 \quad \text{or} \quad 73.1\%$$

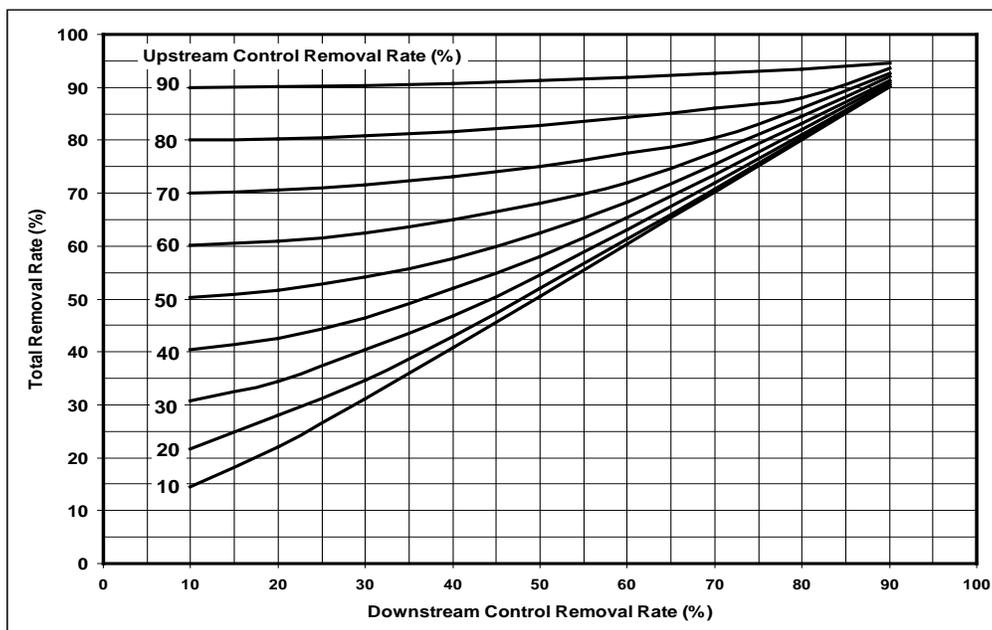
It is assumed that the removal capability of the downstream control is proportional to the ratio of the downstream to upstream control removal efficiencies. That is, if the removal rates are nearly equal then the downstream control should achieve a greater contribution than if its removal efficiency is small relative to the upstream control. In the limiting case where the two are equal, the equation will be identical to Case 1.

It is assumed that if the downstream control is 1/8 of the upstream control's efficiency its removal rate is zero (e.g. a 10% efficiency control downstream from a general application control would have zero removal credit). If it is equal to the upstream control its removal rate is half. Removals are assumed to vary linearly between these two extremes.

The following assumptions serve as the basis for this approach:

- This methodology is limited to TSS and related particulate removal.
- The maximum TSS removal efficiency for a stand-alone structural control is assumed to be 80% (all general application structural controls have an 80% TSS removal efficiency).
- The combined removal rate can never be less than the removal rate of the most effective of the controls, and never more than the equivalent of the more effective control plus half the effectiveness of the less effective control operating on the remaining pollutant.
- For a control of lesser efficiency downstream from one of greater efficiency the removal ability of the downstream control is assumed to be zero if its independent removal rate is ten percent. It varies in a linear fashion up to the case where it equals the upstream control.

The nomograph below shows the graphic results of the equations presented above and can be used to quickly determine the total TSS removal rate for two structural controls in series.



**Appendix #2: Inspection and Maintenance Agreement**

**APPENDIX G**

**Permanent Stormwater System Maintenance and Inspection Agreement**

In accordance with Columbia County Code of Ordinances Section 34-156 which requires the Landowner, its successors and assigns, including any homeowners association, shall adequately maintain privately owned stormwater management/Best Management Practices (BMP) facilities. This includes all pipes and channels built to convey stormwater to the facility, as well as all structures, improvements, and vegetation provided to control the quantity and quality of the stormwater. Adequate maintenance is herein defined as good working condition so that these facilities are performing their design functions.

Columbia County requires that the Landowner, its successors and assigns, inspect the stormwater management/BMP facility in accordance with the attached maintenance plan. The purpose of the inspection is to assure safe and proper functioning of the facilities. The inspection shall cover the entire facilities, berms, outlet structure, pond areas, access roads, etc.

The Landowner, its successors and assigns, hereby grant permission to Columbia County, its authorized agents and employees, to enter upon the Property and to inspect the stormwater management/BMP facilities whenever Columbia County deems necessary. The purpose of the inspection is to follow-up on reported deficiencies and/or to respond to citizen complaints. Columbia County shall provide the Landowner, its successors and assigns, copies of the inspection findings and a directive to commence with the repairs if necessary.

The Landowner, its successors and assigns, will perform the work necessary to keep these facilities in good working order as appropriate. A maintenance schedule for the stormwater management/BMP facilities (including sediment removal) shall be outlined on attached maintenance and inspection plan. The owner shall keep written records of any maintenance and/or observations. These records shall be made available to Columbia County for review upon request.

This Agreement imposes no liability of any kind whatsoever on Columbia County and the Landowner agrees to hold Columbia County harmless from any liability in the event the stormwater management/BMP facilities fail to operate properly.

**I accept responsibility for ownership and proper maintenance of the stormwater system (pond, swales, etc.) on the \_\_\_\_\_ site per the approved maintenance plan. I will complete any necessary repairs and/or preventive maintenance procedures in a timely manner to ensure proper functioning as a stormwater management device(s).**

**It is my understanding that if the maintenance plan is deemed to be inadequate, Columbia County may require the plan to be revised and I will abide by any prescribed revisions. I will continue to own and maintain the Stormwater Management/BMP Facility until Columbia County is notified in writing of a transfer in ownership and maintenance responsibility. The notification will include a date for the transfer of responsibility and a letter of acceptance from the new owner.**

**I understand that failure to adhere to the signed maintenance agreement may result in fines of up to \$2,500.00 per day, per violation and /or the institution of a court action.**

\_\_\_\_\_  
Signature of Owner/Agent Printed

\_\_\_\_\_  
Date

\_\_\_\_\_  
Name of Owner/Agent

\_\_\_\_\_  
Address & Phone Number:

\_\_\_\_\_  
**Notary Stamp/Signature/Date**

My Commission Expires: \_\_\_\_\_

**Appendix #3: Memo from Georgia EPD Regarding “Roadway Drainage Structures”**

# Georgia Department of Natural Resources

2 Martin Luther King, Jr., Drive, S.E, Suite 1152, East, Atlanta, Georgia 30334-9000

Chris Clark, Commissioner  
Environmental Protection Division

F. Allen Barnes, Director  
Phone: (404) 656-4713

MEMORANDUM

September 20, 2010

TO: Mr. Gerald Ross, P. E. Chief Engineer Georgia Department of  
Transportation

FROM: Jim Ussery, Assistant Director, EPD

RE: Buffer variance issues

This memorandum expands and supercedes the June 8, 2006 memorandum from Bert Langley regarding these issues.

