Washington County MARYLAND

DIVISION OF CONSTRUCTION

AS-BUILT CHECKLIST
STORMWATER MANAGEMENT

Shaded areas for County use only.

AS-BUILT SUBMITAL DATE:			
SWM STRUCTURE NUMBER:			
COUNTY PLAN FILE NUMBERS:		COUNTY AS-BUILT APPROVAL:	
DESIGN FIRM:			
CERTIFIYING ENGINEER:		MARYLAND REGISTRATION NO.	

INSTRUCTIONS: To be completed by the certifying engineer. The as-built submittal must include this checklist, a complete set of the as-built plans and any pertinent report/logs relative to the construction of the SWM facility, as well as associated fees. This checklist contains a list of items required and does not relieve the certifying engineer of completing a review according to good engineering practices. All items are expected to be addressed in the first submittal and failure to do so will result in a less than full review.

I. SUBMISSION DOCUMENTS/METHODS:

A. 1st Review:

1. Three (3) folded copy sets of the Approved Stormwater Management plans redlined. (24"x36" max. paper size) _____
2. Two (2) Geotechnical Engineering Reports, and Two (2) Compaction Reports both with PE seal and signature. _____
3. Two (2) copies of Stormwater Management Computations with PE seal and signature (as needed). _____
4. Revised MD-14 _____
5. Notice of Construction Completion Form (NOCC) _____

B. Final Approval:

1. Two (2) folded copy sets of the Approved Stormwater Management plans redlined with PE seal and signature. _____

C. Methods:

1. The minimum information shall be shown in Red on the print copy and final mylar with "As-Built" in the lower right corner or each sheet. All information to be shown on approved plans. _____
2. A check mark (√) shall be made beside design values if they were actually constructed values. For changed values, line out the design value and enter the actual value. _____
3. Elevations to the nearest 0.1' are sufficient.
4. There must be the proper relation between the elevations of the principal spillway crest, the emergency/token spillway crest, and the top of the dam. All of these elevations should meet SCS-MD378 criteria. _____

II. INFRASTRUCTURE

A. PLAN VIEW OF FACILITY (SCALE < 1" = 50'; I.E., 40', 40' ETC.)

1. As-built contours in red (1' or 2' interval with design contours in gray). _____
2. Design and as-built improvements. _____
3. Landscaping, plantings, trees, shrubs and other woody vegetation (show in green, trees not allowed within 15' of any portion of the embankment or within 25' of outlet structure). _____
4. As-built water surface elevations (WSEL) for WQ_v, CP_v, 10-yr, 100-yr, permanent pool. _____
5. SWM easement area shown and labeled (for private facilities). _____
6. Fee simple SWM parcel lot, with a minimum 25' wide, fee simple, access from public right-of-way. (For subdivision ponds or ponds being deeded to the County, all property corners must be set and flagged). _____
7. SWM maintenance easement and access for private facilities. Access to be a minimum 10' wide, with a maximum cross slope of 4:1, and a maximum longitudinal slope of 15%. Maintenance access must reach control structure, pond bottom and forebay area. _____
8. SWM facility(s) constructed within SWM easement area. No permanent structures (fences, sheds, play equipment, retaining walls) shall be permitted within any storm drainage or SWM easement either shown or described on the final plat of subdivision or deed of easement. _____
9. Paved access entrance apron (if applicable). _____
10. Minimum 15 foot setback from SWM facility toe of fill or top of cut to nearest property lines. Minimum 25 foot setback from SWM facility outfall channel protection to nearest property lines. _____
11. Outflow pipe(s), outlet protection (detail required), outfall channel(s) to stable outfall (pipe diameter, material length, invert in and invert out shown), outfall channel length, width, thickness, material lining size and type labeled. Cross-section detail with dimensions required. _____
12. Emergency spillway with outlet channel shown and dimensioned with elevations labeled. _____
13. As-built easements for ponding and/or pond slopes on private property. _____
14. Engineer's Certification of as-built conditions. _____
15. Graphically identify all proposed non-structural credit areas and as-built slop and location (i.e. dry swales, wet swales, rain gardens, non-rooftop and rooftop disconnection credits, natural area conservation credit). _____
16. Slopes not steeper than 3:1 anywhere in SWM lot or easement area except for concrete or rip-rap lined side slopes. _____
17. Maintenance schedule (shown on plans, ie. how often, minimum requirements). _____
18. Location and detail for repaired sink holes (if applicable). _____
19. Existing and proposed utilities and utility easements shown and labeled. _____
20. Show and label limits of pond forebay, forebay weir, forebay weir protection and reference detail. _____
21. Show and label principal spillway, control structure, limits of embankment fill stationed.

