

**REVIEW CHECKLIST for
STORMWATER MANAGEMENT PLANS**

DEVELOPMENT

NAME: _____ (PHASE/UNIT) _____

REVIEWED BY: _____ ENGINEER/PHONE # _____

DATE: _____ COMMERCIAL _____ INDUSTRIAL _____ MUNICIPAL _____

RESIDENTIAL _____

Note: Plans must adhere to standards in the Georgia Stormwater Management Manual (GSMM) Volumes I and II, Floodplain Ordinance, and Post Development Stormwater Management Ordinance

A. BACKGROUND/GENERAL INFORMATION

1. ___ Development name
2. ___ Engineer's seal, signature, address and telephone number
3. ___ Developer's name, address, and telephone number
4. ___ Date and vicinity map
5. ___ Include revision date
6. ___ Provide statement of post-construction pond/storm water drainage ownership.
7. ___ Execute the Engineer's Affidavit
8. ___ Provide floodplain statement. Reference the 2006 FEMA Firm Panel number. If no floodplain analysis is required per the County's adopted Floodplain Management Ordinance, please state so on the cover page
9. ___ Provide wetlands statement
10. ___ On the front cover state which watershed project is located in
11. ___ On the front cover list the total impervious surface on the property

B. REGULATORY

1. ___ For all proposed developments, other than public single-family residential, execute and return the attached **Operation & Maintenance Agreement**. It must be **executed and recorded** at the Clayton or Fulton County Court House prior to final plan approval. The Agreement is available on the College Park Stormwater Management website in the Technical & Engineering Section. Contact Ada Caston, @ (404) 669-3778 for information.
2. ___ Provide existing and/or future conditions flood study per the Flood Plain Management Ordinance in accordance with FEMA approved methodology. The flood plain ordinance is available on the College Park Stormwater Management website. **Refer to the ordinance for guidance.**
3. ___ Add engineer's certification to plans: "Engineer certifies that the flood study was prepared in accordance with a FEMA approved methodology". IF a LOMR or CLOMR, etc. is needed the Applicant must send documents to FEMA and a copy to College Park Stormwater Department.
4. ___ Offsite easements are/may be required (see plans). Permanent offsite stormwater easements must be delineated, contain legal description and recorded in perpetuity at the courthouse).
5. ___ there _____

C. STORMWATER MANAGEMENT REPORT/HYDRO

1. ___ The submittal does not meet the requirements of the *Georgia Stormwater Management Manual*.

Please refer to the appropriate sections in the manual that cover the topics of water quality/ channel protection volumes and over-bank flood protection etc.

2. ___ Consider the application of Better Site Design “credits” to reduce the gross WQV and CPV.

3. ___ Provide supporting engineering calculations for all Better Site Design “credits”. Please see Section 1.4.4 of the GSMM for a complete listing of all available design credits.

4. ___ Provide a brief summary of Better Site Design Credits. Per section 1.4.4 of the GSMM, design credits cannot be claimed twice for the same area. Credit areas and features must be identified and delineated on the construction drawings and final plat.

5. ___ List and show that for each “credit”, the site design criteria is being met to the maximum extent practicable.

6. ___ Please obtain the following table from Stormwater. It must be completed for all proposed developments with 3 or more drainage basins. The following basins are an example.

Drainage Basin	Basin Area (acres)	Soil Group	Basin Description	Imp Area (sf/ac)	C	Slop (ft/ft)	Tc (min)	WQv Treatment	CPv Treatment	Pond Attenuation	Receiving Point
1 Pre	45	B	50% wooded & 50% grass	0	59	.02	35	n/a	n/a	n/a	Onsite Stream
1 Post to Pond	40	same	15 ac of res/ 10 ac street/5 ac disturbed pervious/10 ac undisturbed pervious	522,720 sf 12 ac	74	.02	10	Y	Y	Attenuate Q25& safely pass Q100	Wet Ext Detention Pond with WPv & CPv
1 Post Bypass	5	same	Undisturbed pervious	0	55	n/a	n/a	N	N	n/a	Onsite Stream
2 Pre	10	C	100% woods	4,356 sf existing structure 0.1 ac	71	.01	28	n/a	n/a	n/a	Existing Municipal Piped System
2 Post to Pond	8	same	6 ac of res/ 2 ac streets	165,528 sf 3.8 ac	76	.01	8	Y	N	Q2 thru Q25 & safe passage of Q100	Wet Extended Detention Pond with WPv
2 Post Bypass	2	same	1 ac undisturbed 1 ac residential	4,356 sf 0.1 ac	74	.01	5	n/a	n/a	n/a	Existing Municipal Piped System