The issue addressed in this memorandum is how do the buffer variance requirements apply when a roadway drainage structure is installed across a stream. A subset of this is the situation where the stream or a tributary makes a bend such that the stream or tributary runs parallel to the roadway and the cleared right of way encroaches into the buffer. At what point does a buffer variance become necessary.

General Permit GAR100002 at part IV(i) authorizes the construction of drainage structures and roadway drainage structures without the necessity of obtaining a variance from EPD. The first issue, is at what point does a roadway drainage structure such as a bridge begin and end. The structure obviously includes some amount of approach road. This is of particular concern in the situation described above where the stream turns and runs parallel to the roadway drainage structure. At what point is the cleared right of way exempt from the variance requirements because of the drainage structure and at what point do the buffer variance requirements become applicable.

Discussions with GDOT representatives have indicated that for structures such as a bridge, GDOT specifications require additional compaction along the traveled way beginning one hundred feet from the actual structure and that this would be a reasonable way to determine the beginning and end for a bridge. Likewise a culvert requires additional compaction for fifty feet.

EPD agrees that for future projects the land disturbing activities along the traveled way within 100 feet of bridges and 50 feet of culverts will be considered part of the roadway drainage structure and no buffer variance would be required. However any buffer intrusion along the traveled way, outside these areas could be subject to the buffer variance requirements. This is represented in Figure 1 below.

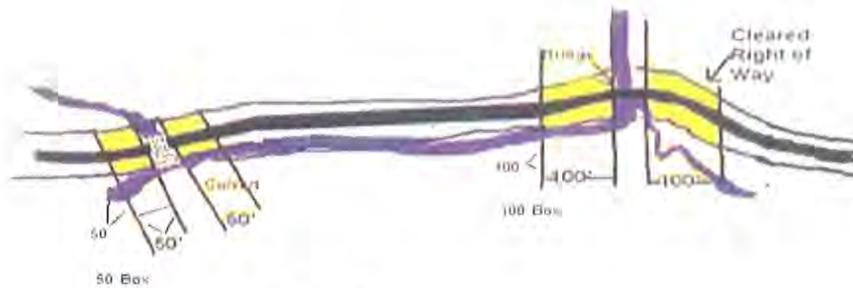


Figure 1

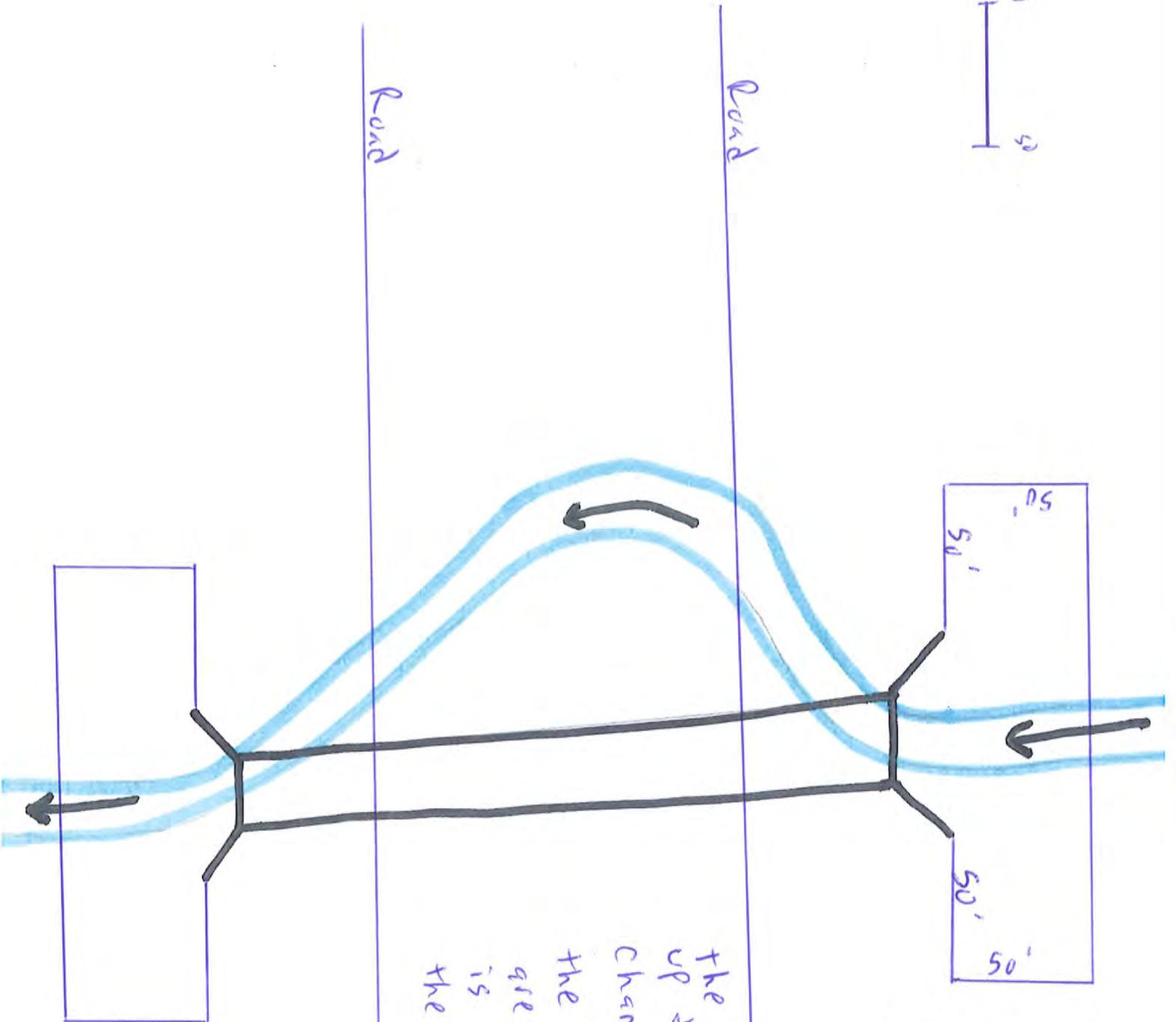
The areas on either side of the bridge or culvert identified in yellow would be considered part of the structure and no variance would be required for the sections of stream running parallel to the roadway. However, the areas outside the yellow with the stream running parallel to the roadway and within 25' (50' for a trout stream) would be subject to the buffer requirements.

