



Stormwater Division
 Department of Public Works
 800 Rabbitt Road
 Gaithersburg, Maryland 20878

STORMWATER MANAGEMENT PLAN REVIEW –ESD- CHECKLIST

Project Name:		SWM Plan Number:	
Project Address:		SWM Plan Level*:	FINAL
		*(Concept, Prelim, Final, or a combination per Ch.8)	
Engineer Contact:		Reviewer Contact:	
Engineer Company:		ESC Plan Number:	

<u>Reviewer Markup Legend:</u>	Submittal Date:	Review Date:	Reviewer Initials:
√ Completed Satisfactorily.	_____	_____	_____
INC. Incomplete or Incorrect	_____	_____	_____
N/A Not Applicable	_____	_____	_____
? Not enough info provided.	_____	_____	_____

General Information:

This checklist has been developed to provide specific instruction to engineers and to serve only as a supplement to the City’s Chapter 8 Code. The initial checklist shall be completed by the City’s plan reviewer. **All submissions must fully address the City’s Chapter 8 Code addressing Sediment Erosion Control and Stormwater Management for approval and compliance.**

This checklist shall be utilized in the review of the Concept, Preliminary and Final Stormwater Management Plans. Applicable items shall be provided in the level of detail needed in the first submittal. All comments are expected to be addressed in the immediately following subsequent submission. Failure to do so may result in less than a full review.

Plan Submission Process:

The Initial Submission and subsequent submittals shall be made electronically for processing and fee acceptance. For all information related to permits please see: <https://www.gaithersburgmd.gov/services/permitting-inspections>

Note to the Applicant / Engineer:

Your submission for Stormwater Management Plan has been reviewed. The review was made per the following checklist. If you do not address a checklist item and/or comments on the plan sheets, explain your reasoning in your transmittal letter.

Typical Abbreviations contained within: ESD_v is Environmental Site Design Volume as defined by MDE SWM Ch.5; 10-YR is the storm event with a 10% probability of occurrence; and WSEL is Water Surface Elevation.

Note: Per Chapter 8, Section 8-25(1)(4): If a stormwater management plan involves direction of some or all runoff off from the site to an adjacent property, it is the responsibility of the developer to obtain from adjacent property owners any easements or necessary property interests concerning flowage of water. Approval of a stormwater management plan does not create or affect any right to direct runoff onto adjacent property without that property owner's permission.

The Review Checklist begins on the next page.

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PART 1 - PRE-REVIEW: REQUIRED PLAN PACKAGE AND SUPPORTING DOCUMENTATION

___	___	___	Transmittal: Specifically explains the purpose of submission (i.e. what plan type and associated plan (ESC, SDP, FSP, AFP, etc.) with tracking numbers.
___	___	___	Safe Conveyance / Adequate Outfall Analyses and Supporting documentation: Storm drain area maps and plans with supporting computational analysis which shows that runoff can be safely conveyed off-site at all points of discharge. The City enforces the County's analysis method, MCDOT Drainage Design Criteria, revised June 10, 2014. Analysis should include stability and capacity for the 10-year storm.
___	___	___	Downstream Facility Impacts: for Developments that are within the drainage area of a previously approved and installed downstream facility. For downstream regional ponds, the applicant must be aware of the downstream pond and be able to identify factors that may adversely impact the downstream facility (e.g., dam breach hazards). This is typically done via the Safe Conveyance / Adequate Outfall Analysis.
___	___	___	Stormwater Management Report: Narrative of project with establishment of site imperviousness, redevelopment criteria (if applicable), computational analysis of stormwater requirements, breadth and scope of proposed stormwater management according to City Code and State regulations, include necessary appendices of vicinity map and soils hydrologic information. Discussion of ESD to MEP and alternatives considered/rejected.
___	___	___	Mapped Site Resources: <ul style="list-style-type: none"> <input type="checkbox"/> Wetlands <input type="checkbox"/> Major Waterways <input type="checkbox"/> Floodplains <input type="checkbox"/> Tidal and Nontidal Wetlands <input type="checkbox"/> Wetlands of Special State Concern <input type="checkbox"/> Wetland buffers <input type="checkbox"/> Stream valley buffers (SVB) <input type="checkbox"/> Forests <input type="checkbox"/> Forest buffers <input type="checkbox"/> Steep slopes <input type="checkbox"/> Highly erodible soils <input type="checkbox"/> Springs/seeps <input type="checkbox"/> Intermittent streams <input type="checkbox"/> Vegetative cover <input type="checkbox"/> Ponds <input type="checkbox"/> ESD facilities <input type="checkbox"/> SWM BMPs
___	___	___	Stormwater Maintenance Covenants.
___	___	___	Ponds Only – Pond Summary Sheet (NRCS MD ENG-14): Must be signed copy from NRCS.
___	___	___	Geotechnical Report: Infiltration testing and boring reports.
___	___	___	Structural Computations (if applicable).
___	___	___	Supplemental Engineering Plans: Site Plan, Storm Drain Plans, and Plumbing Plans as applicable to ensure coordination of stormwater design with other site related parameters.