7. ___ Provide executive summary of the report’s findings to include a table similar to:

Flow Summary

Cumulative Drainage Area	Frequency	Pre-development Flow (cfs)	Post-development Flow(cfs)	Ponding Elevation (ft)	Volume (cf) (for 25 and 100 yr. only)
	2				
	5				
	10				
	25				
	50				
	100				

Note: Include bypass and offsite areas.

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8. ___ Include a narrative paragraph in the report that includes a description of existing site, soils, slopes, vegetative cover, and proposed improvements, methodologies and procedures, calculations, summary of results and a conclusion detailing the findings of the drainage investigation.
9. ___ Delineate all drainage areas/basins to include offsite and bypass areas.
10. ___ Detailed pre and post developed drainage area maps are required.
11. ___ Rational “C” and/or SCS “CN” values need clarification and/or further explanation (see hydro).
12. ___ Show segmented TC flow paths on scaled drainage maps.
13. ___ The time of concentration (TC) for pre and/or post developed conditions needs clarification and/or further explanation (see hydro).
14. ___ The SCS method and other approved methodologies are required for detention analysis. The Rational method is only acceptable for pipe design within certain acreage limits. The Modified Rational Method can be used for detention design for drainage areas up to 5 acres.
15. ___ A 10% downstream analysis is required. See Section 2.1.9 (GSMM). Provide basin drainage map showing POS, and peak flow analysis results with and without detention.
16. ___ The 10% downstream analysis must specifically prove and state that no structures (businesses, homes, culverts, streets, etc) between the analysis points will be adversely impacted by the increase in site runoff.
17. ___ Provide WQV and/or CPV calculations.
18. ___ State the existing and proposed impervious surface by acre and percent of site for each basin.
19. ___ Provide a breakdown of proposed impervious surface by roofs, roads, sidewalks, access drives, driveways, etc.
20. ___ Provide fore bay calculations (0.1”/acre of impervious area). The fore bay volume counts toward the required WQV.
21. ___ Provide WQV and/or CPV orifice sizing calculations for 24-hour drawdown of these extended detention volumes.
22. ___ Round orifice size to the nearest whole number (2”minimum).
23. ___ Spreadsheets for WQV, CPV, Orifice sizing, Bio-retention, Sand Filter sizing and the Manning’s equation are available on the College Park Stormwater Management Department website. Please use and include these with your submittal.
24. ___ The pond report (stage-storage) does not agree with the plans.

25. ____The volumes required by the hydro do not agree with the proposed pond grading on the plans.
26. ____Provide 50% of net WQV as permanent pool storage for Wet Extended Detention pond.
27. ____Micro pool pond required (10 – 25 acre drainage areas). Show a minimum or 25-30% of net WQV as permanent pool storage.
28. ____Show that the 100-year storm is safely passed through the emergency overflow weir or emergency spillway.
29. ____Show how offsite drainage will be managed.
30. ____Disturbed bypass areas greater than 10% of the drainage basin require water quality treatment.
31. ____Extended dry detention (Dry Ed) ponds do not provide the full water quality treatment when used in isolation. Ed ponds may be used to fully meet CPV, Qp25 and Qf requirements only.
32. ____Extended dry detention (Dry Ed) must be used in conjunction with other onsite BMPs to meet the 80% TSS water quality requirements of the GSMM.
33. ____Underground detention must be used in a treatment train and be downstream of water quality controls.
34. ____Provide adequate construction details to include, manifold & connection details, pipe slopes, and bedding.
35. ____Underground detention facilities must comply with Section 3.4.3 of the GSMM, and are not intended for WQ treatment.
36. ____Include OCS details to include, WQV, CPV, 25yr and 100yr elevation and volumes. Include extended detention volume. See Section 3.2, and Appendix in the GSMM for pond detail requirements.
37. ____If CPV is exempted then Q_{P2} through Q_{P25} is required unless downstream analysis shows channel capacity and over-bank storage can handle the full-build-out Q_{P25}.
38. ____If the WQV and CPV requirements are met, the only additional requirements are attenuation for the 25-year event (site area) and safe passage of the 100-year event (total drainage area).
39. ____Other _____