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22. Limits of pond liner labeled (if applicable). _____

B. PUBLIC SAFETY CONSIDERATIONS:

1. Slopes – no steeper than 3:1 anywhere around pond. _____
2. For ponds with permanent pool, show and label under water safety bench and label elevation, slope and width. _____
3. Show & label 4' chain link fence required when pool depth is 4.0' or greater for the 100-yr storm. Show and label 12' gate opening. _____
4. Fence located 5' from SWM boundary, the top or toe of slope. Fence not permitted on berm. _____
5. Flared end sections (or headwall) on all pipes. _____
6. Pond embankments (fill) planted with grass only (or approved perennial alternative). _____
7. Ponds > 8' deep (measured to 100-year W.S.E.L.) shall be benched within the ponding area 4' horizontally at 4' elevation intervals. _____
8. Ponds which pass the 100-year storm through the principal spillway shall include a token spillway 1' below top of dam, min. 8' width, located entirely within cut soils. Show and label. _____

C. PRINCIPAL SPILLWAY PROFILE AND ASSOCIATED DETAILS:

1. SWM Existing and proposed/as-built ground:
   a. Dam side slopes labeled. _____
   b. Top width meets MD-378 and Washington County Design Standards. Top elevation labeled – constructed and settled. Provide elevation labels every 10 feet along center line of top of embankment. _____
   c. Limits and type of wave erosion protection shown (as directed by Dept _____
   d. Minimum 1' cover over top of spillway pipe. _____
2. Core Trench:
   a. Dimension bottom width (4' minimum). _____
   b. Label Side slopes (1:1 maximum steepness). _____
   c. Dimension depth minimum 4', below the bottom of the dam. _____
   d. Show core trench extends to where 10-year water surface elevation ties into existing grade. _____
   e. Show that core trench extends 4' below principal spillway. _____
3. Principal Spillway:
   a. Barrel must be circular or cast-in-place concrete box. Show and label dimensions, invert elevations in and out. _____
   b. Identify type of material, arch, dia., slope, length, gauges, corrugations size & coating (if metal). _____
   c. Pipe capable of imposed soil loadings. _____
   d. Minimum barrel size 12" (County policy, not MD-378). _____
   e. Barrel dia. $\geq$36" requires use of concrete pipe. _____
   f. Concrete cradle entire length of concrete pipe. Dimension detail. _____
   g. Grate over barrel outlet when barrel dia. $\geq$36" (use similar design as trash rack). Grate detail provided and dimensioned. _____
4. Riser structure (detail required):
   a. Same material as the principal spillway pipe. _____
   b. All as-built dimensions to be shown and labeled.

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c. Minimum difference in elevation between lowest orifice & barrel invert >0.1'. _____
d. Show and label trash rack: dimension openings and confirm size of rebar. _____
e. Trash rack must be 3-dimensional – no flat trash racks. Removable trash rack must be accessible during high water event. _____
f. Show, label and dimension anti-vortex device (detail required if used). _____
g. Trash rack to be galvanized (hot dipped, not painted). _____
h. Principal spillway 100 year as-built elevation at least 1' below the emergency spillway elevation. _____
i. Principal spillway used as emergency spillway, meeting minimum of 3 s.f. flow area.. _____
j. All as-built opening inverts, top and bottom inverts, and openings dimensioned. _____
k. Low flow orifice anchored and supported. _____
l. Dewatering device, gate valve and stem (as applicable). _____

5. Anti-Seep Collars (detail required):
   a. Size and dimensions. _____
   b. Collars located at least 2' from a pipe joint and within phreatic zone. _____
   c. Material and method of connection described. _____
   d. Maximum collar spacing 14 times the minimum collar projection. _____
   e. Minimum collar spacing 5 times the minimum collar projection. _____
   f. Collar projection dimensioned min. of 2' around pipe. _____
6. Outfall Protection (detail required):
   a. Cross-section provided for the outfall channel at the barrel outlet and where the outfall meets existing contours (dimensions and elevations). _____
   b. Outfall dimensions: geometric shape, length, slope, and lining material type. _____
   c. Indicate and dimension 3' minimum deep rip-rap toe wall. _____
   d. Indicate median rip-rap MSHA class and size (d50). _____
   e. Indicate maximum rip-rap size (Dmax = d50 x 1.5). _____
   f. Rip-rap thickness specified: minimum = 2.0 x d50. _____
   g. Rip-rap laid on filter fabric. (specify filter fabric type) _____
   h. Plunge pool or still basin detail (as required) dimensioned. _____
7. Cross-section Through the Dam Across Centerline:
   a. Existing ground shown. _____
   b. Top of dam (constructed and settled) with elevations provided at 10 foot intervals along centerline. _____
   c. Location of emergency spillway shown completely in cut. Invert elevation shown. _____
   d. Minimum emergency spillway width >8' with 3:1 side slopes. _____
   e. Top of core trench extends to elevate where 10-year WSEL ties into existing grade. _____
   f. Bottom of core trench shown 4' below embankment fill and 4' below principal spillway structure. _____
   g. Principal outlet barrel shown with diameter and invert elevation provide. _____
   h. Location of said borings shown and labeled. _____
8. Profile Along Centerline of Emergency Spillway:
   a. Located in a cut section. _____

b. Level control section provided (25' min.). _____
c. Minimum straight length of channel below the control section (ref. MD Std's & Specs for sediment & erosion control, section 18.16). _____
d. Spillway crest elevation shown. _____