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___	___	___	Letter of acknowledgement: from off-site property owner for any required off-site covenants, easements, and/or rights-of-way (if applicable).
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PART 2: PLAN SPECIFIC REQUIREMENTS

COVER SHEET

___	___	___	Owner / Permit Applicant Name (individual and company), Address, Email Address, and Phone number.
___	___	___	Civil Engineer Name (individual and company), Address, Email Address, and Phone Number.
___	___	___	Vicinity Map with Site Identified (approximate outline of site and label); 1" = 2000' minimum scale.
___	___	___	Required Permits Table: The Applicant / Engineer must note all required permits involved with the development including the City's permits.

PLAN VIEW SHEETS

___	___	___	Scale such that readability of measures and improvements are ensured. Typical scales are 1" = 20' and 1" = 30'. <u>Any non-typical scale must be discussed with plan reviewers prior to submission.</u>
___	___	___	Property lines (site boundaries and adjacent properties) with Owner / Legal Description and mailing addresses for Site and immediately adjacent and confronting properties.
___	___	___	Fill Areas: Identify any areas of large amounts of structural fill. Rule of thumb: fill of 2' or more.
___	___	___	Limits of Clearing and Grading: Include conceptual limits of disturbance (LOD). Include the amount of disturbance, in acres.
___	___	___	Topography: Existing and proposed contours (2' contour intervals maximum)
___	___	___	Existing and Proposed Improvements (buildings, streets, utilities, stormwater facilities, etc.)
___	___	___	Natural Resources to be protected must be delineated (aka the buildable envelope must be shown).
___	___	___	Designated Wetlands with associated 25' buffers.
___	___	___	Floodplain, Stream Valley Buffer (SVB), and BRL Impacts: These items must be clearly shown and identified on the plan (as applicable to the property) along with any proposed grading or other improvements in these extents.
___	___	___	Plan Legend: Must include soils, Floodplain, SVB, BRL, and ESD symbology.
___	___	___	Tree Lines (existing and proposed), Tree Save measures, and Tree Protection measures must be delineated. <u>Note construction details may remain on their prospective plans; the ESC must only delineate the extents of the measures.</u>
___	___	___	Proposed Stormwater Management Facilities (ESDs, ponds, BMPs).

PART 3 – STORMWATER MANAGEMENT REPORT REQUIREMENTS

___	___	___	Stormwater Narrative: Includes basic background of site and proposed development, must mention if the site is redevelopment (with justification), the proposed stormwater management facilities intended to be used, achievement of ESD to the MEP and / or supplementation with structural facilities (i.e. design per MDE Ch. 3 facilities) along with mentioning of any waiver requests.
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___	___	___	Stormwater Requirements: Computational analysis of site’s stormwater management requirements. This must include the discussion of Site Boundary versus LOD volumetric requirements, redevelopment criteria (if applicable), required stormwater management volumes. Sites that have a net increase in impervious area shall provide hydrologic analysis of 2- and 10-year peak discharge rates and velocities at all points of discharge from the site. Refer to Stormwater Management Summary Table below for additional detail.
___	___	___	Stormwater Implementation: Computational analysis for provided stormwater with computations for each facility per state design methodology. This includes contributing drainage area, facility dimensions and surface area, depths and elevations of filter layers, void ratio and outlet configuration. Calculate required and provided rainfall depth (PE) and storage volume.
___	___	___	Infiltration Practices must demonstrate maximum depth allowed via computations.
___	___	___	ESD Alternatives Not Used: The report must include an analysis of the application of other ESD facilities in Ch.5 of MDE and why those facilities were not used. Excessive Cost is not acceptable.
___	___	___	Hydraulic and structural computations: for all ESD practices and structural stormwater management measures to be used.

