

**Local Stormwater Design Manual
For
Macon-Bibb County, Georgia**

**Macon Water Authority
(Last Revised 9/28/2021)**

Revision Log	Date
Revision 0	9/28/2021

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1. FOREWORD

This manual is meant to serve as a comprehensive guide to implementing stormwater management systems in Macon-Bibb County, Georgia. Additionally, the manual is designed to supplement the Georgia Stormwater Management Manual (GSMM) 2016 Edition, which shall serve as the technical manual for design and specification of individual components within the system.

2. GENERAL LEVEL OF SERVICE STANDARDS

2.1. Detention Requirements

2.1.1. Discharge Rates from New Development Projects

Development plans including site grading and drainage plans should be developed to minimize disruption of natural drainage patterns on properties as well as to minimize impacts to downstream drainage infrastructure and structures. Whenever a Hydrologic & Hydraulic Report (as defined in Section 6 of this document) indicates a potentially adverse impact resulting from development of a property, that project shall incorporate stormwater detention facilities as outlined herein. The meaning of adverse impact shall apply to situations where the post development discharge rates, up to and including the 100 year storm event, exceed those determined for the pre-developed conditions, or where downstream conditions indicate that the conveyance and /or storage capacity of the existing infrastructure could be inundated by the post development conditions, or where existing structures could be impacted by the post developed conditions. Additionally, no significant increases in stormwater runoff rates shall be allowed at any discharge point on the site which would negatively affect adjacent property owners. The baseline predevelopment condition of new sites shall be, as a minimum, pasture land in good condition. If actual conditions indicate that less runoff would occur than for pasture (assuming a CN of 55), then the actual conditions shall be modeled unless there is a known downstream flooding issue. In the event there is known downstream flooding concerns, sufficient detention shall be provided or other practices to reduce the flows on redevelopment projects to 90% of the predevelopment flows.

The development shall be analyzed for the following storm events:

- 2-year 24-hour Design Storm
- 5-year 24-hour Design Storm
- 10-year 24-hour Design Storm
- 25-year 24-hour Design Storm
- 50-year 24-hour Design Storm
- 100-year 24-hour Design Storm

If the total area of the site (i.e. total property area) and the drainage area to each stormwater management facility is less than one acre, then a rainfall intensity based analysis (i.e. rational method) may be performed. If detention facilities are to be designed and constructed in series, the 24-hour storm criteria will apply regardless of the drainage area.

2.1.2. Discharge Rates from **Redevelopment** Projects

Development plans including site grading and drainage plans should be developed to minimize disruption of natural drainage patterns on properties as well as to minimize impacts to downstream drainage infrastructure and structures. Whenever a Hydrologic & Hydraulic Report (as defined in Section 6 of this document) indicates a potentially adverse impact resulting from development of a property, that project shall incorporate stormwater detention facilities as outlined herein. The meaning of adverse impact shall apply to situations where the post development discharge rates, up to and including the 100 year storm event, exceed those determined for the pre-developed conditions, or where downstream conditions indicate that the conveyance and /or storage capacity of the existing infrastructure could be inundated by the post development conditions, or where existing structures could be impacted by the post developed conditions. Additionally, no significant increases in stormwater runoff rates shall be allowed at any discharge point on the site. The baseline predevelopment condition of redevelopment sites shall be the existing conditions of the site including any existing depression or detention storage unless there is a known downstream issue. In the event there is known downstream flooding concerns sufficient detention shall be provided or other practices to reduce the flows on redevelopment projects to 90% of the predevelopment flows. Any vegetated areas shall be presumed to be a minimum of pasture land in good condition. If actual conditions indicate that less runoff would occur than for pasture, then the actual conditions shall be modeled. The development shall be analyzed for the following storm events:

2-year 24-hour Design Storm

5-year 24-hour Design Storm

10-year 24-hour Design Storm

25-year 24-hour Design Storm

50-year 24-hour Design Storm

100-year 24-hour Design Storm

If the total area of the site (i.e. total property area) and the drainage area to each stormwater management facility is less than one acre, then a rainfall intensity based analysis (i.e. rational method) may be performed. If detention facilities are to be designed and constructed in series, the 24-hour storm criteria will apply regardless of the drainage area.

2.2. Conveyance Systems

2.2.1. Bridges

All bridges shall be designed to accommodate the 100-year 24-hour design storm with no over-topping.

2.2.2. Culverts & Pipe Systems

Roadway Classification / Use	Design Storm
Arterial / Emergency Evacuation Roadway	100-Year
Collector Roads	50-Year
Neighborhood Roads	25-Year
Roads with No Other Outlet serving 10 or more homes or equivalent commercial properties	100-Year
Parking Lots / Material Storage Areas / Landscape Areas	10-Year

If a culvert is designed to connect to an existing system of a differing design level of service, then the system with the greater design requirement will be used to size the proposed system.

2.2.3. Inlets (Catch Basins, Yard Inlets, Drop Inlets, Hooded Grate Inlets and Flumes)

Inlets collecting stormwater runoff from street surfaces and area inlets shall be sized to capture the storm event specified for the pipe system to which it drains and a maximum flooding depth as determined by the following table:

Roadway Classification / Use	Flooding Depth
Arterial / Emergency Evacuation Roadway	8.0 ft Maximum Gutter Spread
Collector Roads	8.0 ft Maximum Gutter Spread
Neighborhood Roads	8.0 ft Lane Width Open
Roads with No Other Outlet	One Lane Width Open
Parking Lots	Maximum 0.5 ft Depth
Detention Areas utilized for other purposes (i.e. parking lot detention, etc.) with flood warning sign	Maximum 1.5 ft Depth
Material Storage Areas / Landscape Areas with flood warning sign if area is utilized by the public	Maximum 2.0 ft Depth

Inlets and grading adjacent to habitable structures shall be designed to prevent stormwater runoff from entering the structure during the 100-year design storm.

2.2.4. Inlets (Headwalls, Flared End Sections, etc.)

Inlets that utilize the opening of the pipe as the inlet (i.e. headwalls, flared end sections, etc.) shall be sized to capture the storm event specified for the pipe system to which it drains and a maximum flooding depth that will not result in bypass of the inlet or cause structural / nuisance flooding.

2.2.5. Roadside Ditches

Roads constructed without curb and gutter shall incorporate ditches that are designed to the specific design storms as shown in the following table: Ditches may be installed with less capacity only if the engineer demonstrates that the flow may be accommodated in other ways without causing a traffic safety problem or causing damage to private property.

Roadway Classification / Use	Design Storm
Arterial / Emergency Evacuation Roadway	100-Year
Collector Roads	50-Year
Neighborhood Roads	25-Year
Roads with No Other Outlet serving 10 or more homes or equivalent commercial properties	100-Year

2.2.6. Drainage Channels

For drainage channels designed to convey stormwater runoff either from or to a culvert, the channel should be sized to accommodate the same storm event specified for the pipe system.

Channels designed to convey stormwater runoff to and from detention ponds shall be sized to accommodate the 100-year design storm.

2.3. Unified Stormwater Sizing Criteria

2.3.1. Runoff Reduction/Water Quality

For development with a stormwater management plan submitted after April 2020, the applicant shall choose (A) Runoff Reduction and additional water quality shall not be required. To the extent (A) Runoff Reduction has been determined to be infeasible for all or a portion of the site using the Practicability Policy described in 2.3.2 and included in Appendix A (MWA Pre-submittal Package for Designers), then (B) Water Quality shall apply for the remaining runoff from a 1.2 inch rainfall event and must be treated to remove at least 80% of the calculated average annual post-development total suspended solids (TSS) load or equivalent as defined in the GSMM.

- (A) Runoff Reduction - The stormwater management system shall be designed to retain the first 1.0 inch of rainfall on the site using runoff reduction methods, to the maximum extent practicable.
- (B) Water Quality – The stormwater management system shall be designed to remove at least 80% of the calculated average annual post-development total suspended solids (TSS) load or equivalent as defined in the GSMM for runoff from a 1.2 inch rainfall event.

If a site is determined to be a hotspot, the Authority may require the use of specific or additional components for the stormwater management system to address pollutants of concern generated by that site.

2.3.2 Runoff Reduction Practicability Policy

The GSMM provides broad guidance about conditions that may lead a local jurisdiction to waive or reduce the runoff reduction requirement. If one of following conditions apply, the site may warrant a Determination of Infeasibility.