The second part of this question is how much area at right angles to the traveled way can be considered necessary for the construction of a roadway drainage structure.

EPD has conducted extensive discussions with GDOT regarding the amount of disturbance necessary to construct roadway drainage structures, particularly bridges. GDOT, in preparing construction plans assumes that the entire cleared right of way may be necessary for the activities associated with constructing any roadway drainage structure.

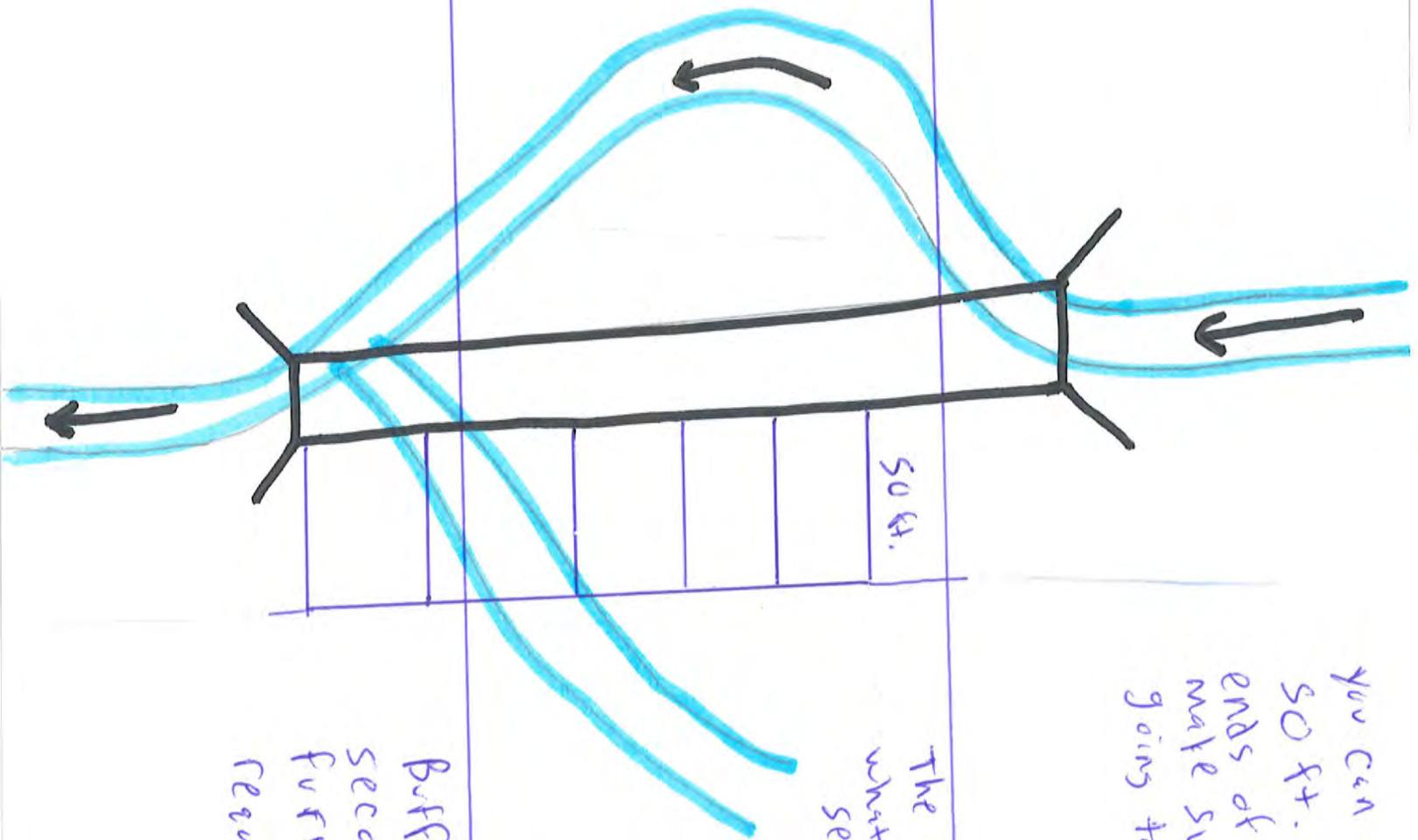
For future projects EPD agrees that the roadway drainage structure exemption will include the cleared right of way for 50' x 50' along the traveled way for culverts and 100' x 100' for bridges. Construction activities within this "box" would be part of the activities necessary to construct the roadway drainage structure and no buffer variance would be needed. Obviously, disturbance should be kept to a minimum and only the areas actually necessary for construction activities should be disturbed.

There will be specific situations where installation or construction of a roadway drainage structure may require disturbance that exceeds that described in this memo. In cases where the stream needs to be rerouted, a buffer variance is required. In those cases where GDOT exceeds the cleared right of way for 50' x 50' along the traveled way for culverts and 100' x 100' for bridges, GDOT should document the necessity, along with an explanation, for the extra disturbance. This should be submitted in writing to the Nonpoint Source Program, Watershed Protection Branch for concurrence. A copy of the concurrence letter will be forwarded to the appropriate District Office. GDOT should not initiate the additional land disturbance before receiving final concurrence from the Nonpoint Source Program. In addition, a copy of the concurrence letter should be retained on site within the appropriate GDOT records.



In this scenario, you only need to make sure the cut/fill, bents are not outside the boxes at the ends of the culvert.