PART 4 – OVERALL PLAN INFORMATION

___	___	___	Titleblock: Project Name, Address, Legal Subdivision (with lots/blocks and/or other appropriate legal references, election district).
___	___	___	Sheet Numbering: Erosion and Sediment Control Plans are separate from Stormwater Management Plans per City Code, All sheets shall be numbered as a single plan set (must have ESC-X of X, or ESC-X of X / SWM X of X). ESC/SWM Plans are not allowed to be a part of the greater construction set where no coversheets or overall plan numbers, C-XXX are applied). Typically, applicants use two sheets numbers: 1) the Plan Number, C-XXX and 2) the sheet number, ESC-X of X / SWM-X of X.
___	___	___	Signature / Seal of Licensed Professional: All sheets are to be signed and sealed by a registered professional, i.e. P.E. for design plans and R.L.A. for Landscape.
___	___	___	Match Lines: Must clearly identify corresponding sheet to sheet.
___	___	___	Overall Plan / Composite Sheet / Key map: An Overall Plan is required which identifies ESC measures across large distances for large tracts of lands and larger than typical scales.
___	___	___	Approval Block with Plan Number Included: The bottom right of each plan sheet, approximately 3” by 5” of blank space must be included to accommodate the City’s Approval block.
___	___	___	Overall Drainage Area Map may be a separate plan, but must show all facilities with associated drainage divides (existing and proposed) and areas including off-site and on-site for the site and adjacent areas (adjacent areas only applicable to the development). Please refer to the safe conveyance section in part 1 for more information.

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___	___	___	<p>Overall Plan which shows locations and identifies stormwater facilities.</p> <ul style="list-style-type: none"><input type="checkbox"/> Existing Conditions plan showing existing impervious, contours, and natural resources<input type="checkbox"/> Proposed conditions plan showing proposed impervious locations and size, site improvements, natural resources to be protected, and existing contours and proposed grading<input type="checkbox"/> Type, size, and location of ESD and other SWM features<input type="checkbox"/> Critical setbacks from buildings, roads, and property lines<input type="checkbox"/> Building Restriction Lines (BRL)<input type="checkbox"/> Flood Protection Elevation<input type="checkbox"/> Maximum Limits of Disturbance (LOD)<input type="checkbox"/> Proposed drainage area boundaries to all ESD/SWM facilities<input type="checkbox"/> Maximum side slopes<input type="checkbox"/> Final maintenance access<input type="checkbox"/> Inflow points<input type="checkbox"/> Inflow protection method (material, dimensions)<input type="checkbox"/> Surface and sub-surface flow paths<input type="checkbox"/> Flow splitters (upstream of ESD is preferred)<input type="checkbox"/> An overlay of sediment control measures
___	___	___	<p>Stormwater Management Summary Table: Identifies stormwater requires and demonstrates how the facilities provide the necessary requirement.</p> <ul style="list-style-type: none"><input type="checkbox"/> Total Site Area<input type="checkbox"/> Project Site Area (defined by property or LOD)<input type="checkbox"/> Disturbed Area (maximum extent, not phased)<input type="checkbox"/> Existing Impervious Area for Site<input type="checkbox"/> Proposed Impervious Area for Site<input type="checkbox"/> ESD_v Required<input type="checkbox"/> Target PE<input type="checkbox"/> ESD_v Provided categorized by facility type (or individual facilities)<input type="checkbox"/> PE achieved<input type="checkbox"/> MDE Ch.2 Tabulations (WQ_v, CP_v, Re_v, etc.) if applicable to project.
___	___	___	<p>Maintenance Certification on Private Lands must be on first sheet of plan (if not already included on combined Sediment and Erosion Control plan).</p>
___	___	___	<p>Soil Boring Locations (both site borings and infiltration test locations).</p>
___	___	___	<p>Maintenance Access: Access path to a public right-of-way (minimum 12-foot wide, justification if less than 12' must be reviewed/accepted by reviewer). Where necessary utilize sections, plan view information or both to demonstrate practical access to the facilities. Label critical dimensions on appropriate plans to facilitate review such as top of wall to media inside a facility and ground to top of wall for access into a facility</p>
___	___	___	<p>Sequence of Construction: Should direct contractor on how and when to build the stormwater facilities. However, the sequence of construction may be located on the Sediment Control Plans.</p>
___	___	___	<p>Seepage Analysis: Certain facilities such as ponds and surface sandfilters may require seepage analysis. This is a case by case basis dependent on the size and scope of facility.</p>