D. PLAN/DETAIL SHEETS

1. ____ Show the existing and proposed R/W lines and widths, lot lines, building footprint, pavement and other impervious areas including curb and gutter.
2. ____ Show all existing and proposed lakes with surface area, normal pool elevation. If converting existing pond/lake to a stormwater management pond, then show dam height, top width, % slopes. Provide details for existing/proposed outlets/drain pipes and spillways.
3. ____ Show the 25' (state) and 50' (county) undisturbed stream buffers as measured from the wrested bank, not the centerline of the creek.
4. ____ **Note on plans:** Stream buffers and floodplain limits shall be staked prior to construction.
5. ____ Show/note the boundaries of other natural feature protection and conservation areas such as wetlands, lakes, ponds, and other setbacks (e.g. septic tank and drinking water well setbacks).

6. ___ Drainage other than sheet flow across two or more lots requires a dedicated drainage easement.
7. ___ Show a 20-ft minimum Access/Maintenance easement to and around the outer limits of the pond(s).
8. ___ Use Figure 1 at end of this section to determine the minimum drainage easement width requirement per Section 3-8-108 (Easements & Widths) (20' minimum).
9. ___ Extend storm sewer to 30' behind proposed structure.
10. ___ Show water quality ponds and BMPs outside of creeks/streams, floodplains, wetlands, and buffers.
11. ___ General minimum slope for pond(s) is 3:1. Show 3:1 grading inside of pond(s).
12. ___ Residential pond(s) should be located within a subdivision common place. No part of the facility should be located on private property.
13. ___ Pond construction requires minimum setback of 20' from property line, (residential), and 10' (commercial), 100' to 250' from a private well and 50' from a septic tank/leach field
14. ___ Show, label and dimension the pond's aquatic bench.
15. ___ Show and label the fore bay. (0.1" per impervious acre). State volume requirements on plans.
16. ___ Show the micro pool (25-30% of net WQV).
17. ___ Show and label a safety bench if the permanent pool storage is deeper than 4' or if the slopes are steeper than 4:1.
18. ___ Provide 5' chain link fence with a 10' gate.
19. ___ Provide pond maintenance under drain with supporting 24-hour drawdown calcs. in study. (3" min. diameter with 3" (min.) gate valve located in OCS). Also, provide manufacturer model or equal.
20. ___ **Add note to plan:** "The pond's maintenance under drain is intended to drain the pond in 24-hours for infrequent maintenance and inspection purposes. The gate valve must be closed immediately after construction of the pond. After construction is completed, it can only be opened upon authorization by the College Park Stormwater Management Department."
21. ___ Provide a **complete pond cross-section detail sheet** including compaction detail, water surface elevations, structure and freeboard elevations, perforated and wrapped under drain pipe, material specifications, cutoff trench with antiseep collar, orifice and spillway sizes and location, minimum 10' embankment berm width and minimum slopes of 3:1 per GSMM.
22. ___ Show all design water surface elevations and volumes from zero to maximum head.
23. ___ Provide construction detail for emergency spillway. Grouted rip rap required if spillway used to route/pass the 100yr event.
24. ___ Consider the use of reverse slope pipe attached to the riser, with its inlet submerged below the permanent pool elevation.
25. ___ Provide a trash rack or skimmer hood. (a flat top trash rack is not advised for private developments. It is not allowed for public single-family residential developments). Trash rack must have 10 times the surface area of the orifice it screens.