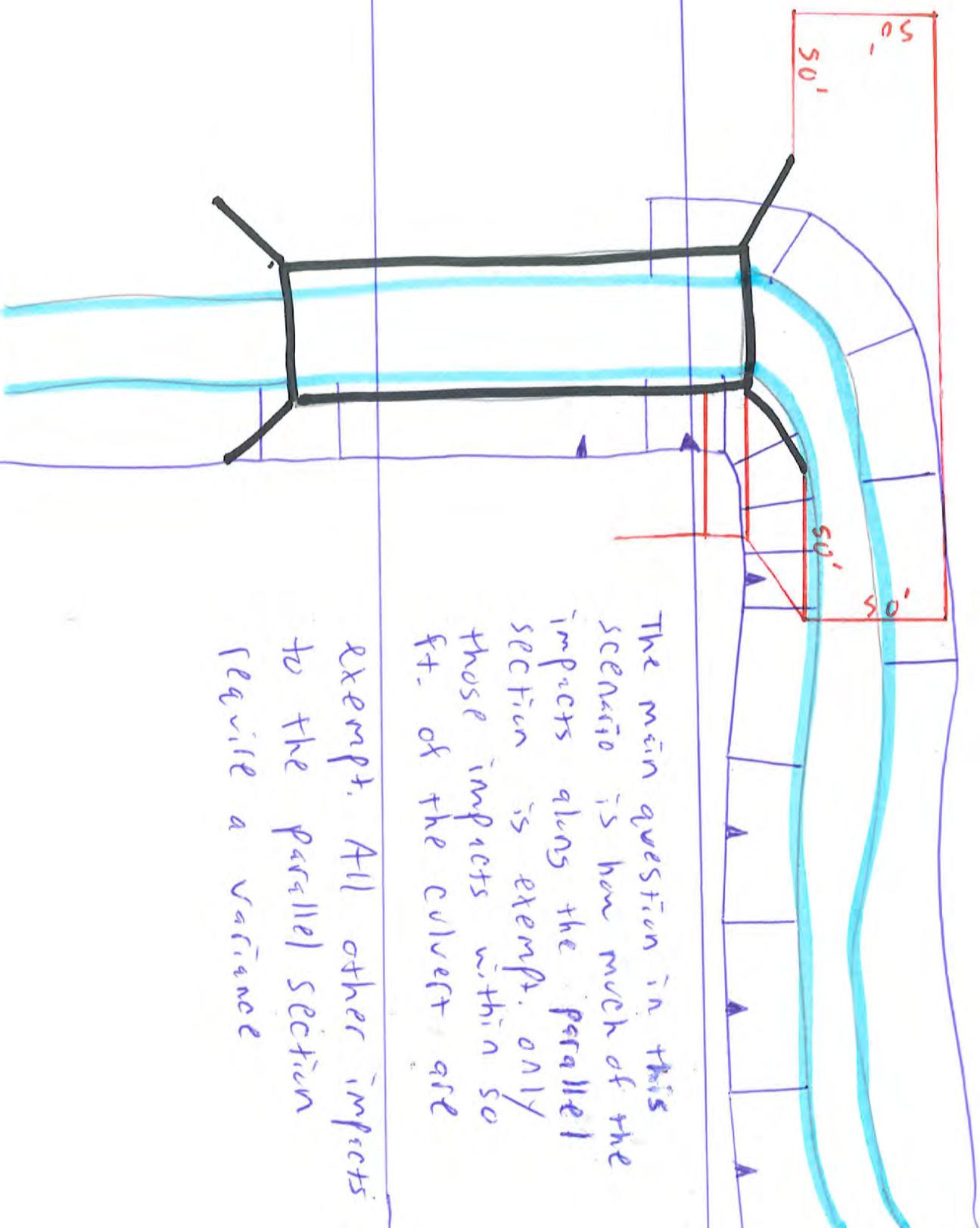
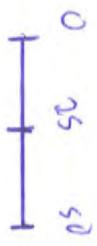
The stream is being picked up & put back into existing channel. The impacts to the stream in the middle are exempt regardless if it is more than 50 ft. from the sides of the culvert



you can measure the 50 ft. boxes at the ends of the culvert to make sure you are not going too far.

The main question is what impacts on this secondary stream are exempt. That is when it is necessary to draw 50 ft. from sides of culvert.

Buffer impacts on secondary stream further than 50 ft. require a variance



The main question in this scenario is how much of the impacts along the parallel section is exempt. Only those impacts within 50 ft. of the culvert are exempt. All other impacts to the parallel section require a variance

**Appendix #4: Memo from Georgia EPD Regarding “Dams Located in Buffers”**

# Georgia Department of Natural Resources

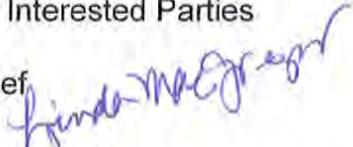
Reply To:  
NonPoint Source Program  
404/675-6240  
FAX: 404/675-6245

Environmental Protection Division, Watershed Protection Branch  
4220 International Parkway, Suite 101, Atlanta, Georgia 30354  
Linda MacGregor, P.E., Branch Chief  
404/675-6232

July 24, 2012

## MEMORANDUM

TO: Local Issuing Authorities and Other Interested Parties

FROM: Linda MacGregor, P.E., Branch Chief  
EPD Watershed Protection Branch 

SUBJECT: Local and State Permitting and Buffer Variance Requirements for Dams

The intent of this memorandum is to clarify the permitting and buffer variance requirements for the construction and maintenance of dams, including "emergency" scenarios.

In general, land-disturbing activities associated with the construction and maintenance of dams are subject to the permitting and buffer variance requirements delineated in the Georgia Erosion and Sedimentation Act (GESA), the NPDES General Permits for Storm Water Discharges Associated with Construction Activity and the Rules for Erosion and Sedimentation Control. In addition, authorization may be required from the United States Army Corps of Engineers if the land-disturbing activities impact Waters of the United States, including jurisdictional wetlands and streams.

In all instances, regardless of exemptions, adequate erosion and sedimentation control measures (i.e., Best Management Practices) must be provided to protect the State's soils and waters.

**Scenario 1** – Construction, maintenance and/or modification<sup>(1)</sup> of dams for **recreational and/or stormwater management ponds** where the disturbed area of the project (including any disturbed areas flooded by the impoundment) is equal to or greater than one (1) acre:

- In an area with a certified Local Issuing Authority (LIA), a local Land Disturbing Activity (LDA) permit is required.
- Coverage under the NPDES General Permits for Storm Water Discharges Associated with Construction Activity<sup>(2)</sup> is required, which includes the submittal of a Notice of Intent (NOI), NPDES General Permit – Fee Form, and an Erosion, Sedimentation and Pollution Control Plan (Plan).
- In an area with no certified LIA, a fee of \$80 per acre disturbed<sup>(3)</sup> must be paid to the Environmental Protection Division (EPD). In an area with a certified LIA, a

fee of \$40 per acre disturbed must be paid to EPD and a fee of \$40 per acre disturbed must be paid to the LIA. The NPDES General Permit fees are in addition to any LDA permit fees required by the LIA.