- **Soil Infiltration Rate:** The soil infiltration rate is less than 0.5 inch per hour as measured over a meaningful portion of the site. Consideration should be given to infiltration rates throughout the soil profile.
- **Water Table:** The seasonal high-water table is less than two feet from the bottom of an infiltration practice.
- **Shallow Bedrock:** Material that cannot be excavated except by drilling or blasting AND is less than two feet from the bottom of an infiltration practice.
- **Extreme Topography:** In the proposed final condition, as shown on the Stormwater Concept Plan with the proposed post-development condition, anything steeper than 3:1 slope for more than 50% of the site.
- **Karst Topography:** Any of the existing condition is karst.
- **Hotspots/ Contamination:** Reasonable suspicion that previous uses of the site have resulted in soil contamination.
- **Historic Resources:** Buildings, structures, or historic sites included in the Georgia Historic Preservation Division's Historic Resources Survey or listed in the National Register of Historic Places or that has been recommended as a historic resource by a Preservation Professional.
- **Site Constraints:** Sites where the density or nature of the proposed redevelopment would create irreconcilable conflicts for compliance between the on-site runoff reduction requirement and other requirements such as zoning, floodplains, stream buffers, or septic fields.
- **Economic Hardship:** The cost of retaining the first 1.0 inch of rainfall onsite using runoff reduction practices is a minimum of three times greater than the cost of providing water quality practices. This condition must be present with another site condition for a Determination of Infeasibility. Additionally, a Determination of Infeasibility for economic hardship may only be allowed for up to 50% runoff reduction volume.

If the maximum extent practicable for runoff reduction is less than the required volume, the applicant shall review the Policy on Practicability Analysis for Runoff Reduction within Appendix A, request a pre-consultation meeting with the Authority, and complete the infeasibility analysis described in the Practicability Policy.

2.4. Channel Protection

Channel protection shall be provided for each site by providing by using all of the following three approaches

1. Extended detention of the 1-year, 24- hour return frequency storm event released over a period of 24-hours.

2. Erosion prevention measures, such as energy dissipation and velocity control; and
3. Preservation of any applicable stream buffer.

2.5 Overbank Flood Protection.

2.5.1 Overbank flood protection shall be provided by controlling the post-development peak discharge rate to the pre-development rate (natural or existing condition, as applicable) for the 25-year, 24-hour return frequency storm.

2.6 Extreme Flood Protection

Extreme flood protection shall be provided by controlling and/or safely conveying the 100-year, 24-hour storm event. This is accomplished through BMP's to maintain the existing 100-year floodplain, or by sizing the on-site conveyance system to safely pass the flow and allowing it to discharge into a receiving water whose protected floodplain is sufficiently sized to account for extreme flow increases without causing damage.

2.7. Energy Dissipation

Energy dissipation shall be employed whenever the velocity of flows leaving a new stormwater facility exceeds the erosion velocity of the downstream area channel area or five fps whichever is less.

2.8 Highways - New Construction and Widening Projects

Drainage requirements caused by the construction of new highways and the widening of existing arterial and collector roads in Macon-Bibb County shall be governed by the standards of the Georgia Department of Transportation (GDOT). The designer must provide a copy of the applicable sections of the Post Construction Stormwater Report.

The GDOT standards do not apply to the construction of new local roads developed as a part of a traditional subdivision. Local roads developed as a part of a new subdivision shall be governed by the standards of this manual.

3. APPROVED CONSTRUCTION MATERIALS & BMPs

3.1. Conveyance Structures

3.1.1. Pipes Under Roads and Within the Public Right-of-Way and Pipes in Residential Lots.

Pipes installed in Macon-Bibb County shall conform as a minimum to Pipe Selection Guide (Appendix B) attached to this document. In general, pipes in all Macon-Bibb County rights-of-way installed by private contractors must be 18” or greater, reinforced concrete, corrugated smooth lined HDPE or PVC corrugated smooth interior pipes may be considered. In addition to these, corrugated smooth lined HDPE and PVC corrugated smooth interior pipes may also be used on residential lots. All pipes must be installed in accordance with the manufacturer’s recommendations unless Macon-Bibb County has a stricter standard.

Maximum deflection of installed pipe systems shall be in accordance with manufacturer’s specifications.

3.1.2. Pipes in Commercial Developments

In commercial developments and not within the county rights-of-way the developer is encouraged to use those pipes approved for county rights-of-way. However, the developer may use any other pipe that he or she chooses provided he or she signs a written acknowledgement of his or her approval of the pipe specified.

3.1.3. Post inspection testing. For all projects the contractor must perform post installation inspection in accordance with the Georgia Department of Transportation specification 550.3.06. Visual inspection methods may be used for projects with less than 100 LF total of pipe.

3.1.4. Channels

All channels must be protected from erosion through the use of rip-rap, concrete, erosion control matting or similar method acceptable to the County. All channel side slopes shall have *maximum* slopes as indicated below.

Depth of Ditch	Cut Sections	Fill Sections
0-5 Feet	3(H) to 1(V)	3 to 1
>5 Feet	1.5 to 1	2 to 1

3.1.5. Inlets

All inlets shall be constructed of materials and methods approved by the Georgia Department of Transportation and designs pre-approved by Macon-Bibb County. The City of Macon Standard for inlet design and construction is also acceptable.

Inlet covers (where appropriate) shall be designed and manufactured in accordance with local construction standards related to storm drain stenciling and pollution prevention education. The Owner and/or designer shall consult Macon-Bibb County regarding specific requirements for storm drain covers and inlets.

3.2. Detention Ponds

3.2.1. Dry or Wet Earthen Detention Ponds

Detention ponds shall be designed to provide for positive drainage on the pond floor to the outlet of the pond. Side slopes shall be designed to have a maximum of 3-feet horizontal to 1-foot vertical (3:1) slopes. If the 100-year maximum water surface depth is equal to or greater than four feet, then a standard four foot chain link fence shall be constructed around the detention pond with a 20-foot gate provided to allow access.

Acceptable backfill and fill materials shall consist of suitable soils for dam construction as determined by Macon-Bibb free of rock or gravel larger than 1-inch in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter. Backfill and fill materials should be placed in layers not more than 8-inches in loose depth for material compacted by heavy compaction equipment, and not more than 4-inches in loose depth for material compacted by hand-operated tampers. Each layer should be uniformly moistened or aerated before compaction to within 3 percent of optimum moisture content. Layers should not be placed on surfaces that are muddy, frozen, or contain frost or ice. All backfill and fill materials should be placed evenly to required elevations, and uniformly along the full length of the embankment. Additionally, soils should be compacted to at least 95% maximum dry unit weight according to ASTM D 698.

3.2.2. Underground Detention Ponds

No underground detention pond shall be constructed on new residential development projects. Underground detention ponds may be considered on non-residential development projects after the Engineer has shown that construction of an aboveground detention pond is not feasible.

3.3. Water Quality Best Management Practices

3.3.1. General application structural stormwater controls and limited application structural controls as well as low impact development controls are given in the GSMM. Any application defined in the GSMM is acceptable provided the engineer can demonstrate the appropriateness of the application for the particular site.

3.3.2. Proprietary Structural Controls

The MWA Engineering Department may at their discretion allow proprietary structural controls. Prior to specification of such a device, the designer shall consult the Engineering Department to determine if the control will be acceptable.

3.4. Channel Protection Design

Outlets to provide for meeting channel protection criteria shall be designed to meet the standards outlined in the GSMM.

4. APPROVED HYDROLOGIC & HYDRAULIC METHODS

4.1. Hydrologic Methods

4.1.1. Rational Method

The rational method may be used with the approval of Macon-Bibb County Engineering Department or its Agent to develop peak runoff flows for culverts or to size ponds within the limits specified in the GSMM. All computations shall be in accordance with the GSMM. Rainfall intensities shall be derived from the National Oceanic and Atmospheric Administration data currently provided by the web link <http://hdsc.nws.noaa.gov/hdsc/pfds/>.

4.1.2. SCS or USGS Methods

In most cases, the Soil Conservation Service (SCS) or Natural Resource Conservation Service methods must be utilized to size detention ponds in accordance with the GSMM. The rational method may be used with the limitations specified in the GSMM. All computations shall be in accordance with the GSMM. Rainfall depths shall be derived from the NOAA web site specified in 4.1.1. The following table also provides the rainfall depths for use in Macon-Bibb County:

Design Storm Rainfall Depth

1-Year 24-Hour 3.30"
2-Year 24-Hour 3.75"
5-Year 24-Hour 4.55"
10-Year 24-Hour 5.28"
25-Year 24-Hour 6.36"
50-Year 24-Hour 7.27"
100-Year 24-Hour 8.23"

4.2. Hydraulic Methods

All hydraulic calculations shall be made in accordance with the GSMM

5. SPECIAL DISTRICTS

The Macon-Bibb County Engineering Department may establish special design criteria for select areas based on the findings of watershed assessments, hydrologic and hydraulic reports, and known flooding issues. The designer is encouraged to consult with the Engineering Department to determine if any special districts exist within Macon-Bibb County. Macon-Bibb County currently requires that the following locations provide sufficient detention or other practices to reduce the flows on new development projects to 90% of the predevelopment flows.