26. ____ Provide a wetland seeding schedule for all wet ponds. Use schedule detailed in Appendix F of the GSMM. Provide a planting schedule to include spacing requirements for planted material.
27. ____ **Add note to plan:** “No woody vegetation is allowed within 15’ of the downstream toe of earthen embankment”. (i.e. stumps, etc)
28. ____ **Add note to plan:** All retaining wall designs greater than 4’ in height shall be submitted and approved by the College Park Building Department prior to installation. Poured concrete walls are required for residential pond retaining walls.
29. ____ HDPE pipe is only allowed outside of the R/W and on non-single family projects (i.e. commercial, industrial). (Junction boxes are required to have manhole access. Plans should reference AASHTO M294 requirements.
30. ____ Provide pipe bedding details for residential projects.
31. ____ Show curb inlet placement at low points in road.
32. ____ Show the 100-year ponding elevation at inlet. Ponding shall not occur on adjacent property without obtaining a drainage easement.
33. ____ Provide appropriate energy dissipation devices at all pipe outlets, open channels, and outlet control structures and culverts if exit velocities exceed 4 fps. Show/note the type of energy dissipation to be provided. Provide sizing calculations if rip-rap is proposed.
33. ____ Show and state the county benchmark to which TOPO is tied.

Drainage Easement Width Calculation

Given a minimum 2 feet of clearance between the pipe walls and an embankment slope of 2:1 (H:V), the formula is:

Minimum easement width = 4’ + diameter + (4 x maximum depth) = total easement width (feet), to be centered on structure/pipe.

E. PIPE PROFILES / CULVERT DESIGN / OPEN CHANNELS

Pipe

1. ____ Show a minimum 18” pipe cover. Additional cover may be required based on loading.
2. ____ Verify pipe has been checked for inlet and outlet control.
3. ____ In junction boxes, match crowns (not inverts) of differently sized adjacent pipe.
4. ____ Provide a minimum of 12” vertical and horizontal separation between all buried utilities & storm pipes.
5. ____ Show all sanitary and water line crossings on storm profiles.
6. ____ Provide pipe profiles with existing and proposed ground surface profiles, pipe lengths, slopes, inverts, and type.
7. ____ Show 25-year hydraulic grade line. It must be below the crown of the pipe for residential projects. Please provide supporting data in a pipe chart on the plans.
8. ____ **Note on plans:** All storm pipe and structures shall comply with GADOT standards for design, construction, and installation.
9. ____ **Note on plans:** Inverts on all structures to be paved smooth.
10. ____ **Note on plans:** All metal pipes used must be BCCMP with re-rolled ends and hugger/corrugated bands used for connection.
11. ____ Minimum acceptable pipe diameter is 18 inches.

12. ___ Minimum slope is 1% for BCCMP and 0.50% for RCP. For slopes < 1%, show that a minimum of 2.5 fps is attained for the 2-year frequency event.
13. ___ Velocity in pipe No. (s) _____ exceeds 15 fps. Velocities should be between 3-15 fps.
14. ___ CMP or BCCMP pipe(s) exceed(s) 12% slope. RCP pipe exceed(s) 12% slope.
15. ___ On CMP pipe exceeding a 12% slope, show anchor collars. Provide construction detail and locations.
16. ___ RCP is recommended under public roads.
17. ___ Metal pipe shall not be specified for live streams.
18. ___ Pipe in live streams shall have the invert buried beneath the stream bed.

F. PIPE CHART

Provide pipe chart indicating the following:

1. ___ Pipe and Junction Box Labels
2. ___ Invert elevations
3. ___ Pipe Sizes
4. ___ Pipe Slopes
5. ___ Pipe Lengths
6. ___ Contributing Drainage Area
7. ___ Design discharge (Q25 for piped drainage; Q100 for cross-road culverts)
8. ___ Design storm frequency (25-year for piped drainage; 100-year for culverts)
9. ___ Roughness Coefficient(s)
10. ___ Run-off coefficient(s)
11. ___ Inlet Tc
12. ___ Pipe material/coating.
13. ___ Velocity (V25 may not exceed erosive velocity at outlet headwall unless additional energy dissipation is provided.)
14. ___ Gutter spread (not to exceed 10' of the travel lane width on 25-year design storm), or a maximum of 16' at any one point.

