



STORMWATER MANAGEMENT FACILITY **POST CONSTRUCTION VERIFICATION DOCUMENT** **SUBMITTAL CHECKLIST**

Submittal Requirements

- Post Construction Verification Document survey plan in accordance with the items of this Checklist
- Supporting calculations in accordance with the items of this Checklist
- A copy of the completed Post Construction Verification Document Submittal Checklist
- Stormwater Management Facility Construction Checklist completed during construction of the facility, if applicable
- Geotechnical engineer's report, if applicable

Post Construction Verification Document Plan Requirements

All Plans:

- Plans must be submitted on minimum 24" x 36" sheets
- Provide a location map on the plan
- Provide a north arrow on the plan

The title block must include:

- Project name indicating "Post Construction Verification Document" in the plan title
- Name, address, telephone and fax numbers of the individual preparing the plan
- Scale of plan (maximum plan scale accepted will be 1"=50')
- Date of the survey
- Hundred, County, and State
- Street address of the project site
- Signature and seal of Delaware Registered Professional Engineer or Professional Land Surveyor

Delineate and properly label the following (as applicable):

- Roads adjoining the stormwater management facility
- Property lines adjacent to the stormwater management facility
- Easements (i.e. drainage, utility, access, etc.) adjacent to the stormwater management facility



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Ponds

Provide the following as it relates to the stormwater management pond's storage volume:

- Surveyed contours of the constructed stormwater management pond including forebays, micropools, and elevations below permanent pool at 1- or 2-foot intervals based on the datum of the approved plan. (One-foot contours will generally be expected for projects located in Kent and Sussex Counties. For sites with greater elevation differences (+20' across the site) such as is often found in New Castle County, 2-foot contours will be accepted.)
- Pond bottom elevations on a fifty-foot grid with high and low points noted
- Lowest top of bank elevation at fill for embankment/combination pond or lowest top of bank elevation for excavated pond. ****The acceptable top of bank elevation may be no lower than the design elevation for top of bank.*
- Actual cross section showing elevations, inside slopes, benching, top width and backslope, as applicable (to scale).
- Elevation of permanent pool, if applicable.
- Calculations of the volume of the pond as constructed with incremental storage and cumulative storage volumes in cubic feet for each one-foot elevation contour. ****The allowable variance from the design volume of the basin is ten percent.*

Provide the following information related to the inlet and outlet structures within the stormwater facility. ****The allowable variance for invert elevations on any structure is 0.1 ft:*

- Diameter and material of all inlet and outlet pipes
- Invert elevations of all inlet and outlet pipes
- Dimensions (length, width, depth, d50) for all areas of rock outlet protection
- Dimensions and material of outfall structures
- Profile through principal spillway showing inverts and dimensions of all pipes, weirs, orifices, risers and other appurtenances, as applicable (to scale)
- Cross-section of emergency spillway (to scale)
- Profile through emergency spillway (to scale)

****When the allowable variances are exceeded for either stormwater management pond volume or outlet structure invert elevations, supplemental calculations must be submitted to determine if the stormwater management pond, as constructed, meets the design requirements. Submit the following:*

- Calculations of outflow from the stormwater management pond for all design storms. Routing computations must be based on the post construction verification survey volumes and elevations for the facility.



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Bioretention

Provide the following as it relates to the bioretention facility's surface area and available storage:

- Post construction verification contours of the bioretention facility, including any forebays, at 1-foot intervals
- A minimum of two cross sections showing elevations, inside slopes, top width and backslope, as applicable (to scale). Cross sections should be taken through inlet and outlet structures as applicable.
- Lowest top of bank elevation ****The acceptable top of bank elevation may be no lower than the design elevation for top of bank.*
- Calculations of the surface area of the bioretention soil surface. ****The allowable variance from the design surface area of the bioretention surface is ten percent less than the design surface area.*
- Calculations of the volume of the bioretention facility as constructed with incremental storage and cumulative storage volumes in cubic feet for each one-foot elevation contour. ****The allowable variance from the design volume of the bioretention surface storage is ten percent less than the design volume.*

Provide the following information related to the inlet and outlet structures within the bioretention facility. ****The allowable variance for elevations on any structure is 0.1 ft:*

- Diameter and material of all inlet and outlet pipes
- Invert elevations of all inlet and outlet pipes
- Dimensions (length, width, depth, d50) for all areas of rock outlet protection
- Dimensions and material of overflow structures
- Profile through principal spillway showing inverts and dimensions of all pipes, weirs, orifices, risers and other appurtenances, as applicable (to scale)
- Cross-section of emergency spillway (to scale)
- Profile through emergency spillway (to scale)

****When the allowable variances are exceeded for bioretention facility surface area or volume or structure elevations, supplemental calculations must be submitted to determine if the bioretention facility, as constructed, meets the design requirements. Submit the following:*

- Calculations of outflow from the bioretention facility for all design storms. Routing computations must be based on the constructed volumes and elevations for the facility.
- Calculations demonstrating that the design requirements have been met in the constructed condition.