Most of basin 7-roughly bounded by Hartley Bridge Rd, Sandy Circle, Hawkinsville Rd, Avondale Mill Rd, Grace Rd, Walden Rd, Goodall Mill Rd, and Skipperton Rd.

Most of basin 6-roughly bounded by Hartley Bridge Rd on the NW, Skipperton Rd, Goodall Mill Rd, cross country south of Perkins Cir, to I-475, back to Hartley Bridge Rd

The portions of Basins 47, 48, and 49 that drain to Lake Wildwood.

6. HYDROLOGIC & HYDRAULIC REPORT REQUIREMENTS

All development projects must submit a hydrologic and hydraulic report outlining the impacts of the site on the stormwater system. A Stormwater Pre-Submittal Package for Designers is included as Appendix A to outline the requirements of the hydrologic and hydraulic report. At a minimum, this report must include the following sections:

Certification by Registered Professional

Existing Conditions Hydrologic Analysis

Post-Development Hydrologic Analysis

Stormwater Management System Design

Downstream Analysis

Erosion & Sedimentation Control Plan

Planting Plan (if applicable)

Operations & Maintenance Plan

The following subsections provide a narrative about the requirements for each of the elements outlined above.

6.1. Professional Certification

Each report should begin with the following statement and be signed and sealed by the professional who prepared the report and analysis:

“I, (Name of Professional), a Registered (Professional Engineer / Land Surveyor) in the State of Georgia, hereby certify that the grading and drainage plans for the project known as (Project Name), lying in Land Lot (XXX), of the (XX) District, Bibb County, Georgia, have been prepared under my supervision, and, state that in my opinion, the construction of said project will not produce storm drainage conditions that will cause damage or adversely affect the surrounding properties. This (day) day of (Month), (Year).”

6.2. Existing Conditions Hydrologic Analysis

The existing conditions hydrologic analysis should provide the reader with a comprehensive evaluation of the site conditions prior to development of the project. The designer should provide the following information with this element of the report:

6.2.1. Existing Conditions Map

Topography (2-ft. or less contour interval) of existing site conditions
Perennial / intermittent streams, wetlands, lakes and other surface water features

Drainage basin delineations showing the location of each drainage sub-basin

Drainage basin delineations for each contributing drainage basin upstream of the project site on an appropriate map (USGS Quadrangle, etc.)

Existing stormwater conveyances and structural control facilities

Direction of flow and discharge points from the site including sheet flow areas

Any area of significant depression storage

6.2.2. Existing Conditions Tables

A table listing the acreage, soil types and land cover characteristics for each sub-basin

A table listing the peak runoff rates and total runoff volumes from each sub-basin

A table listing the peak runoff rates and total runoff volumes for each drainage area upstream of the project site

A table listing the peak runoff rates and maximum water surface elevations for all detention facilities studied as part of the existing conditions analysis

6.2.3. Narratives

Written description of the existing conditions found on the site

Analysis of runoff provided by off-site areas upstream of the project site

Methodologies, assumptions, site parameters and supporting design calculations used in analyzing the existing conditions site hydrology

6.3. Post-Development Hydrologic Analysis

The post-development hydrologic analysis should provide the reader with a comprehensive evaluation of the anticipated site conditions following development of the project. The designer should provide the following information with this element of the report:

6.3.1. Post Development Conditions Map

Topography (2-ft or less contour interval) of proposed site conditions

Perennial/intermittent streams, wetlands, lakes and other surface water features
Drainage basin delineations showing the location of each drainage sub-basin

Proposed stormwater conveyances and structural control facilities.

Direction of flow and discharge points from the site including sheet flow areas

Location and boundaries of proposed natural feature protection areas

6.3.2. Post Development Conditions Tables

A table listing the acreage, soil types, impervious surface area and land cover characteristics for each sub-basin

A table listing the peak runoff rates and total runoff volumes from each sub-basin

A table listing the peak runoff rates and total runoff volumes for each drainage area upstream of the project site

A table listing the peak discharge rates, total runoff volumes and peak elevations for all detention ponds studied

6.3.3. Narratives

Written description of the existing conditions found on the site

Stormwater calculations for water quality, channel protection and post construction detention for each sub-basin affected by the project

Documentation and calculations for any applicable site design credits that are being utilized

Methodologies, assumptions, site parameters and supporting design calculations used in the analyzing the post development conditions site hydrology

6.4. Stormwater Management System Design

The stormwater management system design should provide the reader with a comprehensive description of the proposed stormwater management system components on site. The designer should provide the following information with this element of the report:

6.4.1. Stormwater Management System Map

Location of all non-structural stormwater controls

Location of all existing stormwater controls to remain after development
Location of all proposed stormwater controls

Location of all proposed impoundment type controls (i.e. detention ponds, stormwater ponds, stormwater wetlands, etc.)

Location of all conveyance structures

All impoundment type controls should be labeled with the following information:

maximum water surface elevation, depth and storage volumes for both the design storm and maximum water surface if the design storm event is exceeded (i.e. top of dam)

All inlets to conveyance structures should be labeled with the following information:

maximum design water surface and maximum potential water surface

All pipes should be labeled with length, material and slope

All pipes should be profiled and labeled with length, material, slope and hydraulic grade line

Map showing all contributing drainage areas/sub-basin delineations

6.4.2. Narratives

Narrative describing that appropriate and effective structural stormwater controls have been selected

Design calculations and elevations for all existing and proposed stormwater conveyance elements including stormwater drains, pipes culverts catch basins, channels, swales and areas of overland flow

Design calculations and elevations for all structural water quality Best Management Practices to be utilized for water quality improvement

Design calculations showing that the design meets the requirements of the water quality improvements as outlined in the ordinance and local design manual

6.5. Downstream Analysis

Due to peak flow timing and runoff volume effects, some structural components of the stormwater management system fail to reduce discharge peaks to pre-development levels downstream from the site. A downstream peak flow analysis shall be provided to the point in the watershed downstream of the site or the stormwater management system where the area of the site comprises 10% of the

total drainage area. This is to help ensure that there are minimal downstream impacts from development on the site. The downstream analysis may result in the need to resize structural components of the stormwater management system.

6.5.1. Maps

Drainage basin delineations showing the point at which the contributing area of the project represents 10% of the total drainage basin area as defined in the GSMM

Identify culverts, channels and other structural stormwater controls that the stormwater runoff must pass through prior to the 10% point identified previously

6.5.2. Narratives

Supporting calculations for a downstream peak flow analysis using the 10% rule necessary to show safe passage of the post-development design flows downstream

6.6. Planting Plan

A planting plan should be included in the report for all water quality BMPs that utilize vegetation as a pollutant removal method. Examples of these types of controls include but are not limited to stormwater wetlands, enhanced swales, etc.

6.7. Operations & Maintenance Plan

The operations and maintenance plan shall include a narrative of what maintenance tasks will be required for the stormwater controls specified for the site as well contact information for the responsible parties. Additionally, a schedule for inspection and maintenance activities should be provided. Additionally, the report will need to identify access and safety issues for the site. Maintenance issues for various BMPs and other stormwater controls can be found in the GSMM.

As-built drawings identifying stormwater measures shall be submitted to the Authority upon completion of construction in PDF format.

APPENDIX A
Stormwater Pre-Submittal Package for Designers

Stormwater Pre-Submittal Package for Designers

For assistance:
(478) 464-5635



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SITE PLAN CHECKLIST – Identify location of items in the tables

Section 1: Report Format

1.1 Does the Hydrologic & Hydraulic Report or Plans contain the following information:

No.	Plan/Report Page Number	Item
1.1.1		Name of the Development
1.1.2		Name of the Developer
1.1.3		Location Map of the Site referencing the nearest major road
1.1.4		Stormwater Impact Certification
1.1.5		Seal of the Professional having prepared the Report
1.1.6		Total Project Area
1.1.7		Disturbed Project Area

1.2 Does the Hydrologic & Hydraulic Report or Plans contain the following sections:

No.	Plan/Report Page Number	Item
1.2.1		Existing Conditions Hydrologic Analysis
1.2.2		Post Development Hydrologic Analysis
1.2.3		Stormwater Management System Design
1.2.4		Downstream Analysis
1.2.5		Erosion & Sedimentation Control Plan
1.2.6		Planting Plan (if applicable)
1.2.7		Operations & Maintenance Plan

Section 2: Existing Conditions Hydrologic Analysis

This section should provide the reader with a comprehensive evaluation of the site conditions prior to development of the project.