G. Provide open channel chart indicating the following:

1. ___ Identify Numerous Channels by Name or Number
2. ___ Contributing Drainage Area
3. ___ Runoff coefficient (per future land use plan; assuming no offsite detention)
4. ___ Conveyance Size. Provide typical cross section
5. ___ Lining Material (riprap, sod, vegetative, etc.)
6. ___ Channel Length
7. ___ Channel Slope (for min and max values)
8. ___ Velocity (V25 may not exceed erosive velocity)
9. ___ Design Frequency (25-year)
10. ___ Design Discharge (25-year)
11. ___ Normal Flow Depth (25-year)
12. ___ Indicate free board capacity

H. Culverts

1. ____ Headwater & Tailwater Limitations: For piped conveyances with cross-sectional areas equal to or less than 30 ft², the HW/D ratio for the 100-year frequency storm must be equal to or less than 1.5. For cross-sectional areas greater than 30 ft², HW/D for the 100-year frequency storm must be equal to or less than 1.2. Culverts must be sized to maintain flood-free conditions on major thoroughfares with a freeboard of 18" as measured from the low point of the road. (All criteria from Section 4.3, culvert design, of the GSMM are required.)
2. ____ As stated above, inlet/outlet control calculations are required for all street crossings in addition to Manning's equation. Insure that Tc is representative of the drainage area.
3. ____ The rational formula's ($Q=CfCwIA$) weighted runoff coefficient (Cw) for major culvert analysis should be based on full build-out using the current zoning plan for the entire receiving area.
4. ____ Show the 100-year ponding limits above pipe (culvert).
5. ____ Show the 100-year hydraulic grade line in all culverts (cross-street).
6. ____ RCP is required for culvert(s) placed in streams with any base flow.

I. FLOODPLAIN PLAN AND DETAIL SHEET

1. ____ Show areas of proposed cut/fill in the floodplain. Provide cut and fill sections. Cut and fill must balance, within boundary of site against floodplain. See Floodplain Management Ordinance for additional cut/fill requirements.
2. ____ Show/note the Minimum Footing Elevations (MFE) for all lots located adjacent to the FEMA designated flood hazard area and/or as required by the floodplain ordinance. For residential developments, the MFE is measured no less than 3' above the current BFE or 1' above the future conditions BFE, whichever is higher.
3. ____ Show/note the 100-year flood plain limits/sections, and elevations on grading plans. Indicate the source of the information.

J. FLOOD ANALYSIS / STUDY

1. ____ Provide copy of FEMA approved methodology flood study.
2. ____ Provide digital copy of flood models and report.
3. ____ State the drainage basin area being studied. (each basin for multiple creeks)
4. ____ State the length (in feet) of creek studied.
5. ____ State the basis for which the MFE's were selected. (current or future conditions)
6. ____ Field-locate the 100yr floodplain. Encroachment is not generally allowed and requires a separate permit.
7. ____ **Note:** Limited details studies and detailed studies for the 2005 FIRMs/FIS are available from the College Park Stormwater and/or Engineering Department.
8. ____ Complete the attached Floodplain Management form(s).

K. Drain pipes outside of the Right of Way

____ **Add note to plans:** All storm drain pipes located outside of the Right of Way shall be maintained by the property owner. If it becomes necessary for College Park to provide any maintenance or make any repairs to the line that is an extension of the storm drain line under roadway, to protect the roadway or other property owner upstream from this line. College Park will back charge the property owner for all expenses incurred in correcting the drainage problem. College Park shall not be responsible for damage to any improvement on this site resulting from the repair of this line including but not limited to the replacement or repair of curb and gutter, pavement, or other infrastructure improvement.

OTHER REVIEW COMMENTS:

STORMWATER DIVISION OF PUBLIC WORKS AND ENGINEERING DEPARTMENT