



**A. Project Information**

Project Name: \_\_\_\_\_  
 Municipal Jurisdiction: \_\_\_\_\_ PIN: \_\_\_\_\_  
 Receiving Stream: \_\_\_\_\_ Receiving Stream Classification: \_\_\_\_\_

**B. Design Professional Information**

Engineer/PLA: \_\_\_\_\_ NC License #: \_\_\_\_\_  
 Firm: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 Email: \_\_\_\_\_ Phone: \_\_\_\_\_

**C. Submittal Requirements**

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li><input type="checkbox"/> Plans, calculations, estimate, and draft O&amp;M documents (<a href="#">electronic submittal</a>)</li> <li><input type="checkbox"/> Financial Responsibility Form (Application)</li> <li><input type="checkbox"/> Appropriate Fee (\$525/disturbed acre, prorated)</li> </ul> | <ul style="list-style-type: none"> <li><input type="checkbox"/> Completed Stormwater Management Plan Review Checklist</li> <li><input type="checkbox"/> Completed and sealed <a href="#">Stormwater Permit Plan Review Compliance Certification</a></li> </ul> |
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**D. Stormwater Management Plan requirements**

The following items shall be incorporated with respect to specific site conditions, in a stormwater management plan		Applicant		Staff Use	
		✓	N/A	✓	N/A
<b>1. APPLICATION FOR STORMWATER PERMIT FORM</b>		✓	N/A	✓	N/A
a	Completed, signed & notarized <a href="#">Financial Responsibility/Ownership form</a> (PINs include total scope of project, FRO and applicant contact information provided, DB/PG consistent with current land records, project name is consistent between plans, calculations, and FRO form)				
b	Executed <a href="#">Buncombe County Stormwater Agent Authorization Form</a> (if applicant not landowner of record) <sup>1</sup>				
c	Correct application fee (See fee schedule)				
d	Plans and calculations sealed, signed and dated by a licensed NC Professional Engineer or Landscape Architect (calculations should be in a comprehensive pdf with sealed cover page)				
e	Completed and sealed Stormwater Permit Plan Review Compliance Certification: <i>download Excel file <a href="#">here</a>.</i>				

<b>2. GENERAL PLAN FEATURES</b>		✓	N/A	✓	N/A
a	Legend, North arrow & scale, etc. (1 inch=50 feet minimum scale)				
b	Project location (roads, streets, landmarks)				
c	Property lines				
d	Existing contours				
e	Proposed contours, tying into existing				
f	Limits of disturbed area (provide acreage total, delineate limits, and label; total matches application and fee) <sup>2</sup> Sheet Limits of Disturbance total is provided on:				
g	Planned and existing building locations (Total Buildout Potential)				
h	Percentage of built-upon area and density (if applicable) for project, at full build-out				

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2. GENERAL PLAN FEATURES (continued)		✓	N/A	✓	N/A
i	Planned & existing road locations & elevations				
j	Lot and/or building numbers ( <i>on stormwater plan sheet</i> )				
k	Geologic features: rock outcrops, seeps, springs, wetland and their limits, streams, lakes, ponds, dams, etc. Include one of the following statements: There are no potentially jurisdictional surface waters of the state or United States on this project site. OR All potentially jurisdictional surface waters of the state or United States have been shown on these plans. Sheet this statement is provided on:				
l	Regulated floodway and floodplain limits, if applicable, labeled. <i>No stormwater control measures (SCMs) permitted within floodway.</i>				
m	Profiles of streets, storm drain piping, ditch lines, etc.				
n	Identification of permanent land cover proposed with extents marked (e.g. vegetation, stone, pavement, concrete, etc.) <i>Note: If non-vegetated areas are not included in BUA calculations, this must be clearly indicated both on the plans and in the narrative.</i>				
o	Location of permanent stormwater measures, with labels and sufficient details for construction, consistent with calculations, and not in conflict with other site components. <i>Note: roof leaders only need to be shown if needed to ensure BUA drainage is directed to the stormwater system.</i>				
p	Location of easements to all measures for access and maintenance, including permanent swales and piping. <i>Note: Shared roof leaders crossing property lines are considered stormwater piping that requires an easement. Easements for SCMs shall have minimum width of 10', extend to the nearest public right-of-way, and not include lateral or incline slopes that exceed 3:1.</i>				
q	If receiving stream is designated trout waters, SCMs that avoid a sustained increase in receiving water temperature are used. <sup>3</sup>				