2.1 Narratives

A narrative and supporting calculations of the pre-development conditions of the site as related to stormwater management should be provided to determine the current characteristics of the site.

No.	Plan/Report Page Number	Item
2.1.1		Written description of the existing conditions found on the site
2.1.2		Name of the receiving waters from which runoff drains to after leaving the site
2.1.3		Analysis of runoff provided by off-site areas upstream of the project site

No.	Plan/Report Page Number	Item
2.1.4		Methodologies, assumptions, site parameters and supporting design calculations used in the analyzing the existing conditions site hydrology

2.2 Existing Conditions Map

A map documenting the following elements should be provided with the following information if applicable.

No.	Plan/Report Page Number	Item
2.2.1		Topography (2-ft. or less contour interval) of existing site conditions
2.2.2		Perennial / intermittent streams, wetlands, lakes, and other surface water features
2.2.3		Drainage basin delineations showing the location of each drainage sub-basin
2.2.4		Drainage basin delineations for each contributing drainage basin upstream of the project site on an appropriate map (USGS Quadrangle, etc.)
2.2.5		Existing stormwater conveyances and structural control facilities
2.2.6		Soil types including hydrologic soil groups
2.2.7		Direction of flow and discharge points from the site including sheet flow areas
2.2.8		Existing easements (e.g. water, sewer, drainage) on the project area

2.3 Existing Conditions Tables

No.	Plan/Report Page Number	Item
2.3.1		A table listing the acreage, soil types, impervious surface area and land cover characteristics for each sub-basin
2.3.2		A table listing the peak runoff rates and total runoff volumes from each sub-basin
2.3.3		A table listing the peak runoff rates and total runoff volumes for each drainage area upstream of the project site
2.3.4		A table listing the peak discharge rates, total runoff volumes and peak elevations for all detention ponds studied

Section 3: Post-Development Hydrologic Analysis

The post-development hydrologic analysis should provide the reader with a comprehensive evaluation of the anticipated site conditions following development of the project. The designer should provide the following information with this element of the report:

3.1 Narratives

A narrative and supporting calculations of the post-development conditions of the site as related to stormwater management should be provided to determine the future stormwater characteristics of the site.

No.	Plan/Report Page Number	Item
3.1.1		Written description of the existing conditions found on the site
3.1.2		Stormwater calculations for water quality, channel protection, and post construction detention for each sub-basin affected by the project
3.1.3		Documentation and calculations for any applicable site design credits that are being utilized
3.1.4		Methodologies, assumptions, site parameters and supporting design calculations used in the analyzing the post development conditions site hydrology

3.2 Post Development Conditions Map

A map documenting the following elements should be provided with the following information if applicable.

No.	Plan/Report Page Number	Item
3.2.1		Topography (2-ft or less contour interval) of proposed site conditions
3.2.2		Perennial / intermittent streams, wetlands, lakes and other surface water features
3.2.3		Drainage basin delineations showing the location of each drainage sub-basin
3.2.4		Proposed stormwater conveyances and structural control facilities
3.2.5		Direction of flow and discharge points from the site including sheet flow areas
3.2.6		Location and boundaries of proposed natural feature protection areas
3.2.7		Existing and proposed easements (e.g. water, sewer, drainage) on the project area

3.3 Post Development Conditions Tables

Tables documenting the following information should be provided if applicable.

No.	Plan/Report Page Number	Item
3.3.1		A table listing the acreage, soil types, impervious surface area and land cover characteristics for each sub-basin
3.3.2		A table listing the peak runoff rates and total runoff volumes from each sub-basin
3.3.3		A table listing the peak runoff rates and total runoff volumes for each drainage area upstream of the project site
3.3.4		A table listing the peak discharge rates, total runoff volumes and peak elevations for all detention ponds studied

Section 4: Stormwater Management System

The stormwater management system section should provide the reader with a comprehensive description of the proposed stormwater management system components on site. The designer should provide the following information with this element of the report:

4.1 Narratives

A narrative and supporting calculations describing the on-site stormwater management controls to be utilized. This narrative should include appropriate narratives / tables demonstrating compliance with the various stormwater management requirements outlined in the post-development article of the stormwater ordinance and local design manual.

No.	Plan/Report Page Number	Item
4.1.1		Narrative describing that appropriate and effective structural stormwater controls have been selected
4.1.2		Design calculations and elevations for all existing and proposed stormwater conveyance elements including stormwater drains, pipes culverts catch basins, channels, swales and areas of overland flow

4.2 Stormwater Management System Map(s)

A map(s) illustrating the location, type, and specifications of all stormwater management components to provide stormwater management for the proposed site.

No.	Plan/Report Page Number	Item
4.2.1		Location of all non-structural stormwater controls
4.2.2		Location of all existing stormwater controls to remain after development
4.2.3		Location of all proposed stormwater controls
4.2.4		Location of all proposed impoundment type controls (i.e. detention ponds, stormwater ponds, stormwater wetlands, etc.)
4.2.5		Location of all conveyance structures
4.2.6		All impoundment type controls should be labeled with the following information: maximum water surface elevation, depth and storage volumes for both the design storm and maximum water surface if the design storm event is exceeded (i.e. top of dam)
4.2.7		All inlets to conveyance structures should be labeled with the following information: maximum design water surface and maximum potential water surface
4.2.8		All pipes should be labeled with length, material, invert elevation, and slope
4.2.9		All pipes should be profiled and labeled with length, material, slope and hydraulic grade line
4.2.10		Pipe chart summarizing peak flows and peak velocities for design storms

Section 5: Downstream Analysis

The downstream analysis should provide the reader with a comprehensive picture of the downstream areas and their capacity to accommodate stormwater runoff from the proposed development.

5.1 Narratives

A narrative and supporting calculations for a downstream peak flow analysis using the ten-percent rule necessary to show safe passage of the post-development design flows downstream.

No.	Plan/Report Page Number	Item
5.1.1		Downstream analysis narrative including appropriate descriptions / tables for points of interest such as culverts and channel constrictions downstream of the project where increases in stormwater runoff rates could be of concern.

5.2 Downstream Analysis Stormwater Management Components Map(s) and Results

A map(s) illustrating the location, type and specifications of all stormwater management components to provide stormwater management for the proposed site and a summary of results for the areas of interest.

No.	Plan/Report Page Number	Item
5.2.1		Drainage basin delineations showing the point at which the contributing area of the project represents 10% of the total drainage basin area
5.2.2		Identify culverts, channels and other structural stormwater controls that the stormwater runoff must pass through prior to the 10% point identified previously
5.2.3		Results table summarizing the results of the downstream analysis clearly identifying either a decrease in flows or an adverse impact

Section 6: Planting Plan

No.	Plan/Report Page Number	Item
6.1		If necessary, a planting plan should be included for all stormwater controls that utilize vegetation as part of the functional design
6.2		Note identifying reference used for planting specifications and species selection (e.g., Georgia Stormwater Management Manual)

Section 7: Operations & Maintenance Plan

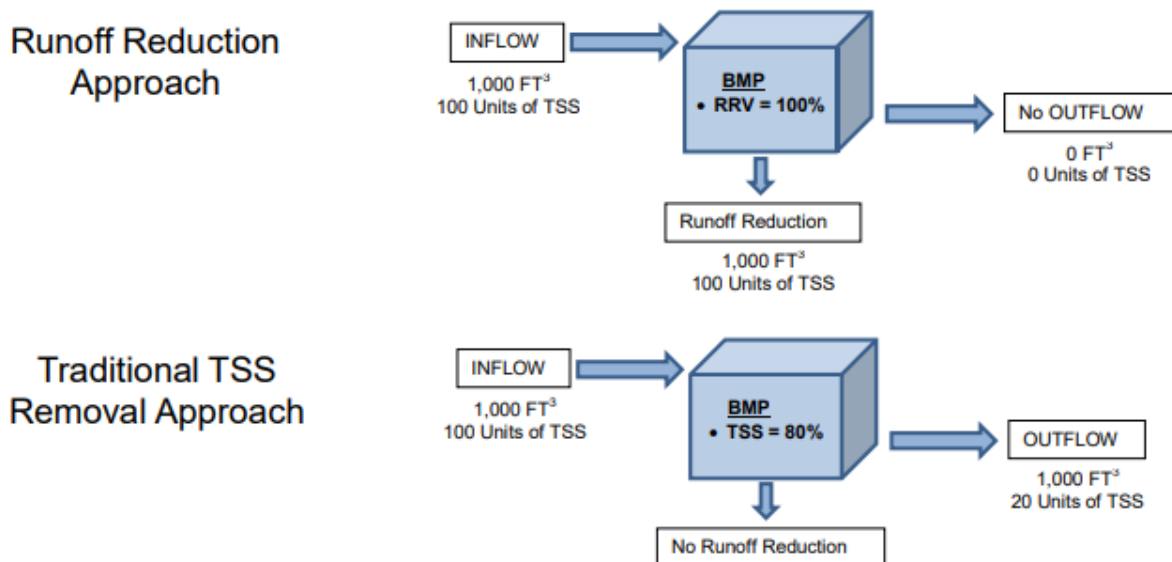
No.	Plan/Report Page Number	Item
7.1		A narrative of what maintenance tasks will be required for the stormwater controls specified for the site as well. Additionally, the report will need to identify access and safety issues for the site
7.2		Responsible party for maintenance activities identified