- In an area with a certified LIA, multiple copies of the Plan (as specified by the LIA) must be submitted to the LIA for review and approval or disapproval. In an area with no certified LIA regulating the project, a single copy of the Plan must be submitted to the EPD Watershed Protection Branch<sup>(4)</sup> for review and a second copy of the Plan must be submitted to the appropriate EPD District Office prior to or concurrent with the NOI submittal.
- For projects with land disturbances equal to or greater than 50 acres, regardless of the existence of a certified LIA, a single copy of the Plan must be submitted to the appropriate EPD District Office.
- Buffer variance applications must be submitted to the EPD Watershed Protection Branch for review and approval or disapproval. Incomplete applications will be returned to the applicant.

**Scenario 2** – Construction, maintenance and/or modification<sup>(1)</sup> of dams for **recreational and/or stormwater management ponds** where the disturbed area of the project (including any disturbed areas flooded by the impoundment) is less than one (1) acre and located within 200 feet of any perennial State Waters<sup>(5)</sup>:

- In an area with a certified LIA, a local LDA permit is required (O.C.G.A. § 12-7-17(8)).
- Coverage under the NPDES General Permits for Storm Water Discharges Associated with Construction Activity is **not** required if the project is not located within a larger common plan of development.
- In an area with a certified LIA, multiple copies of the Plan (as specified by the LIA) must be submitted to the LIA for review and approval or disapproval.
- Buffer variance applications must be submitted to the EPD Watershed Protection Branch for review and approval or disapproval. Incomplete applications will be returned to the applicant.

**Scenario 3** – Construction, maintenance and/or modification<sup>(1)</sup> of dams for **recreational and/or stormwater management ponds “technically supervised” by the Natural Resources Conservation Service (NRCS)** where the disturbed area of the project (including any disturbed areas flooded by the impoundment) is equal to or greater than one (1) acre:

- A local LDA permit is **not** required (O.C.G.A. § 12-7-17(7)).
- Coverage under the NPDES General Permits for Storm Water Discharges Associated with Construction Activity<sup>(2)</sup> is required, which includes the submittal of a NOI, NPDES General Permit – Fee Form, and an Erosion, Sedimentation and Pollution Control Plan.
- A fee of \$80 per acre disturbed<sup>(3)</sup> must be paid to EPD.

- A single copy of the Plan must be submitted to the EPD Watershed Protection Branch<sup>(4)</sup> for review and a second copy of the Plan must be submitted to the appropriate EPD District Office prior to or concurrent with the NOI submittal.
- Buffer variance applications must be submitted to the EPD Watershed Protection Branch for review and approval or disapproval. Incomplete applications will be returned to the applicant.

**Scenario 4** – Construction, maintenance and/or modification<sup>(1)</sup> of dams for **recreational and/or stormwater management ponds “technically supervised” by the Natural Resources Conservation Service (NRCS)** where the disturbed area of the project (including any disturbed areas flooded by the impoundment) is less than one acre:

- A local LDA permit is **not** required (O.C.G.A. § 12-7-17(7)).
- Coverage under the NPDES General Permits for Storm Water Discharges Associated with Construction Activity is **not** required if the project is not located within a larger common plan of development.
- Project is **exempt** from the State-mandated buffer requirements (O.C.G.A. § 12-7-17(7)).

**Scenario 5** – Construction of dams for **public drinking water reservoirs** where the disturbed area of the project (including any disturbed areas flooded by the impoundment) is equal to or greater than one (1) acre:

- A local LDA permit is **not** required (O.C.G.A. § 12-7-17(11)).
- Coverage under the NPDES General Permits for Storm Water Discharges Associated with Construction Activity<sup>(2)</sup> is required, which includes the submittal of a NOI, NPDES General Permit – Fee Form, and an Erosion, Sedimentation and Pollution Control Plan.
- A fee of \$80 per acre disturbed<sup>(3)</sup> must be paid to EPD.
- A single copy of the Plan must be submitted to the EPD Watershed Protection Branch<sup>(4)</sup> for review and a second copy of the Plan must be submitted to the appropriate EPD District Office prior to or concurrent with the NOI submittal.
- Project is **exempt** from the State-mandated buffer requirements (O.C.G.A. § 12-7-17(11)).

**Scenario 6** – Maintenance of **public drinking water reservoir dams and shorelines** where the disturbed area of the project is equal to or greater than one (1) acre:

- A local LDA permit is **not** required (O.C.G.A. § 12-7-17(11)).
- Coverage under the NPDES General Permits for Storm Water Discharges Associated with Construction Activity<sup>(2)</sup> is required, which includes the submittal of a NOI, NPDES General Permit – Fee Form, and an Erosion, Sedimentation and Pollution Control Plan (Plan).
- A fee of \$80 per acre disturbed must be paid to EPD.

- A single copy of the Plan must be submitted to the EPD Watershed Protection Branch<sup>(4)</sup> for review and a second copy of the Plan must be submitted to the appropriate EPD District Office prior to or concurrent with the NOI submittal.
- Project is **exempt** from the State-mandated buffer requirements (O.C.G.A. § 12-7-17(11)).
- Projects such as boat launches and docks (including access ways) are not considered maintenance projects. Buffer variance applications for these projects must be submitted to the EPD Watershed Protection Branch.

**Scenario 7** – Maintenance of **public drinking water reservoir dams and shorelines** where the disturbed area of the project is less than one (1) acre:

- A local LDA permit is **not** required (O.C.G.A. § 12-7-17(11)).
- Coverage under the NPDES General Permits for Storm Water Discharges Associated with Construction Activity is **not** required.
- Project is **exempt** from the State-mandated buffer requirements (O.C.G.A. § 12-7-17(11)).
- Projects such as boat launches and docks (including access ways) are not considered maintenance projects. Buffer variance applications for these projects must be submitted to the EPD Watershed Protection Branch.