III. STORMWATER MANAGEMENT PLANS – UNDERGROUND DETENTION – ADDITIONAL INFORMATION REQUIRED:

A. PLAN REVIEW OF STRUCTURE (scale <1"=50'; i.e. 40', 30', etc.)

1. Grit Chamber dimensions and elevations. All opening located and dimensioned.
2. Access ports per storage pipe/chamber located and size shown. _____
3. Internal trash rack shown. _____

B. DETENTION CHAMBERS DETAIL (section & profile)

1. Pipe must have a 48" minimum rise. Pipe material indicated. _____
2. Pipes laid on prepared subgrade with 12"gravel or sand bed. _____
3. Minimum 1.0' fill over pipe (or per manufacturers loading criteria). _____
4. Profile thru structures (s) showing as-built WSELs for permanent pool, Rev, WQ_V, CP_V 10, 100-year WSEL. _____

C. STRUCTURE INLETS DETAIL:

1. Same material as detention chamber. _____
2. Grates to be bolted on. _____

D. PUBLIC SAFETY CONSIDERATIONS:

1. Flared end sections (or head wall) on all pipes. _____
2. Traffic bearing grate. _____
3. Bolt on grates. _____
4. "Confined Space" warning sign at access point. _____

IV. STORMWATER MANAGEMENT PLANS – INFILTRATION – ADDITIONAL INFORMATION REQUIRED:

A. PLAN VIEW OF STRUCTURE (scale <1"=50'; i.e. 40', 30', etc.)

1. Observation well location shown. Top elevation provided and cap shown. _____
2. Stone diaphragm or stone trench or other pretreatment. Show and labeled. _____

B. SECTION & PROFILE THROUGH INFILTRATION TRENCH

1. Existing ground and proposed grade and as-built elevations at 10 foot intervals. _____
2. Observation well location(s). Cap labeled and shown. _____
3. Aggregate depth and stone size specifications, dimensioned and labeled. _____
4. 1 foot minimum soil or gravel covering. _____
5. 6 inches clean, washed sand on bottom of trench. _____
6. Filter cloth top and sides. _____
7. Bottom and top elevations provided. Minimum buffer to ground water table met. _____

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V. STORMWATER MANAGEMENT PLANS – FILTRATION – ADDITIONAL INFORMATION REQUIRED:

A. PLAN VIEW OF STRUCTURE (scale <1"=50'; i.e. 40', 30', etc.)

1. Under drain location shown and outfall for under drain shown. _____
2. Landscaping plan required for bioretention facilities. Label number, size, spacing of each plant material provided. _____
3. Show and label pretreatment area and dimension. _____
4. Minimum top width of berm 3 feet. Label width and top elevation. _____
5. Bioretention facility to be off line. Show flow splitter device. Provide as-built opening inverts and dimensions. _____

B. SECTION DETAIL

1. Dimension and label mulch, planting soil, sand layer. Provide material specifications. _____
2. Label top and bottom elevations. _____
3. Under drain required. Label pipe material and size. Label invert out. Label slope. _____
4. All bioretention facilities in karst areas to have clay or geosynthetic liner bottom and sides with under drain _____

VI. STORMWATER MANAGEMENT PLANS – OPEN CHANNEL SYSTEMS – ADDITIONAL INFORMATION REQUIRED:

A. PLAN VIEW OF STRUCTURE (scale <1"=50'; i.e. 40', 30', etc.)

1. Pretreatment shown and labeled. _____
2. Under drain location and outlet invert labeled. _____
3. Geosynthetic lining required top and sides for dry swales located in karst areas. Show limits of lining. _____

B. SECTION & PROFILE DETAIL

1. Dimensions and label bottom width, side slopes, top width, design storm WSELs.
2. Dimension and label under drain pipe, material, size, slope, bedding material (if applicable). _____

VII. ADDITIONAL COMMENTS:

1. Check if additional comments have been attached. _____

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Prepared by: _____

Name (signed)	Company	Date
Name (printed)	Registration Number	Telephone

Developer: _____

Telephone

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