THE RUNOFF REDUCTION STANDARD VS. THE WATER QUALITY-ONLY STANDARD

Since the early 2000's, the minimum performance standard set by the NPDES permit program for regulated MS4 communities required to be adopted for stormwater runoff quality was an 80% total suspended solids (TSS) reduction from the 1.2-inch rainfall event. This "water quality-only" standard allowed for the entire runoff volume to leave the site as long as some standard of treatment was applied. The minimum standard of water quality treatment was defined in the Georgia Stormwater Management Manual (a.k.a. "The Blue Book").

As of April 2020, a runoff reduction standard is required by the US EPA NPDES permit program and it replaces the water quality-only standard. Runoff reduction is referring to retaining runoff volume on site. The MS4 permit states that the stormwater management system shall be designed to retain the first 1.0 inch of rainfall on the site to the maximum extent practicable. This retention can be achieved through infiltration, evapotranspiration, rainwater harvesting or similar natural-hydrologic-cycle-mimicking processes.

As shown in the graphic below, the new runoff reduction approach focuses on both TSS removal and runoff volume reduction whereas the water quality-only approach (referred to as "Traditional TSS Removal Approach" in this graphic) focuses only on pollutant removal.



POLICY ON PRACTICABILITY ANALYSIS FOR RUNOFF REDUCTION

Introduction

Runoff reduction practices are stormwater Best Management Practices (BMPs) used to disconnect impervious and disturbed pervious surfaces from the storm drainage system. The purpose is to reduce post-construction stormwater runoff rates, volumes, and pollutant loads. Runoff reduction is more than simple infiltration. The Runoff Reduction Volume (RR_v) is the retention volume calculated to infiltrate, evapotranspire, harvest and use, or otherwise remove runoff from a post-developed condition to more closely mimic the natural hydrologic conditions.

Certain conditions, such as soils with very low infiltration rates, high groundwater, or shallow bedrock, may lead a local jurisdiction to waive or reduce the runoff reduction requirement for proposed site development on a case-by-case basis. If any of the stormwater runoff volume generated by the first 1.0" of rainfall cannot be reduced or retained on the site, due to site characteristics or constraints, the remaining volume shall be increased by a multiplier of 1.2 and shall be intercepted and treated in one or more best management practices that provide at least an 80 percent reduction in total suspended solids.

The Policy on Practicability Analysis for Runoff Reduction (practicability policy) was developed to provide guidance about the site conditions and supporting documentation that could justify a "Determination of Infeasibility" for the runoff reduction requirement. This practicability policy does not address infeasibility for linear transportation projects being constructed by the local jurisdiction, other local governments, or authorities.

The practicability policy is based on the following principles:

- It is designed to help administrators implement a process for granting a Determination of Infeasibility that supports efficient review of land development applications.
- It applies to new development and redevelopment projects for public and private post-construction stormwater BMPs. It is referenced in the *Model Ordinance for Post-Construction Stormwater Management for New Development and Redevelopment* (Model Ordinance) developed by the Metropolitan North Georgia Water Planning District (Metro Water District).
- It aligns with requirements for runoff reduction in the Georgia Environmental Protection Division's (EPD's) permit to discharge from the municipal separate storm sewer system (MS4) permit. The MS4 permit states that the stormwater management system shall be designed to retain the first 1.0 inch of rainfall on the site to the maximum extent practicable. Most Georgia Stormwater Management Manual (GSMM) BMPs include a runoff reduction component.
- It is focused on the typical site conditions and regulatory environment in the Metro Water District and may not be applicable for all of Georgia.
- It requires a pre-submittal meeting when pursuing a Determination of Infeasibility to ensure all attempts to provide 100% RR_v on site have been exhausted.

The local jurisdiction is responsible for the review of land development applications and determination that it is infeasible to apply the runoff reduction requirement on part or all of a proposed site development. Local jurisdictions may choose to make substantive changes or otherwise customize this practicability policy. These further changes and customizations are allowable so long as their substance

meets the requirements of a local jurisdiction's MS4 permit. EPD is responsible for evaluating MS4 permit and District Plan compliance, which includes verifying whether changes and customizations are "at least as effective." EPD has reviewed this document and their comments have been incorporated.

Conditions that may warrant a Determination of Infeasibility

The GSMM provides broad guidance about conditions that may lead a local jurisdiction to waive or reduce the runoff reduction requirement. The following conditions may warrant a Determination of Infeasibility.

- **Soil Infiltration Rate:** The soil infiltration rate is less than 0.5 inch per hour as measured over a meaningful portion of the site. Consideration should be given to infiltration rates throughout the soil profile.
- **Water Table:** The seasonal high-water table is less than two feet from the bottom of an infiltration practice.
- **Shallow Bedrock:** Material that cannot be excavated except by drilling or blasting AND is less than two feet from the bottom of an infiltration practice.
- **Extreme Topography:** In the proposed final condition, as shown on the Stormwater Concept Plan with the proposed post-development condition, anything steeper than 3:1 slope for more than 50% of the site.
- **Karst Topography:** Any of the existing condition is karst.
- **Hotspots/ Contamination:** Reasonable suspicion that previous uses of the site have resulted in soil contamination.
- **Historic Resources:** Buildings, structures, or historic sites included in the Georgia Historic Preservation Division's Historic Resources Survey or listed in the National Register of Historic Places or that has been recommended as a historic resource by a Preservation Professional.
- **Site Constraints:** Sites where the density or nature of the proposed redevelopment would create irreconcilable conflicts for compliance between the on-site runoff reduction requirement and other requirements such as zoning, floodplains, stream buffers, or septic fields.
- **Economic Hardship:** The cost of retaining the first 1.0 inch of rainfall onsite using runoff reduction practices is a minimum of three times greater than the cost of providing water quality practices. This condition must be present with another site condition for a Determination of Infeasibility. Additionally, a Determination of Infeasibility for economic hardship may only be allowed for up to 50% runoff reduction volume.

Supplemental Materials

The District has prepared supplemental materials to support the implementation of this practicability policy. *Appendix A* is meant for internal use and provides an overview of the steps a local jurisdiction could take to implement the practicability policy and issue a Determination of Infeasibility. *Appendix B* has a template the local jurisdiction could use as a runoff reduction infeasibility form.

APPENDIX A: OVERVIEW OF PROCESSING A DETERMINATION OF INFEASIBILITY

Obtaining a Determination of Infeasibility

Determination of Infeasibility is not an all or nothing proposition. Designers must demonstrate that they have explored all avenues to meet the runoff reduction standard. If this is determined to be infeasible, they must attempt to provide the maximum percentage of RR_v on site as feasible. Only after all attempts to provide any RR_v on site are exhausted will the local jurisdiction consider a Determination of Infeasibility. The following process is recommended to:

1. identify conditions early,
2. provide flexibility,
3. support efficient land development application review, and
4. protect water quality to the maximum extent practicable.

Does the Site Qualify for a Determination of Infeasibility?

Answering “NO” to any of the following questions may indicate that the site qualifies for a Determination of Infeasibility:

1. Can GSMM runoff reduction BMPs fully meet the runoff reduction volume?
2. Does the site analysis show the conditions are supportive for managing the calculated runoff reduction volume needed for the site?
3. Can better site design practices (see GSMM, Volume 2, Section 2.3) be used to avoid challenging site conditions or constraints?
4. Can BMPs, such as green roofs and rainwater harvesting techniques, be used in ways that do not require infiltration into subsurface soils, but rather rely on evapotranspiration and reuse?
5. Can the installation of multiple runoff reduction BMPs, such as installing runoff reduction BMPs at higher elevations or in multiple sub watersheds, manage the calculated runoff reduction volume needed for the site?