3. GENERAL NARRATIVE		✓	N/A	✓	N/A
a	Description of the project scope and water quantity/quality standards to be met				
b	Project density calculations <sup>4</sup> supporting low-density/high-density determination <sup>5</sup>				
c	Precipitation data source				
d	Soil information: type, special characteristics, hydrologic soil group				
e	Name and classification of receiving water course or name of municipal operator ( <i>only where stormwater discharges are to occur</i> )				
f	Construction sequence related to permanent stormwater management measures on site				
g	Projects on sites with potentially contaminated soils must clearly describe this in the narrative and shall not locate infiltrating SCMs in areas with potentially contaminated soils.				

4. WATER QUANTITY REQUIREMENTS <sup>6</sup>		✓	N/A	✓	N/A
a	Existing and planned drainage area delineation ( <i>include off-site areas that drain through project, and show proposed structure locations that correlate to calculations</i> )				
b	Pre-construction and post-construction runoff calculations and hydrographs (1Yr/24Hr storm) for each outlet from the site (at peak discharge points) showing no increase in peak flow rate <i>Note: Calculations should include drainage area, CN, Tc, and rainfall intensity. If software is used, routing table or schematic should be provided. Total for each discharge point pre- and post-development should be summarized in a table. SCM inputs (e.g. dimensions, outlet structure configuration, etc.) must be provided and consistent with plans.</i>				
c	Post-construction calculations demonstrating SCMs can pass 25YR/24HR storm without causing erosion (per Erosion Control, reqm'ts)				
d	Stormwater is not diverted from one natural drainage basin to another beyond a negligible amount. <sup>7</sup> Calculations of total area draining to each discharge point from the site pre-development and post-development are provided.				

5. WATER QUALITY REQUIREMENTS – LOW DENSITY <sup>8</sup>		✓	N/A	✓	N/A
a	Dispersed flow maximized. Vegetated conveyances utilized to the maximum extent practicable. Piping only permitted for short sections under pavement. Side slopes of vegetated conveyances no greater than 3:1 slope. <sup>9</sup>				
b	Curb outlet systems provided if curb and gutter used. Curb outlets convey 25-year storm with non-erosive velocity (Erosion Control reqm'ts); Longitudinal slope <5% OR infiltration promoting devices provided; trapezoidal with at least 2' bottom width; side slopes 3:1 or flatter; at least 100' in length OR treatment swales per 15A NCAC 2H .1061 provided.				
c	30' stream buffer delineation for blue line streams [as shown on latest <a href="#">UGSG 7.5 minute quadrangle</a> or published NRCS Soil Survey maps ( <a href="#">downloadable on the Buncombe County Stormwater website</a> )]. <sup>10</sup> No built-upon area or SCMs located within buffer. No untreated water discharged in vegetated setback ( <i>outlet protection terminates prior to stream buffer</i> ).				

6. WATER QUALITY REQUIREMENTS – HIGH DENSITY <sup>11</sup>		✓	N/A	✓	N/A
a	Demonstration of compliance with runoff treatment or runoff volume match. State in narrative which is being used.				
b	Runoff Treatment Method: Provide BUA calculations demonstrating that runoff from the 1" storm for the net added impervious area from the project is treated through a primary SCM <sup>12</sup>				
c	Runoff Volume Match Method: Provide calculations demonstrating that the annual mean runoff volume after development will be no more than 10% higher than the annual runoff volume before development.				
d	SCM drainage area delineation map, which supports and is consistent with calculations provided ( <i>include off-site areas that drain through project</i> )				
e	Calculations for design volume for each SCM, following SCM-specific calculation requirements per the <a href="#">NCDEQ Stormwater Design Manual</a> , consistent with compliance method calculations. <i>Note: Design volume must take into account runoff at build out from all surfaces draining to the system.</i>				
f	30' stream buffer delineation for blue line streams [as shown on latest <a href="#">UGSG 7.5 minute quadrangle</a> or published NRCS Soil Survey maps ( <a href="#">downloadable on the Buncombe County Stormwater website</a> )]. <sup>13</sup> No built-upon area <sup>14</sup> or SCMs located within buffer. No untreated water discharged in vegetated setback.				

