City of Durham

Public Works Department

Stormwater Services Divisions

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Constructed Wetland and Pocket Wetland Design Summary

Stormwater Management Construction Plan Review:
A complete stormwater management construction plan submittal includes a design summary for each stormwater BMP, design calculations, plans and specifications showing BMP, inlet and outlet structure details.

I. PROJECT INFORMATION

Project Name: _____ Phase _____
PIN: _____ Case #: _____
Design Contact Person: _____ Phone #: (____) ____-_____
Legal Name of Owner:_____
Owner Contact: _____ Phone #: (____) ____-_____
Owner Address:_____
Deed Book _____Page #_____ or Plat Book _____ Page#_____ for BMP Property
For projects with multiple basins, specify which pond this worksheet applies to: _____
Does the proposed pond also incorporate stormwater detention? Yes No
Detention provided for: ☐ 1-year ☐ 2-year ☐ 10-year ☐ other _____
Dam Height: _____ (feet) Dam Classification: _____

Elevations

Wetland bottom elevation	_____	ft.	*(floor of the wetland)*
Permanent pool elevation	_____	ft.	*(invert elevation of the orifice)*
Temporary pool elevation	_____	ft.	*(elevation of the structure overflow)*
1-year storm orifice/weir elevation	_____	ft.	*(invert elevation)*
1-year storm water surface elevation	_____	ft.	
2-year storm orifice/weir elevation	_____	ft.	*(invert elevation)*
2-year storm water surface elevation	_____	ft.	
10-year storm orifice/weir elevation	_____	ft.	*(invert elevation)*
10-year storm water surface elev.	_____	ft.	
Emergency spillway elevation	_____	ft.	*(invert of emergency spillway)*
Top of embankment/dam	_____	ft.	*(elevation)*
Maximum water surface elevation	_____	ft.	(max. storm pond can safely pass)
Depth from design storm to Lowest orifice elevation	_____	ft.	

Areas

Permanent pool area provided	_____	ft^2	*(water surface area at orifice invert elevation)*
Minimum required perm. pool area	_____	ft^2	*(calculated surface area required)*
Design storm surface area	_____	ft^2	*(Specify frequency event:_____ year)*
Drainage area (10-acres min to Constructed Wetland)	_____	ac.	*(total drainage to the wetland)*

Discharges (Specify only applicable frequency events)

At BMP

	1-year	2-year	10-year	_____-year
Inflow	_____ cfs	_____ cfs	_____ cfs	_____ cfs
Routed outflow	_____ cfs	_____ cfs	_____ cfs	_____ cfs

At Analysis Point(s) that BMP Contributes to

	1-year	2-year	10-year	_____-year
Pre-development	_____ cfs	_____ cfs	_____ cfs	_____ cfs
Post-development w/o detention	_____ cfs	_____ cfs	_____ cfs	_____ cfs
With detention	_____ cfs	_____ cfs	_____ cfs	_____ cfs

Volumes

Permanent pool volume	_____ ft^3	*(volume of main pond and forebay)*
Water quality pool storage volume	_____ ft^3	*(volume above permanent pool)*
Design storm storage volume	_____ ft^3	*(volume above permanent pool)*
Total Storage volume provided at design storm	_____ ft^3	
Total Storage volume provided at top of dam	_____ ft^3	
Forebay volume (Constructed Wetlands only)	_____ ft^3	

Environmental Zones

Zone	Water Depth at Normal Pool[1]	Water Depth at Temporary Pool (Max Depth of 12-inches above Normal Pool)[1]	Portion of Temporary Pool Surface Area
Deep Pool			
Low Marsh			
High Marsh			
Woody Upland			

[1] Depths are to be calculated using the hydraulic depth calculation for each zone. Hydraulic Depth is the volume of water at an elevation divided by the water surface area at the same elevation.

Other Parameters

SA/DA[2]	_____	*(from DWQ table)*
Diameter of orifice	_____ in.	*(must provide draw down over 2 to 5 day period)*
Draw-down time	_____ hrs	
Design TSS removal	_____ %	*(minimum 85% removal required)*

[2] When using the SA/DA tables from the NCDENR BMP Manual, linear interpolation may be used for values between table entries.)

Riser/Principal and Emergency Spillway Information

1-year storm orifice/weir	diameter_____ in.	length _____ft.	
2-year storm orifice/weir	diameter_____ in.	length _____ft.	
10-year storm orifice/weir	diameter_____ in.	length _____ft.	
___- year storm orifice/weir	diameter_____ in.	length _____ft.	
Principal spillway	diameter_____ in.		
Emergency spillway	width_____ ft.	side slopes ___:1	slope_____%

II. REQUIRED ITEMS CHECKLIST

The following checklist outlines design requirements. Initial in the space provided to indicate the following design requirements have been met and supporting documentation is attached.

Applicant's initials

_____ a. The forebay volume is approximately equal to 20% of the pond volume.
_____ b. The temporary pool controls runoff for water quality design storm.
_____ c. The temporary pool draws down in 2- to 5-days.
_____ d. The drainage area to a Constructed Wetland is at least 10-acres. Smaller drainage areas to Pocket Wetlands will be reviewed on a case-by-case basis.
_____ e. Riprap outlet protection, if provided, reduces flow to non-erosive velocities (provide calculations).
_____ f. The wetland length to width ratio is greater than or equal to 3:1.
_____ g. The wetland side slopes above the permanent pool area are no steeper than 3:1.
_____ h. A submerged and vegetated shelf with a slope no greater than 6:1 is provided around the perimeter of the pond (show on plan and profile and provide a vegetation plan).
_____ i. Vegetative cover above the permanent pool elevation is specified. No woody vegetation is permitted on the embankment.
_____ j. A surface baffle, trash rack or similar device is provided for both the overflow and orifice. Flat top trash racks are not acceptable. Access hatch has been provided.
_____ k. A recorded drainage easement is provided for each pond including access to the nearest right-of-way and is graded per Section 8.3, Stormwater Control Facilities (BMPs).
_____ l. If the basin is used for sediment and erosion control during construction, a note requiring clean out and vegetative cover being established prior to use as a wet detention basin shall be provided on the construction plan.
_____ m. A mechanism is specified which will drain the pond for maintenance and emergencies. Valves used shall be plug valves.
_____ n. Anti-floatation calculations are provided for riser structure.
_____ o. A plan view of the wetland with grading shown is provided.
_____ p. A profile through the forebay, wetland and spillway is provided. Water surface elevations are shown on the profile.
_____ q. Riser structure details are provided.
_____ r. Dam designed to account for a 5.00% settlement factor.
_____ s. Compaction specifications for the embankment are shown on the plan.
_____ t. The minimum top of dam width has been provided for the wetland embankment top width per Section 8.3, Stormwater Control Facilities (BMPs)

Note: Executed Stormwater Facility Operation and Maintenance Permit Agreement, payment of permit fee per facility and payment of surety are required prior to construction drawing approval