Prior to Construction

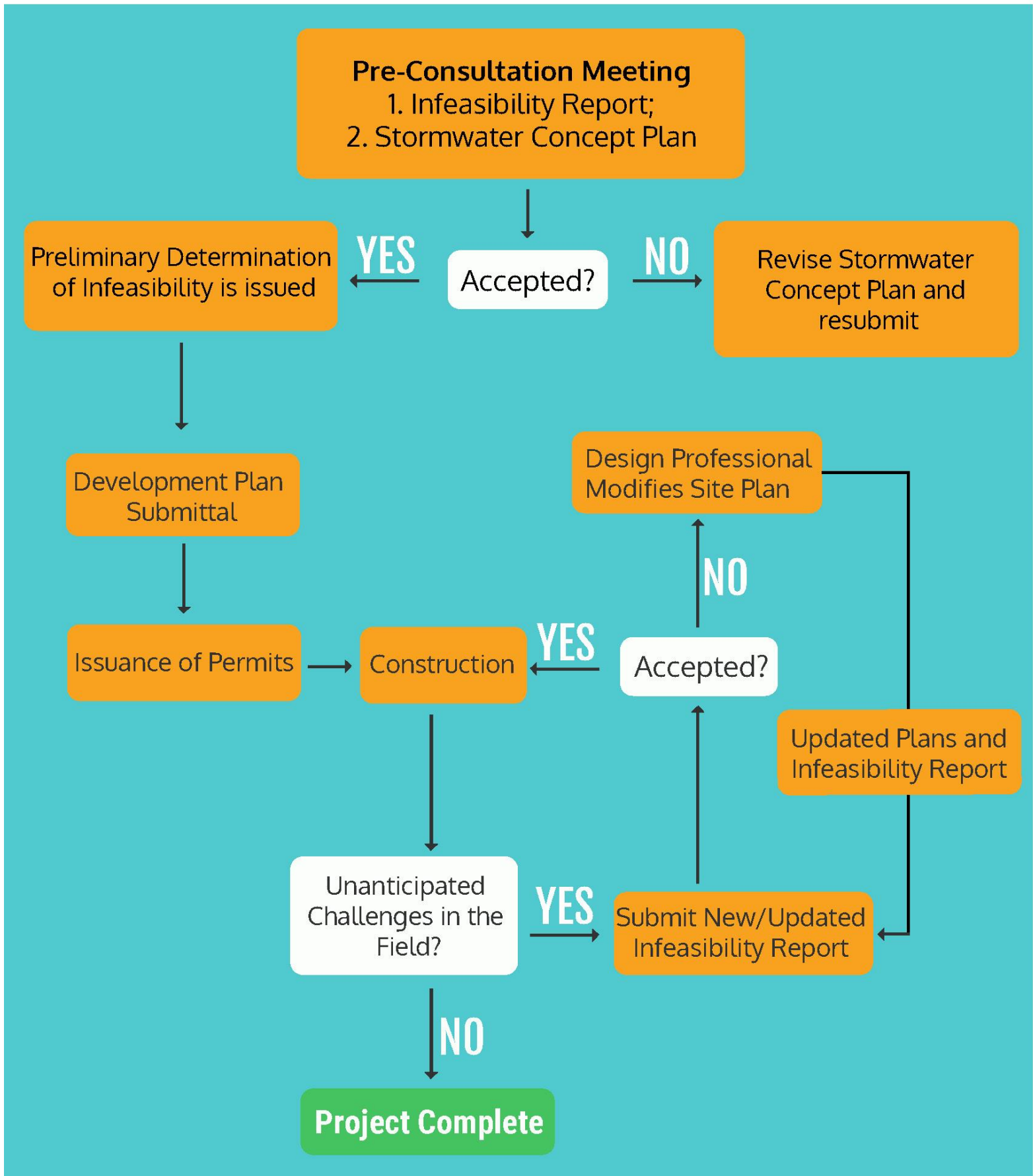
- 1) The design professional identifies conditions that limit using runoff reduction methods to retain 100% of the first 1.0 inch of rainfall onsite and initiates a pre-submittal meeting with the plan reviewer prior to submittal of the land development permit application. During the meeting, the following information will be reviewed:
 - Runoff Reduction Infeasibility Form to initiate the request and provide basic project information, confirmation that supporting documentation was submitted, and documentation of pre-submittal meeting outcomes.
 - Stormwater Concept Plan that has been developed based on site analysis, and natural resources inventory (including impracticability) in accordance with Section 2.4.2.5 of the GSMM.
- 2) The plan reviewer will evaluate the pre-submittal information on a case-by-case basis; coordinate with the design professional to understand site-specific issues; and (if possible) explore potential design strategies to achieve 100% RR_v in compliance with the standards and specifications of the Post-Construction Stormwater Management Ordinance and GSMM.

- 3) Based on the pre-submittal information and meeting, the plan reviewer will provide one of the following determinations to the design professional:
 - Approval – preliminary Determination of Infeasibility issued
 - Approval with conditions – preliminary Determination of Infeasibility issued with conditions to incorporate plan reviewer comments into the Stormwater Concept Plan
 - Denial - revise the Stormwater Concept Plan to obtain 100% RR_v
- 4) Design professional may either:
 - Submit the land development application with the Stormwater Management Plan and preliminary Determination of Infeasibility (as applicable).
 - Appeal the “denial” or “conditions” following the appeals process outlined in the local jurisdiction’s regulations.

During Construction

- 1) During the development process, the owner encounters a site condition that would prevent building stormwater BMPs as specified in the Stormwater Management Plan. The design professional will complete a Runoff Reduction Infeasibility Form and initiate a meeting with the local jurisdiction plan reviewer to discuss the findings. The designer must evaluate modifications to the proposed BMPs or installation of alternative BMPs that will provide some or all RR_v in an alternative method.
- 2) The plan reviewer will evaluate the Runoff Reduction Infeasibility Form on a case-by-case basis; coordinate with the design professional to understand site-specific issues; and (if possible) explore potential design strategies to keep the stormwater BMPs identified in the Stormwater Management Plan.
- 3) Based on the Runoff Reduction Infeasibility Form and meeting, the plan reviewer will provide one of the following determinations to the design professional:
 - Approval – Determination of Infeasibility is issued and attached to the land development permit
 - Approval with conditions – preliminary Determination of Infeasibility issued with conditions to either:
 - i) Revise the design of runoff reduction methods (e.g. adding soil amendments or an underdrain to maximize runoff reduction volume) to retain the first 1.0 inch of rainfall onsite.
 - ii) Meet the stormwater runoff quality/reduction standard through a combination of Runoff Reduction and Water Quality.
- 4) Design professional may either:
 - Continue construction as outlined modified Stormwater Management Plan under the Permit Revision with approved Determination of Infeasibility.
 - Appeal the “conditions” following the appeals process as outlined in the local jurisdiction regulations.

Determination of Infeasibility Process



APPENDIX B: TEMPLATE FOR A RUNOFF REDUCTION INFEASIBILITY FORM

Date (submitted): _____

MACON WATER AUTHORITY Runoff Reduction Infeasibility (RRI) Form for Determination of Infeasibility

Design Professional Primary Contact (Name/Email/Phone): _____

Description of Site/Land Development Application Number: _____

Address: _____

Size (acres): _____

Maximum Practicable Runoff Reduction Volume*: _____

**If any of the stormwater runoff volume generated by the first 1.0" of rainfall cannot be reduced or retained on the site, due to site characteristics or constraints, the remaining volume shall be increased by a multiplier of 1.2 and shall be intercepted and treated in one or more best management practices that provide at least an 80 percent reduction in total suspended solids.*

GENERAL SUPPORTING DOCUMENTATION

All General Supporting Documentation must be included with this RRI Form for the submittal for a Determination of Infeasibility to be considered complete. Please check each item below to confirm it has been included in the submittal package.

- Stormwater Concept Plan that has been developed based on site analysis, and natural resources inventory (including impracticability) in accordance with Section 2.4.2.5 of the GSMM
- GSMM Stormwater Quality Site Development Review Tool for the Stormwater Concept Plan
- Please include justification that the site cannot accommodate best management practices that rely on evapotranspiration and reuse such as rainwater harvesting or green roofs

SITE CONDITION APPLICABILITY

(descriptions are in *Policy on Practicability Analysis for Runoff Reduction*)

Please check each applicable item below and confirm the supporting documentation has been included in the submittal for a Determination of Infeasibility.