7. STORMWATER CONVEYANCE		✓	N/A	✓	N/A
a	Location (with labels), size, and elevations/slopes of culverts and subsurface drainage conveyances on plans, consistent with calculations. Details provided for conveyance components.				
b	Location (with labels), dimensions, and lining for permanent swales on plans, consistent with calculations. Channel detail provided. <i>If temporary, biodegradable liner is required, calculations demonstrating that swales will be stable when fully vegetated without a liner.</i>				
c	Location (with labels), dimensions, and details for outlet protection and energy dissipators, consistent with calculations. <i>Note: Outlet protection shall be provided at any concentrated discharge point (including inlets to SCMs) if conveyance calculations indicate discharge to be erosive.</i>				
d	Drainage area delineation for pipes and channels				
e	Capacity calculations of culverts and storm sewers. <i>Note: Calcs should include drainage area, C factor, Tc, rainfall intensity 25Yr/24Hr per Erosion Control reqm'ts, pipe diameter, slope, Manning's n, total flow, and pipe capacity.</i>				
f	Capacity and stability calculations for permanent channels <i>Note: Capacity calcs should include drainage area, C factor, Tc, rainfall intensity 25Yr/24Hr per Erosion Control reqm'ts, channel dimensions, slope, Manning's n, total flow, and normal depth; Stability calcs should include permissible (with references support) and actual velocities or shear stress. If temporary liner is proposed, calculations for permanent condition demonstrating stability must also be provided.</i>				

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<b>7. STORMWATER CONVEYANCE (cont.)</b>		✓	N/A	✓	N/A
g	Design calculations of energy dissipators ( <i>diameters, apron dimensions, and stone size, etc.</i> ) (25Yr/24Hr per Erosion Control reqm'ts) <sup>15</sup>				
h	10' undisturbed vegetated buffer between concentrated stormwater discharges and property line (per Erosion Control reqm'ts)				
<b>8. GENERAL MDC FOR ALL SCMS</b>		✓	N/A	✓	N/A
a	Side slopes no greater than 3:1, if vegetated.				
b	Overflow or bypass provided for excess flows.				
c	Method of dewatering noted in narrative, if standing water present.				
<b>9. OPERATION AND MAINTENANCE MANUAL</b>		✓	N/A	✓	N/A
a	Brief narrative describing the overall project and each component of the stormwater system, including collection system				
b	Inspection requirements				
c	Operation & maintenance required for each SCM (follow <a href="#">NCDEQ Stormwater Design Manual</a> ) and conveyance system components. ( <i>Note: The NCDEQ O&amp;M EZ Form can be used to generate SCM-specific O&amp;M requirements. Please be sure to use the latest version of this form. Checking for and repairing erosion in swales/outlet protection should be included.</i> )				
d	Outline steps needed to restore measures in the event of a failure				
e	Anticipated maintenance budget (line item level) for 20 years				
<b>10. OPERATION &amp; MAINTENANCE AGREEMENT</b>		✓	N/A	✓	N/A
a	Draft Agreement <i>Note: The <a href="#">standard template</a> may be used, and deed book and page reference should cover entire area covered by the permit. O&amp;M Agreement must be recorded after stormwater plan approval, prior to issuance of a building permit or approval of a final plat.</i>				
<b>11. EXTERNAL APPROVALS</b>		✓	N/A	✓	N/A
a	Required Army Corps 404 permit and Water Quality 401 certification if impacting jurisdictional surface waters				
b	Approval from NCDOT or incorporated municipality if stormwater infrastructure is proposed in public right-of-way				
c	Documentation of easements for proposed stormwater infrastructure off-site not located in public right-of-way				
<b>12. PERFORMANCE SECURITY</b>		✓	N/A	✓	N/A
a	Estimated cost of permanent stormwater measures, itemized into unit cost and quantity, incl. 25% contingency per Ordinance. Costs must be reasonable current construction costs. <i>Note: Performance Surety Bond, (Cash, Letter of Credit, Collateral Assignment of CD, Insurance Surety) provided after plan approval.</i>				