**Scenario 8** - Maintenance of a **non-erodible drainage structure** on a dam, as defined in GESA (O.C.G.A. § 12-7-3(7)), and **technically supervised by NRCS** where the disturbed area of the project is equal to or greater than one (1) acre:

- A local LDA permit is **not** required (O.C.G.A. § 12-7-17(7)).
- Coverage under the NPDES General Permits for Storm Water Discharges Associated with Construction Activity<sup>(2)</sup> is required, which includes the submittal of a NOI, NPDES General Permit – Fee Form, and an Erosion, Sedimentation and Pollution Control Plan.
- A fee of \$80 per acre disturbed must be paid to EPD.
- A single copy of the Plan must be submitted to the EPD Watershed Protection Branch<sup>(4)</sup> for review and a second copy of the Plan must be submitted to the appropriate EPD District Office prior to or concurrent with the NOI submittal.
- Project is **exempt** from the State-mandated buffer requirements for non-trout waters (O.C.G.A. § 12-7-6(15)(A)(iv)).

**Scenario 9** - Maintenance of a **non-erodible drainage structure** on a dam, as defined in GESA (O.C.G.A. § 12-7-3(7)), and **technically supervised by NRCS** where the disturbed area of the project is less than one (1) acre:

- A local LDA permit is **not** required (O.C.G.A. § 12-7-17(7)).
- Coverage under the NPDES General Permits for Storm Water Discharges Associated with Construction Activity is **not** required.

- Project is **exempt** from the State-mandated buffer requirements (O.C.G.A. § 12-7-17(7)).

**Scenario 10** - Maintenance of a **non-erodible drainage structure** on a dam, as defined in GESA (O.C.G.A. § 12-7-3(7)), where the disturbed area of the project is equal to or greater than one (1) acre:

- In an area with a certified LIA, a local LDA permit is required.
- Coverage under the NPDES General Permits for Storm Water Discharges Associated with Construction Activity<sup>(2)</sup> is required, which includes the submittal of a NOI, NPDES General Permit – Fee Form, and an Erosion, Sedimentation and Pollution Control Plan.
- In an area with no certified LIA, a fee of \$80 per acre disturbed must be paid to EPD. In an area with a certified LIA, a fee of \$40 per acre disturbed must be paid to EPD and a fee of \$40 per acre disturbed must be paid to the LIA. The NPDES General Permit fees are in addition to any LDA permit fees required by the LIA.
- In an area with a certified LIA, multiple copies of the Plan (as specified by the LIA) must be submitted to the LIA for review and approval or disapproval. In an area with no certified LIA regulating the project, a single copy of the Plan must be submitted to the EPD Watershed Protection Branch<sup>(4)</sup> for review and a second copy of the Plan must be submitted to the appropriate EPD District Office prior to or concurrent with the NOI submittal.
- For projects with land disturbances equal to or greater than 50 acres, regardless of the existence of a certified LIA, a single copy of the Plan must be submitted to the appropriate EPD District Office.
- Project is **exempt** from the State-mandated buffer requirements for non-trout waters (O.C.G.A. § 12-7-6(15)(A)(iv)).

**Scenario 11** – Maintenance of a **non-erodible drainage structure** on a dam, as defined in GESA (O.C.G.A. § 12-7-3(7)), where the disturbed area of the project is less than one (1) acre and located within 200 feet of any perennial State Waters<sup>(5)</sup>:

- In an area with a certified LIA, a local LDA permit is required (O.C.G.A. § 12-7-17(8)).
- Coverage under the NPDES General Permits for Storm Water Discharges Associated with Construction Activity is **not** required.
- In an area with a certified LIA, multiple copies of the Plan (as specified by the LIA) must be submitted to the LIA for review and approval or disapproval.
- Project is **exempt** from the State-mandated buffer requirements for non-trout waters (O.C.G.A. § 12-7-6(15)(A)(iv)).

**Emergency Projects** – The Safe Dams Unit will determine if the “damage to the dam or the area needing repair” presents a serious risk of failure of the dam that would require immediate action. Projects that are determined to be an “emergency” by the EPD Safe Dams Unit are not subject to the State-mandated buffer variance requirements.

However, if the disturbed area of an emergency project is equal to or greater than one (1) acre, permit coverage under Part IV(A)(6) of the NPDES General Permits for Storm Water Discharges Associated with Construction Activity is required.

In all instances, regardless of exemptions, adequate erosion and sedimentation control measures must be provided to protect the State’s soils and waters. If additional information is required, please contact Jan Sammons with the EPD Erosion and Sedimentation Unit at (404) 675-6240 or Tom Woosley with the EPD Safe Dams Unit at (404) 362-2678.

An information guide, *Building or Renovating a Pond in Georgia – A Pond Guide for Citizens*, is also available for landowners in Georgia who want to build a new pond or to renovate an existing pond. There are numerous laws and agencies regulating pond construction in Georgia. This document identifies the multiple agencies available that provide assistance in planning and designing ponds.

- (1) Draining a pond does not require a buffer variance from the EPD Watershed Protection Branch; however, a buffer variance application must be submitted for any encroachments within the State-mandated buffers or modifications to the pond, **such as breaching the dam**.
- (2) The NPDES General Permit forms are located on the EPD website, [www.gaepd.org](http://www.gaepd.org).
- (3) The disturbed acreage for a reservoir project includes any areas disturbed during clearing and subsequently flooded by the impoundment.
- (4) The EPD Watershed Protection Branch will review these Plans for deficiencies using the applicable Erosion, Sedimentation and Pollution Control Plan Checklist (including the delineation of State Waters and State-mandated buffers).
- (5) A certified Local Issuing Authority may enact a local Erosion and Sedimentation Control Ordinance that exceeds the acreage provisions of the Georgia Erosion and Sedimentation Act.

**Appendix #5: Memo from Georgia EPD Regarding “Minor Land Disturbing Activities”**

# Georgia Department of Natural Resources

2 Martin Luther King, Jr. Drive, S.E., Suite 1152 East Tower, Atlanta, Georgia 30334-9000

Chris Clark, Commissioner  
Environmental Protection Division  
F. Allen Barnes, Director  
(404) 656-4713

## MEMORANDUM

**TO:** NonPoint Source Group, Program Coordination Branch Staff, and Local Issuing Authorities

**FROM:** Jim Ussery, P.E., Assistant Director  
Environmental Protection Division

**RE:** Minor Land-Disturbing Activity Guidelines

The attached minor land-disturbing guidance document, dated September 2009, has been developed by the Erosion Sedimentation Advisory Council (ESAC). The intent of this document is to clarify minor land-disturbing activities as defined in the Georgia Erosion and Sedimentation Act and the applicable requirements of the NPDES General Permits for Storm Water Discharges Associated with Construction Activity.