Site Condition	Supporting Documentation
<input type="checkbox"/> Soil Infiltration Rate	Infiltration test(s), Soil Boring Log(s), and Report of results as interpreted by a Professional Engineer, Professional Geologist, or Soil Scientist licensed in Georgia
<input type="checkbox"/> Water Table	Soil Boring Log(s) and Report with results of the seasonal high-water table assessment as interpreted by a Professional Engineer, Professional Geologist, or Soil Scientist licensed in Georgia
<input type="checkbox"/> Bedrock	Soil Boring Log(s) and Report with results of the shallow bedrock assessment as interpreted by a Professional Engineer, Professional Geologist, or Soil Scientist licensed in Georgia
<input type="checkbox"/> Extreme Topography	Site survey showing 50% of the site is steeper than 3:1 slopes as interpreted by a Professional Engineer or Land Surveyor licensed in Georgia AND Stormwater Concept Plan showing the proposed post-development condition will not change from the site survey
<input type="checkbox"/> Karst Topography	Report developed by a Professional Engineer, Professional Geologist, or Soil Scientist licensed in Georgia
<input type="checkbox"/> Hotspots/ Contamination	Phase I Environmental Assessment Report
<input type="checkbox"/> Historic Resources	Documentation of the NAHRGIS listing OR Report of assessment from a Preservation Professional (including Archaeologist, Architectural Historian, Historian, Historic Preservationist, or Historic Preservation Planner)
<input type="checkbox"/> Site Constraints	Site Plan identifying all development requirements (e.g. zoning side/front setbacks, build-to-lines, stream buffers, floodplains, septic fields) that are creating irreconcilable conflicts with on-site runoff reduction
<input type="checkbox"/> Economic Hardship*	An estimated cost comparison of proposed runoff reduction practices compared to the proposed water quality practices must be included to demonstrate an economic hardship and must show the cost of providing runoff reduction is a minimum of three times greater than the cost of providing water quality practices

** Note: A Determination of Infeasibility cannot be granted solely for economic hardship and must be present with another site condition. Additionally, a Determination of Infeasibility for economic hardship may only be allowed for up to 50% runoff reduction volume.*

STORMWATER RUNOFF QUALITY/ REDUCTION SUMMARY

Maximum Practicable Runoff Reduction Volume*: _____

Remainder of Volume treated by Water Quality Best Management Practice: _____

**If any of the stormwater runoff volume generated by the first 1.0" of rainfall cannot be reduced or retained on the site, due to site characteristics or constraints, the remaining volume shall be increased by a multiplier of 1.2 and shall be intercepted and treated in one or more best management practices that provide at least an 80 percent reduction in total suspended solids.*

Design Professional Printed Name _____

Design Professional Signature _____

FOR MACON WATER AUTHORITY USE ONLY		
<input type="checkbox"/> APPROVED		
<input type="checkbox"/> APPROVED with conditions	_____	
<input type="checkbox"/> DENIED	_____	
Reviewer: _____		
(Print Name)	(Signature)	(Date)

EXPLANATION OF THE MAINTENANCE AGREEMENT

The Agreement of Stormwater Management is an agreement between a property owner and MWA that lays out the legally binding terms and conditions to which the property owner agrees. The fifteen sections of the agreement are summarized below. These summaries do not serve as replacements to what is written in a maintenance agreement and do not serve as a part of any maintenance agreement. Information pertaining to each section of the agreement may have been omitted from this summary for brevity. The full maintenance agreement is available in Appendix C.

The maintenance agreement states that the property owner, its administrators, executors, successors, heirs, and assigns shall:

1. Construct stormwater management measures including GI/LID Inspection and Maintenance Procedures (IMPs) in accordance with the plans and specifications for the development as submitted to and approved by the Macon Water Authority.
2. Keep all aspects of the stormwater management measures including GI/LID IMPs in good working condition that are acceptable to MWA and in accordance with the development specific IMPs to ensure the control measures are functioning as designed.
3. Establish a dedicated source of funding to cover all maintenance and inspection costs associated with stormwater maintenance measures.
4. Provide records of all inspections, maintenance, and repairs of stormwater management measures to MWA on an annual basis.
5. Grant permission to MWA to enter the property for regular inspections, periodic investigations, observations, measurements, enforcements, and sampling and testing of stormwater management measures whenever MWA deems necessary.
6. Notify MWA of failure to maintain the stormwater management measures according to the approved maintenance and inspection schedules.
7. Remove sediment accumulation and other waste materials resulting from the operation of the stormwater management measures and IMPs.
8. [Upon sell/transfer of property to a new owner, the new owner shall] provide a Declaration of Transfer of Inspection and Maintenance Responsibilities to MWA.
9. Indemnify and hold harmless MWA and its authorized agents and employees from any and all damages, accidents, casualties, occurrences or claims which may arise or be asserted against MWA from the construction, presence, existence or maintenance of the stormwater management measures by the property owner or MWA, except to the extent caused by the gross negligence or willful misconduct of MWA or its authorized agents and employees.

The maintenance agreement:

1. Shall be recorded among the deed records of Macon-Bibb County and shall constitute a covenant running with the land shall be binding on the property owner.
2. May be enforced by proceedings at law.
3. Will not be affected by the invalidation of any subset of provisions of the agreement.
4. Requires the property owner to comply with all Macon-Bibb County ordinances, including obtaining all required permits and submitting all required plans related to the construction, inspection, and maintenance of the stormwater management measures.
5. May include additional provisions when necessary for a specific site plan.

APPENDIX C: AGREEMENT OF STORMWATER MANAGEMENT

STATE OF GEORGIA

MACON WATER AUTHORITY

AGREEMENT OF STORMWATER MANAGEMENT STORMWATER FACILITY AND GREEN INFRASTRUCTURE/LOW IMPACT DEVELOPMENT INTEGRATED MANAGEMENT PRACTICES (GI/LID IMPs) INSPECTION AND MAINTENANCE

WHEREAS, the property owner, recognizes that the storm drain structures, pipes, (*Development Entity or Owner Name*) water quality integrated management practices and all aspects of a stormwater management facility (hereinafter “stormwater management measures”) must be maintained for the development called of [CITY NAME], Georgia, (*Development Name*) [COUNTY NAME] County, Georgia, being more particularly described by the legal description in Exhibit “A” attached hereto and made a part hereof; and,

WHEREAS, the property owner, , is the owner of the real property more particularly described (*Development Entity or Owner Name*) on the attached Exhibit “B” - Development Plan (hereinafter referred to as “the property”), and,

WHEREAS, , whose title is , is the person responsible for (*Authorized Representative Name*) carrying out all requirements of this Declaration and of the [CITY OR COUNTY NAME], Georgia Code and Area-wide MS4 stormwater management plan for the inspection and maintenance of the stormwater management measures on the property identified in Exhibit “B”, and,

WHEREAS, the property owner, its administrators, executors, successors, heirs and assigns, agree that the health, safety and welfare of the citizens of the city require that stormwater management measures be constructed and maintained on the property to function as designed, and,

WHEREAS, the Stormwater Facility and GI/LID IMPs Inspection and Maintenance agreement(s) for the development called be recorded with , of [CITY NAME], Georgia, [COUNTYNAME] County, Georgia, shall (*Development Name*) the [COUNTY NAME] County Clerk of Court and a copy of recorded agreement(s) provided to [CITY OF COUNTY DEPARTMENT NAME] prior to the release of a Certificate of Occupancy, and

WHEREAS, the [CITY OR COUNTY NAME], Georgia Code and Area-wide MS4 permit require that the stormwater management measures, as shown on the approved development plans and specifications, be constructed and maintained by the property owner, its administrators, executors, successors, heirs and assigns.

NOW, THEREFORE, in consideration of the foregoing premises and following terms and conditions, the undersigned agrees as follows:

SECTION 1.

The stormwater management measures including GI/LID IMPs shall be constructed by the property owner in accordance with the plans and specifications for the development as submitted to and approved by the [ENTER CITY OF COUNTY NAME], Georgia (hereinafter "City OR County").

SECTION 2.

The property owner, its administrators, executors, successors, heirs and assigns shall maintain all aspects of the stormwater management measures including GI/LID IMPs in good working condition acceptable to the City and in accordance with the development specific Inspection and Maintenance Procedures (as defined below) to ensure the control measures functioning as designed. A schedule of long term maintenance activities, including how often routine inspection and maintenance will occur, shall be in accordance with the attached Exhibit "C" (collectively, the "Inspection and Maintenance Procedures"). Such Schedule shall also include plans for annual inspections by a qualified inspector, as determined by the [CITY OR COUNTY DEPARTMENT NAME], to ensure proper performance of the facility between scheduled maintenance and remedies for the default thereof.