**SCM Specific Checklists continue on next page**

**SCM Specific Checklists – ONLY applicable checklists need to be filled out. OTHERS MAY REMAIN BLANK.**

<b>13. SCM-SPECIFIC: INFILTRATION SYSTEM</b>		✓	N/A	✓	N/A
a	Results of a site-specific soil investigation at the proposed location and elevation of the infiltration system provided, noting hydraulic properties and characteristics <sup>16</sup>				
b	Documentation of minimum of 2' separation from the seasonal high-water table (SHWT). <i>Note: May be reduced to one foot if additional requirements are met: See <a href="#">Section C-1 NCDEQ Stormwater Design Manual</a></i>				
c	Soil Subgrade less than or equal to 2% <i>Note: Can use terraces and baffles to achieve this.</i>				
d	Pretreatment provided to prevent clogging, per Infiltration MDC 4				
e	Calculations provided demonstrating ability to dewater design volume within 72 hours or less.				
f	Observation port provided for underground infiltration devices.				

<b>14. SCM-SPECIFIC: BIORETENTION CELL</b>		✓	N/A	✓	N/A
a	Documentation of 2' separation from SHWT provided. <i>Note: May be reduce to one foot if additional requirements are met, see <a href="#">Section C-2 NCDEQ Stormwater Design Manual</a>.</i>				
b	Ponding depth for design volume calculation no greater than 12" above planting surface. Ponding depth for peak flow attenuation no greater than 24" and peak flow attenuation outlet no more than 18" above planting surface. Detail shows ponding depths, and is consistent with calculations.				
c	Underdrain with internal water storage (IWS) provided. Top of IWS zone minimum of 18" below planting surface. Underdrains orientation and cleanout (CO) locations (with callout) shown on plans. Minimum one CO on each underdrain line. Detail shows IWS elevation and cleanout with cap. <i>Note: Underdrains not needed if soil infiltration rate is &gt;2"/hr with additional documentation needs. See <a href="#">Section C-2 NCDEQ Stormwater Design Manual</a> If IWS is required, void space below IWS elevation may not be used in hydrologic calculations.</i>				
d	Media depth at least 36" if shrubs and trees proposed. If no shrubs and trees, minimum 24" depth if IWS not required, or 30" if IWS required. Shown on plan detail.				
e	Bioretention detail includes: Media mix matching requirement from Bioretention MDC 6 (including sand specification), media P-Index less than 50, and statement that no mechanical compaction of the media will occur.				
f	Vegetation noted as sod (non-clumping, deep rooted species, not grown in clay soil) or planting plan provided demonstrating 75% plant cover and less than 50% tree/shrub canopy 5 years after planting. If not sod, mulch specified on detail to be triple shredded hardwood 2-4" deep.				
g	If underdrain has a flow control orifice, calculations indicating that bioretention cell will draw down at a rate of 1"/hr must be provided.				

<b>15. SCM-SPECIFIC: WET POND</b>		✓	N/A	✓	N/A
a	Main pool sized using Hydraulic Retention Time Method or the SA/DA and Average Depth Method, calcs provided				
b	Average main pool depth 3'-8' below permanent pool elevation, calcs provided				
c	At least 6" sediment storage provided in forebay and main pool, excluded from volume/dept calculations above				
d	Location of inlet and outlet avoids short circuiting				
e	Forebay volume 15-20% main pool volume, calcs provided; forebay entrance deeper than forebay exit; water flowing over or through structure to main pool at non-erosive velocity				
f	6' vegetated shelf with max 6:1 slope provided; Planted with at least 3 diverse species of herbaceous, native vegetation at least 50 plants per 200 SF				

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15. SCM-SPECIFIC: WET POND (continued)		✓	N/A	✓	N/A
g	Design volume drawdown time 2-5 days between temporary pool and permanent pool elevation; calcs provided				
h	If fountains proposed, documentation provided demonstrating they will not suspend sediment or cause erosion				
i	Trash rack provided to prevent large debris from entering outlet system				
j	Dam structure slopes called out to be vegetated with non-clumping turf grass; no trees or woody shrubs proposed				