Please initiate implementation of these guidelines immediately for all applicable minor land-disturbing activities.

Should there be any questions regarding this memorandum, please contact the appropriate EPD District Office or the Watershed Protection Branch's NonPoint Source Program at (404) 675-6240.

### Attachment

**Cc:** Jim Sommerville  
Linda MacGregor  
Larry Hedges

## **MINOR LAND-DISTURBING ACTIVITIES**

As per O.C.G.A. 12-7-17(3), minor land-disturbing activities are exempt from the Georgia Erosion and Sedimentation Act: ***“Such minor land-disturbing activities as home gardens and individual home landscaping, repairs, maintenance work, fences, and other related activities which result in minor soil erosion.”***

The intent of this document is to clarify minor land-disturbing activities as defined in the Georgia Erosion and Sedimentation Act and the applicable requirements of the NPDES General Permits for Storm Water Discharges Associated with Construction Activity, as follows:

- A. The following land-disturbing activities are examples of projects not specifically listed in O.C.G.A. 12-7-17(3) that would be considered minor land-disturbing activities and therefore, exempt from the Georgia Erosion and Sedimentation Act and the applicable buffer requirements for State waters:
1. Elevated structures such as decks, gazebos, patios, walkways, viewing platforms and/or open picnic shelters, provided:
    - a. No more than 100 square feet of footprint of the elevated structure extends into or over the buffer, with an exception for structures compliant with the Americans with Disability Act (ADA);
    - b. No grading, cutting, filling or similar land-disturbing activities occurring as a part of the site preparation, construction or subsequent development;
    - c. The structure is built on posts, concrete blocks and/or similar supports;
    - d. Permanent protective vegetative cover remains or protective measures (e.g., mulch, gravel) are installed within the footprint of the elevated structure to prevent post-construction soil erosion;
    - e. A natural canopy is left in sufficient quantity to keep shade on the stream bed; and
    - f. No concrete and/or asphalt slabs, pads or foundations constructed or placed as a part of the site preparation, construction or subsequent development.
  2. A pervious ground level walkway approach to a dock and/or similar structure, provided:
    - a. No more than 100 square feet of the constructed walkway extends into the buffer, with an exception for structures compliant with the Americans with Disability Act (ADA);
    - b. No grading, cutting, filling or similar land-disturbing activities occurring as a part of the site preparation, construction or subsequent development;
    - c. No concrete and/or asphalt slabs, pads, supports or foundations constructed or placed as a part of the site preparation, construction or subsequent development; and
    - d. All ground preparation and walkway material placement is completed with the use of hand-held equipment.
  3. Restoration of buffer area after the removal of an existing structure, provided:

- a. No more than 100 square feet of the structure footprint is in the buffer; and
  - b. The buffer area must be replanted with native vegetation.
4. Maintenance or repair of existing structures, the failure of which would result in a threat to human health or State waters, such as sewer lines, water lines, dams, or gas lines. Total disturbance must be less than 100 square feet.
  5. Placement of rock riprap within the buffer not to exceed 100 square feet on any one property, provided:
    - a. The placement of the rip-rap does not result in soil disturbance outside the placement area; and
    - b. No grading, cutting, filling or similar land-disturbing activities occurring as part of the site preparation, construction or subsequent development.
- B. The following land-disturbing activities are examples of projects that are **NOT** considered minor land-disturbing activities and therefore, **NOT** exempt from the Georgia Erosion and Sedimentation Act and the applicable buffer requirements for State waters:
1. Any land-disturbing activity utilizing wheeled or tracked machinery and equipment resulting in soil erosion within the buffer;
  2. Paving with poured or prefab concrete and/or asphalt;
  3. Any project or combination of projects occurring within the same calendar year on the same property resulting in more than 100 square feet of any elevated structures and/or pervious ground level walkways within or extending into the buffer;
  4. Construction of a barbeque pit on a concrete and/or asphalt slab or pad within the buffer;
  5. Construction of a ground level patio within the buffer;
  6. Construction of a swimming pool within the buffer;
  7. Construction of a structural or decorative retaining wall within the buffer;
  8. Construction of a new seawall with land-disturbing activities occurring within the buffer; and
  9. Backfilling any new seawall construction within the buffer.

In addition, O.C.G.A. 12-7-6(b)(15)(A) and O.C.G.A. 12-7-6(b)(16)(A) state that "**No land disturbing activities shall be conducted within a buffer and a buffer shall remain in its natural, undisturbed, state of vegetation until all land-disturbing activities on the construction site are completed.** Once final stabilization of the site is achieved, a buffer may be thinned or trimmed of vegetation as long as a protective vegetative cover remains to protect water quality and aquatic habitat and a natural canopy is left in sufficient quantity to keep shade on the stream bed; provided, however, that any person constructing a single-family residence, when such residence is constructed by or under contract with the owner for his or her own occupancy, may thin or trim vegetation in a buffer at any time as long as protective vegetative cover remains to protect water quality and aquatic habitat and a natural canopy is left in sufficient quantity to keep shade on the stream bed."

Therefore, for **Common Development** construction projects covered under the NPDES General Permit for Storm Water Discharges Associated with Construction Activity (Permit), the exemption for minor land-disturbing activities (O.C.G.A. 12-7-17(3)) within the buffer for State waters would not be applicable for an individual lot(s) until such time as a Notice of Termination (NOT) for the **Common Development** had been submitted in accordance with the Permit.

For **Stand Alone** and **Infrastructure** construction projects covered under the Permit, the exemption for minor land-disturbing activities (O.C.G.A. 12-7-17(3)) would not be applicable for a construction project until such time as a NOT is submitted in accordance with the Permit. However, **for Infrastructure construction projects only**, the installation of **mandatory fences** within the buffer for State waters is allowed prior to submitting a Notice of Termination and is exempt from the applicable buffer requirements.

Compliance with the Georgia Erosion and Sedimentation Act and NPDES General Permits for Storm Water Discharges Associated with Construction Activity does not relieve an individual of any obligation or responsibility for complying with the provisions of any other law or regulations of any Federal, local or additional State authority, nor does it obligate any of the aforementioned to permit this project if they do not concur with its concept of development and control (e.g., placement of rock riprap within the stream channel may require a permit from the United States Army Corps of Engineers).