SECTION 3.

The property owner shall establish a dedicated source of funding that will allow for a budget capable of covering the costs associated with maintenance, staff, equipment, and the repair and replacement of stormwater management measures including GI/LID IMPs components as necessary and helps to ensure the continued functioning of IMPs as designed. The Property owner shall submit a copy of financial documentation (in form and substance as mutually agreed upon by the Property owner and the City OR County) confirming established dedicated source of funding to [CITY OF COUNTY DEPARTMENT NAME], if requested or prior to the release of a Certificate of Occupancy.

SECTION 4.

The property owner, its administrators, executors, successors, heirs and assigns shall provide records of all inspections, maintenance and repairs of the stormwater management measures to the [CITY OF COUNTY DEPARTMENT NAME] on an annual basis, if requested. Such records include items inspected and details of maintenance and repairs performed.

SECTION 5.

The property owner, its administrators, executors, successors, heirs and assigns hereby grants permission to the City OR County, its authorized agents and employees, to enter upon the property for regular inspections, periodic investigations, observation, measurement, enforcement, and sampling and testing of the stormwater management measures whenever the City deems necessary. Inspections may include, but are not limited to: reviewing maintenance and repair records; sampling discharges, surface water, groundwater, and material or water in stormwater management measures; and evaluating the condition of the stormwater management measures and practices. The City OR County, its authorized agents and employees, shall duly notify the owner of the property or the representative on site prior to such entry, except in the case of an emergency.

SECTION 6.

In the event the property owner, its administrators, executors, successors, heirs and assigns fail to maintain the stormwater management measures according to the approved plans and the Maintenance and Inspection Schedule, the City OR County shall notify by certified mail the person specified herein as the person responsible for carrying out the maintenance plan. Such notice shall specify the measures necessary to comply with the site plans and the maintenance schedule and shall specify the amount of time (but in event less than thirty (30) days) within which such measures shall be completed. If the responsible person fails or refuses to meet the requirements of this Declaration, the City OR County, thirty (30) days (or the time set forth in the violation notice, whichever is greater) after the written notice is sent (except, that in the event the violation constitutes an immediate danger to public health or public safety, 24 hours notice shall be sufficient), may enter the property to correct a violation of the design standards or maintenance requirements by performing necessary work to place the facility or practice in proper working condition. The City OR County will assess the property owner or grantor for the cost of repair work. It is expressly understood that the City OR County is under no obligation to maintain or repair the stormwater management measures and in no event shall this Declaration be construed to impose any such obligation on the City OR County.

SECTION 7.

It is the intent of this Declaration to ensure the proper maintenance of the stormwater management measures including GI/LID IMPs by the property owner; provided, however, that this Declaration shall not be deemed to

create or affect any additional liability on the property owner for damage alleged to result from or caused by storm water runoff in addition to any such liability otherwise existing under applicable law.

SECTION 8.

Sediment accumulation and other waste materials resulting from the operation of the stormwater management measures including IMPs shall be removed by the property owner. The property owner shall make arrangements at the property owner's expense for the removal and off-site disposal of all accumulated sediments and other waste materials.

SECTION 9.

In the event the property owner sells or transfers the property, the transferring property owner shall provide to the [CITY OF COUNTY DEPARTMENT NAME], a Declaration of Transfer of Inspection and Maintenance Responsibilities of stormwater management measures including GI/LID IMPs signed by the transferring property owner and the transferee and witnessed by a public notary to document that all inspections and maintenance, and related financial responsibilities have been transferred and communicated to such transferee. Upon such transfer or conveyance of the property by the transferring property owner, all obligations of the transferring property owner hereunder shall automatically be transferred and assigned to, and assumed by transferee and such transferee shall and become the property owner under this Agreement.

SECTION 10.

The property owner, its administrators, executors, successors, heirs and assigns hereby indemnifies and holds harmless the City OR County and its authorized agents and employees for any and all damages, accidents, casualties, occurrences or claims which may arise or be asserted against the City from the construction, presence, existence or maintenance of the stormwater management measures by the property owner or the City OR County, except to the extent caused by the gross negligence or willful misconduct of the City OR County or its authorized agents and employees. In the event a claim is asserted against the City OR County, its authorized agents or employees, the City OR County shall promptly notify the property owner and the property owner shall defend at its own expense any suit based on such claim, except as set forth in the foregoing sentence.

SECTION 11.

This Agreement shall be recorded among the deed records of [COUNTY NAME] County and shall constitute a covenant running with the land shall be binding on the property owner. The City OR County will not release the Certificate of Occupancy for the property until such time that this agreement has been recorded with the [COUNTY NAME] County Clerk of Court.

SECTION 12.

This Agreement may be enforced by proceedings at law or in equity by or against the undersigned and their respective successors in interest.

SECTION 13.

Invalidation of anyone of the provisions of this Agreement shall in no way effect any other provision and all other provisions shall remain in full force and effect.

SECTION 14.

This Agreement complies with the provisions of the City OR COUNTY of [City OR County Name] Code of Ordinances, Article [Article NUMBER AND TITLE] and [City OR County Name] MS4 Permit, Part 3, 3.3.10, and the property owner, its administrators, executors, successors, heirs and assigns acknowledge that it must obtain all required permits, submit all required plans and follow all provisions of Article [Article NUMBER AND TITLE]. Since under Article [Article NUMBER AND TITLE] the responsibility for the operation and maintenance of the stormwater management measures passes to any successor owner, this Declaration shall be binding on all subsequent owners of the property.

SECTION 15.

Additional provisions that relate directly to the individual needs and requirements of this specific site plan as identified in Exhibit "A" and Exhibit "B" are attached hereto and made a part hereof. Such additional provisions have been discussed with and presented to the Authority.

IN WITNESS WHEREOF, the Declarant has executed this Declaration on the day of , 20 .

Declarant:

Property Owner:

(Development Entity or Owner Name)

Signed and Sealed (Seal)

By:

Witness Title

:

Corporate Seal

Notary Public

EXHIBIT "A" Property legal description

EXHIBIT "B" Approved Development Plan

EXHIBIT "C" Stormwater Management Measures Inspection and Maintenance Schedule

APPENDIX B
Pipe Selection Guide

Pipe Selection Guide

Source GDOT Manual on Drainage Design for Highways, September 2014 Table 7.2
(Corrugated metal pipe is removed)

5.22.07

SELECTION GUIDELINE FOR CULVERT, SLOPE AND UNDERDRAIN PIPE

TYPE OF PIPE INSTALLATION (Statewide)	CONCRETE		CORRUGATED HDPE AASHTO M-252	CORRUGATED SMOOTH LINED HDPE AASHTO M-294 TYPE "S"	PVC PROFILE WALL AASHTO M-304	PVC CORRUGATED SMOOTH INTERIOR ASTM F-599
LONGITUDINAL INTERSTATE AND TRAVEL BEARING	YES		NO	NO	NO	NO
LONGITUDINAL NONINTERSTATE AND NONTRAVEL BEARING	YES		NO	YES	YES	YES
CROSS DRAIN						
ADT < 250	YES		NO	YES	YES	YES
CROSS DRAIN						
10% OR LESS GRADE 250 < ADT < 15,000	YES		NO	YES	YES	YES
CROSS DRAIN						
10% OR LESS GRADE ADT > 15,000	YES		NO	NO	NO	NO
SIDE DRAIN						
YES	YES		NO	YES	YES	YES
PERMANENT SLOPE DRAIN						
NO	NO		NO	YES	YES	YES
PERFORATED UNDERDRAIN						
NO	NO		YES	YES	NO	YES

- Structural requirements of storm drain pipe will be in accordance with Georgia Standard 1030-D or 1030-P, whichever is applicable, and the Standard Specifications.
- Procedure for designating pipe culvert materials according to the Standard Specifications:
 - A. Regardless of funding on all projects where a soil survey is not made, the Office of Materials and Research will furnish, upon request, a recommendation of allowable materials.
 - B. The Summary, Detailed Estimate, and Proposal will include the item in accordance with Georgia Standard 1030-D or 1030-P using a nonspecifying nomenclature.
 - C. Allowable pipe materials for the project will be noted on the Plan Summary Sheet.
 - D. Other acceptable pipe materials and/or high performance corrosion protection systems will be noted on the Plan Summary Sheet.
 - E. If steel structural plate for pipe, pipe arches, and arches are required on a project, the materials and coating requirements will be noted on the Plan Summary Sheet.