16. SCM-SPECIFIC: STORMWATER WETLAND		✓	N/A	✓	N/A
a	Ponding depth for design volume max 15" above permanent pool; peak flow attenuation ponding may be higher				
b	Note that soil pH, compaction, and other attributes of the first 12" depth of the soil shall be adjusted if necessary to promote plant establishment and growth				
c	Inlet and outlet location avoid short circuiting				
d	Forebay volume 10-15% wetland surface area, calcs provided; depth 24-40" below permanent pool elevation; forebay entrance deeper than exit.				
e	5-15% wetland surface area are deep pools with depth at least 18" (deepest point) below permanent pool elevation, including adjacent to outlet structure; calcs provided				
f	35-45% wetland surface area is shallow water zone with depth 0-9" below permanent pool elevation; calcs provided				
g	30-45% wetland surface area is temporary inundation zone 0-15" above permanent pool elevation; calcs provided				
h	Design volume draws down to permanent pool elevation in 2-5 days, calcs provided				
i	Landscaping plan showing delineation of planting zones, plan layout with species names and locations, and total number and sizes of all plant species; No cattails.				
j	Shallow Water Plantings: min. 3 diverse species of herbaceous, native vegetation, at a minimum spacing of 50 plants per 200 square feet				
k	Temporary Inundation Zone Plantings: either a) min. 3 diverse species of herbaceous, native vegetation at a density of at least 50 plants per 200 square feet OR b) min. 8 shrubs per 200 square feet OR c) min. one tree and min. 40 grass-like herbaceous plants per 100 square feet				
l	Non-clumping turf grass called out for dam structure and perimeter fill slopes; no trees or woody shrubs.				
m	Trash rack provided on piped outlet structure				

17. SCM-SPECIFIC: PERMEABLE PAVEMENT		✓	N/A	✓	N/A
a	If not counted as BUA, designed to infiltrating pavement standards				
b	Infiltrating Pavement Only: Results of a site-specific soil investigation at the proposed location and elevation of the pavement provided, noting hydraulic properties and characteristics				
c	Documentation of separation from SHWT provided: Infiltrating systems - 2'. <i>Note: May be reduce to one foot if additional requirements are met, see <a href="#">Section C-5 NCDEQ Stormwater Design Manual</a>; Detention systems – 1'</i>				
d	Not located where toxic pollutants are stored or handled				
e	Soil Subgrade less than or equal to 2% <i>Note: Can use terraces and baffles to achieve this.</i>				
f	Washed stone aggregate base material specified				
g	Pavement surface infiltration rate of at least 50"/hr with head ≤ 4"; technical documentation provided				

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17. SCM-SPECIFIC: PERMEABLE PAVEMENT (continued)		✓	N/A	✓	N/A
h	Maximum 1:1 ratio of additional BUA draining to permeable pavement; screened rooftop runoff excluded from this ratio				
i	Runoff from adjacent pervious areas prevented from reaching permeable pavement; incidental, unavoidable runoff from stable vegetated areas allowed.				
j	Infiltrating Systems Only: Calculations provided demonstrating ability to dewater design volume within 72 hours or less.				
k	Capped observation well placed at the low point of system; if terraced, one for each terrace				
l	Detention Systems Only: Drawdown of design volume in 2-5 days; calcs provided				
m	Permeable interlocking concrete pavers and grid pavers only: Edge restraints provided				
n	Infiltrating Systems Only: Note on plans to only grade when soils are dry				
o	Note on plans to protect from sediment deposition. Documentation of in-situ infiltration permeability test required after site stabilization.				

18. SCM-SPECIFIC: SAND FILTER		✓	N/A	✓	N/A
a	Documentation of separation from SHWT: open-bottom designs - 2'; closed bottom designs - 1'. <i>Note: May be reduced if additional requirements are met, see <a href="#">Section C-6 NCDEQ Stormwater Design Manual</a></i>				
b	Sediment chamber and sand chamber provided; storage volume equivalent for design volume calculations; sediment chamber may be oversized for peak flow attenuation; calcs provided				
c	Volume of water stored in sediment chamber and sand chamber above sand surface is 0.75 times treatment volume; elevation of bypass device set above ponding depth associated with this volume.				
d	Ponding depth to bypass device is less than 6'				
e	Designed to evenly distribute flow over surface of sand chamber				
f	Sand specified to be ASTM C33 or equivalent				
g	Filter bed depth at least 18"; sand depth above underdrain pipe at least 12"				
h	Capped cleanout provided at low point of each underdrain line.				
i	If underdrain is capped with an orifice control, calculations indicating that the sand filter can still drawdown at a rate of 2"/hr must be provided, or the WQV discount must be removed from the WQV calculations.				