**Appendix #6: Memo from Georgia EPD Regarding “State Waters Issues”**

# **Georgia Department of Natural Resources**

2 Martin Luther King, Jr. Drive, S.E., Suite 1152 East Tower, Atlanta, Georgia 30334-9000  
Lonica C. Barrett, Commissioner  
Carol A. Couch, Ph.D., Director  
Environmental Protection Division  
404/656-4713

June 14, 2004

## **MEMORANDUM**

**TO:** Erosion and Sedimentation Control Local Issuing Authorities  
Other Interested Parties

**FROM:** Carol A. Couch, Ph.D., Director   
Environmental Protection Division

**RE:** Georgia Erosion and Sedimentation Act  
State Waters Issues

This memo is to clarify certain issues concerning state waters, including the identification of state waters that require stream buffers and the installation of storm water detention ponds in state waters. Please be advised that it is the responsibility of local Issuing Authorities to make these determinations.

### **State Waters that Require Stream Buffers**

The term "state waters" is defined in Section 12-7-3(16) of the Georgia Erosion and Sedimentation Act (Act) as "Any and all rivers streams, creeks, branches, lakes, reservoirs, ponds, drainage systems, springs, wells and other bodies of surface or subsurface water, natural or artificial, lying within or forming a part of the boundaries of the State which are not entirely confined and retained completely upon the property of a single individual, partnership, or corporation."

Section 12-7-6(b)(15) of the Act states that "Except as provided in paragraph (16) of this subsection, there is established a 25-foot buffer along the banks of all state waters, as measured horizontally from the point where vegetation has been wrested by normal stream flow or wave action, except where the director determines to allow a variance that is at least as protective of natural resources and the environment, where otherwise allowed by the director pursuant to Code section 12-2-8, or where a drainage structure or a roadway drainage structure must be constructed, provided that adequate erosion control measures are incorporated in the project plans and specifications and are implemented..." The term "wrested" is defined in Webster's Dictionary as "to pull, force, or move by violent wringing or twisting movements." Similar language is provided in Section 12-7-6(b)(16) for 50-foot trout stream buffers, with the exception that drainage structures are not excluded.

The determination of whether a buffer is required for state water is based solely on whether there is sufficient water flow to "wrest" the vegetation from the banks of the stream, thereby forming a defined channel. The defined channel may have occurred over a long period of time or by soil erosion; however, as observed presently it is a defined channel and is protected by the 25-foot buffer requirement.

The following factors are not to be considered in state waters determinations for stream buffer protection:

- **Whether a stream appears on a topographical map as a solid or dashed blue line (the presence of a blue line is an indication of state waters, but not all streams are mapped as blue lines);**
- **Whether the stream originates on the property;**
- **Whether a stream that originates on the property flows into another stream before it leaves the property;**
- **The amount of water in the stream at any given time, i.e., under normal conditions;**
- **The duration of water flow in the stream;**
- **The watershed area, unless a scientific correlation between wrested vegetation and watershed area has been made by the Issuing Authority; or**
- **The absence of observable aquatic life.**

Analyzing the topography on an erosion and sedimentation control plan is the first step in determining whether a site contains a state water that requires a buffer variance. Further information can be obtained from a soils or topographical map of the area. An onsite inspection is essential in making the final determination if a review of the topography and soils on the site indicate a possible drainage feature. The final determination should then be made using the criteria in the preceding paragraphs.

#### Storm Water Detention Ponds in State Waters

The term "drainage structure" is defined in Section 12-7-3(7) of the Act as a "device composed of a virtually nonerodible material such as concrete, steel, plastic, or such material that conveys water from one place to another by intercepting the flow and carrying it to a release point for storm-water management, drainage control, or flood control purposes." This definition only allows the components of a stormwater management pond that meet this definition as drainage structures to be exempt from stream buffer variance requirements. Other components, including excavated ponds, earthen dams, etc., require a buffer variance that may be applied for under 391-3-7.05(2)(C) in DNR's Erosion and Sedimentation Rules. This states, "The project involves the construction or repair of a structure which, by its nature, must be located within the buffer. Such structures include dams, public water supply intake structures, wastewater discharges, docks, boat launches,

and stabilization of areas of public access to water." Please note that drainage structures are only exempt on warm water streams and are not exempt on trout streams.

Section 12-7-6(b)(14) of the Act states that "Land-disturbing activity plans for erosion and sedimentation control shall include provisions for control or treatment of any source of sediments and adequate sedimentation control facilities to retain sediments on site or preclude sedimentation of adjacent waters beyond the levels specified in subsection a". These levels are 25 NTU for warm water streams and 10 NTU for trout streams. The use of in-stream ponds to intentionally trap sediment during land disturbing activity is in violation of this section of the Act and is not allowed.

EPD appreciates the local Issuing Authorities' efforts in implementation of their local erosion and sedimentation ordinances. We hope the above guidance helps in those efforts. If you should have any questions about this memo, please contact Ms. Jan Sammons in the Water Protection Branch, NonPoint Source Program, at (404) 675-6240.

CAC:jss

**Appendix #7: Columbia County SOP for State Waters Determinations**



## **Columbia County Stormwater Utility**

### **Standard Operation Procedure for State Waters Determinations**

1. Prior to preliminary plat or site plan submittal, the site developer or his representative shall contact the Columbia County Stormwater Utility Department to schedule a site visit, providing parcel number and preliminary project sketch, if available.
2. Stormwater Staff shall walk the site with the developer or with his representative to mark, using visible flagging, all buffered and unbuffered State Waters. The "Field Guide for Determining the Presence of State Waters that Require a Buffer," published by the Georgia Department of Natural Resources shall be used for guidance in the determination.
3. The developer shall submit an "Environmentally Sensitive Areas Plan" showing:
  - a. Project area,
  - b. Topography,
  - c. State Waters as determined by the aforementioned site visit,
  - d. Delineated wetlands, and
  - e. Special flood hazard area.Said plan shall be included as part of the preliminary plat or site plan submittal.
4. The Columbia County Stormwater Utility Department will issue a formal State Waters Determination Letter referencing the data shown on the "Environmentally Sensitive Areas Plan," which shall remain valid for a period of 12 months (1 year).
5. All preliminary plats and site plans shall contain a notation on each Erosion Sedimentation and Pollution Control plan sheet stating, "The state waters shown on this plan have been field verified by Columbia County as a Local Issuing Authority in Georgia on (date)."