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Biofiltration Swales Vegetated Channel

Provide the following as it relates to the biofiltration swale vegetated channel's slope and cross section:

- Profile along the length of the biofiltration swale vegetated channel (parallel to flow direction) with high and low spot centerline elevations at 50-foot intervals along the bottom noted. ****The allowable variance for the constructed slope of the swale channel is 0.001 ft/ft.*
- Cross-section at the beginning of the swale channel
- Cross-section at the discharge point of the swale channel
- Cross-sections at fifty 100-foot stations along the swale channel.
- Label the cross section locations on plan view to correspond with the individual cross section details. All cross-sections must include the following:
 - Bottom width dimension
****The acceptable bottom width may be no less than the design bottom width*
 - Top width dimension
 - Swale Channel bottom elevation at left and right bank
 - Top of bank elevation for left and right bank
 - Left and right side slope (H:V)
****The side slopes may be no steeper than 3:1*

Provide the following information related to the structures within the biofiltration swale vegetated channel. ****The allowable variance for invert elevations on any structure is 0.1 ft:*

- Diameter and material of all pipes
- Invert elevations of all pipes
- Dimensions (length, width, depth, d50) for all areas of rock outlet protection
- ~~Diameter, material and invert of underdrain at the discharge point, if applicable~~
- Overflow elevation of level spreader, if applicable
- Delineate locations of permanent check dams, if applicable.
- Provide weir overflow elevation of each permanent check dam, if applicable.

****When the allowable variances are exceeded for the biofiltration swale vegetated channel slope or structure invert elevations, or the constructed bottom width of the swale vegetated channel is less than the design width, supplemental calculations must be submitted to determine if the biofiltration swale vegetated channel, as constructed, meets the design requirements. Submit the following:*

- Calculations demonstrating that the water quality management Resource Protection event and Conveyance and Flooding event requirements have been met in the constructed condition.



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Filter Strips

Provide the following as it relates to the filter strip's slope:

- Profiles through the width of the filter strip (parallel to flow direction) at fifty-foot intervals along the length of the filter strip, including profiles at either end of the filter strip. ****The allowable variance for the constructed slope of the filter strip is 0.001 ft/ft.*
- Each profile should provide the following:
 - Elevation at the edge of the impervious surface
 - Elevation of top of level spreader stone trench, if applicable
 - Elevation at the beginning of the filter strip
 - Elevation at the design downstream point of the filter strip

Provide the following as it relates to the filter strip's drainage area:

- Spot grades on a 50-foot grid within the filter strip's drainage area to delineate the full drainage area flowing to the filter strip.
- Area in acres or square feet of the drainage area noted on the plan.

****When the allowable variance is exceeded for the filter strip slope, or the drainage area or flow length exceeds the design, supplemental calculations must be submitted to determine if the filter strip, as constructed, meets the design requirements. Submit the following:*

- Calculations demonstrating that the water quality management requirements have been met in the constructed condition.



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Sand Filters

Provide the following information related to the structural elevations and dimensions of the sand filter. ****The allowable variance for elevations on any structure is 0.1 ft:*

- Chamber dimensions of sedimentation (wet) chamber and filtration (sand) chamber. If modular units are used, chamber dimensions must be provided for all units.
- Grate elevations at all four corners of the sand filter. If modular units are used, provide corner elevations of each modular unit.
- Internal weir elevations between the two chambers.
- Water surface elevation in the sedimentation chamber.
- Sand surface elevation in the filtration chamber.
- Overflow catch basin dimensions, grate elevation and invert elevation.
- Pipe material and diameter of discharge pipe from overflow catch basin.



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Underground Storage Facilities

Provide the following information related to the structural elevations and dimensions of the underground storage facility. ****The allowable variance for elevations on any structure is 0.1 ft:*

- Grate and invert elevations of all structures
- Invert and diameter of all pipes or chambers within underground storage system that is accessible following construction.
- Elevation and dimension of any weirs within underground structures.

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