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PART 5 – STORMWATER PLANS AND DETAILS – ESD FACILITIES

___	___	___	Stormwater Facility Design Parameters Table including Design versus As-Built: A design table featuring the critical design parameters for the individual facility must be included on the plans. The table must leave room for design parameters as well as as-built information. The table should be adapted for each type of facility, i.e. pervious pavement doesn't need a line item for planting media depth.
___	___	___	Soil Boring Locations (if applicable).
___	___	___	Drainage Areas do not exceed maximum allowed as set in Ch.5 of MDE SWM Manual.
___	___	___	Void Ratio: 40% voids (n=0.40) are allowed in ESD facilities except pervious paving, which utilizes a 30% ratio (n=0.30).
___	___	___	Facilities which infiltrate must be located a minimum of 10' away from buildings, 50' away from water supply wells, 100' away from unconfined water supply wells, and 25 feet from septic systems.
___	___	___	Facility Bottoms are clearly delineated.
___	___	___	Topography as needed to delineate facility, i.e. embankments, contours for concrete flumes, etc.
___	___	___	Infiltration Rates: Use 3-inches/hour maximum infiltration rate for computations regardless of actual percolation rates. For rates which are exceedingly high (>10-inches/hour) investigate the use of alternate filtration practice including justification.
___	___	___	Bio-Retention: Micro Bio-Filters and Enhanced filters may negate the storage in the mulch layer by assuming that the mulch is 100% voids (n=1.0). Therefore the riser crest elevation shall be set no more than 1' above the planting media for storage depth.
___	___	___	Pervious Pavement: If total area is greater than (>) ten-thousand (10,000) square feet, the facility must comply with infiltration requirements (i.e. designed like an infiltration trench).
___	___	___	Grass Swale: 1" of volumetric runoff is the maximum credit allowed. Intended use for linear applications such as roadway or driveway
___	___	___	Dry Wells: Use only for roof runoff, location must be minimum of 10' off residential building. Additional justification may be required to ensure no impacts to building's footer.
___	___	___	Stormwater Details and Specifications must include necessary material information such as applicable to facility type: <ul style="list-style-type: none"> <input type="checkbox"/> Sand Specification <input type="checkbox"/> Planting Media <input type="checkbox"/> Stone <input type="checkbox"/> Underdrain (PVC Sch. 40 at 0% slope) and show perforated vs. non-perforated extents. <ul style="list-style-type: none"> <input type="checkbox"/> Perforations to be 3/8" Diameter at 4-inches on center, every 90 degrees. <input type="checkbox"/> Cleanouts and Cleanout Cap details/specifications (cap must be removable) <input type="checkbox"/> Overflow Riser and Routing of Storm Event (10-YR typically) <input type="checkbox"/> Pavement cross-section <input type="checkbox"/> Curb Cut details <input type="checkbox"/> Inflow Protection detail

PART 6 – GEOTECHINCAL INVESTIGATION REQUIREMENTS

___	___	___	Geotechnical Report including site specific recommendations.
___	___	___	USDA Textural Classification for various layers with depths.
___	___	___	Minimum Boring Locations using a minimum of 4 feet below proposed bottom of facility and per MDE's Technical Memorandum #7 dated June 18, 2018.

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___	___	___	Season High Groundwater Elevation and Bedrock elevation (if encountered) must be a minimum of 4 below the bottom of the facility.
___	___	___	Percolation Tests for borings in and / or near proposed facilities.

PART 7 – STORMWATER PROFILES AND SECTIONS

___	___	___	Typical Storm Profile with grades (ex. & prop.), stations, inverts, pipe size, rim elevations, and utility crossings.
___	___	___	Embankment widths and side slopes (3:1 maximum allowed)
___	___	___	Cross-section through facility: with existing and proposed grades. Section must show dimensions and materials. <ul style="list-style-type: none"><input type="checkbox"/> Grades – Existing and Proposed<input type="checkbox"/> Water surface elevations<input type="checkbox"/> Materials (sand, stone, pavers, etc.).<input type="checkbox"/> Underdrain (Sch. 40, perforations) with cleanouts clearly shown. Perforation locations must be delineated.<input type="checkbox"/> Cleanout Locations and materials (cap may be shown in detail on different sheet)<input type="checkbox"/> Filter cloth location (top and sides)<input type="checkbox"/> Impermeable Line Location (if applicable)<input type="checkbox"/> Backfill<input type="checkbox"/> Access Ports with details (steps concrete collars, etc.)
___	___	___	Construction Details as necessary for proprietary products.

PART 8 – STRUCTURAL PLANS (IF REQUIRED)

___	___	___	Structural Plans sealed by a professional engineer.
___	___	___	Plans must show: <ul style="list-style-type: none"><input type="checkbox"/> Dimensions<input type="checkbox"/> Materials<input type="checkbox"/> Reinforcement<input type="checkbox"/> Anchoring<input type="checkbox"/> Any applicable references to the stormwater management plans and details.

PART 9 – STORMWATER MANAGEMENT PLANTING PLANS (IF REQUIRED)

___	___	___	Planting Plans sealed by a registered landscape architect (RLA).
___	___	___	Plans must show: <ul style="list-style-type: none"><input type="checkbox"/> Planting Locations<input type="checkbox"/> Planting Schedules<input type="checkbox"/> Planting Details<input type="checkbox"/> A statement of viability for extreme shade conditions

PART 10 – ADDITIONAL COMMENTS