19. SCM-SPECIFIC: RAINWATER HARVESTING		✓	N/A	✓	N/A
a	Designed with a collection system, a pre-treatment device to minimize gross and coarse solids collection in the tank, a cistern or other storage device, an overflow, and a distribution system.				
b	Captured water demonstrated to have a water demand (usage, type, volume, frequency, and seasonality established and justified) or discharge via passive drawdown to a vegetated infiltration area or another SCM				
c	Primary SCM Use Only: 85% of total annual runoff volume captured and discharged via water demand or passive drawdown; water balance calculations provided using NCSU Rainwater Harvester model or other continuous-simulation hydrologic model (additional requirements for this, see <a href="#">Section C-7 NCDEQ Stormwater Design Manual</a> )				
d	Protocol for testing functionality of the distribution system upon completion of the initial system and upon additions to the existing system				
e	Outlets called out to be labeled as "Non-Potable Water"; Passive drawdown devices marked with identifying signage or labels				



20. SCM-SPECIFIC: GREEN ROOF (secondary SCM)		✓	N/A	✓	N/A
a	Maximum organic fraction of media 10% by volume; media specs provided				
b	Design volume equal to media depth times plant available water; max rainfall depth 1.5"; data and calculations provided				
c	Min. media depth 4" without irrigation, and 3" with irrigation; if irrigation provided, irrigation plan included in O&M Manual				
d	Planting plan provided; designed to achieve 75% vegetative cover within 2 years				
e	Slope less than 8% unless container system designed				

21. SCM-SPECIFIC: LEVEL SPREADER-FILTER STRIP (secondary SCM)		✓	N/A	✓	N/A
a	Sized based on 0.75"/hr rainfall if receiving flow from drainage area; Sized based on draw down rate of design volume of SCM; Length of 10' per 1 cfs flow; flow bypass for larger storms if LS/FS is not sized to handle 10-year storm <i>Note: This is for water quality LS/FS only. Outlet protection LS must be designed to convey the 25-year storm at a non-erosive velocity per the erosion control requirements.</i>				
b	Blind swale provided immediately upslope of LS, designed to provide uniform overtopping of LS				
c	Lip of LS provides uniform elevation with construction tolerance of $\pm 0.25$ " at any point along length; constructed of concrete or other stable material				
d	Straight or convex in plan view				
e	1-3" drop followed by transition zone protected from erosion via aggregate or high performance turf reinforcement matting; 12" wide				
f	Minimum width of filter strip 30'; measured perpendicular to the level spreader lip; uniform transverse slope of 8" or less without draws or channels; plans note pH, compaction, and other attributes of first 12" of soil shall be adjusted as necessary to promote plant establishment and growth; specified to be planted with non-clumping, deep-rooted grass sod <sup>17</sup>				

22. SCM-SPECIFIC: DISCONNECTED IMPERVIOUS SURFACE (secondary SCM)		✓	N/A	✓	N/A
a	<b>For disconnected roofs:</b> max 500sf of roof area draining to each disconnected downspout; receiving vegetated area rectangular in shape with min. length in direction of flow 0.04x area of roof and min. width of 0.5x length; downspout discharges in center of upslope end of receiving area; downspout equipped with splash pad; no BUA in receiving area				
b	<b>For disconnected pavement:</b> length of pavement draining to veg. receiving area max. 100' in direction of flow; length of receiving area min. 10' in direction of flow; no BUA in receiving area except incidental areas such as utility boxes, signs, lamp posts				
c	<b>For all vegetated receiving areas:</b> uniform transverse slope max. 8% (except in Hydrologic Soil Group A soils – max. 15%); planted with non-clumping, deep-rooted grass species				

23. SCM-SPECIFIC: TREATMENT SWALE (secondary SCM)		✓	N/A	✓	N/A
a	Swale not excavated below SHWT				
b	Trapezoidal cross-section; bottom width max. 6'; side slopes < 3:1				
c	Longitudinal slope max. 7%; calculations demonstrating <6" depth and min. 4-minute hydraulic retention time for 0.75"/hr storm				
d	Non-clumping and deep-rooted grass species specified; able to withstand velocity of 4ft/s; managed at average 6"; not to be cut lower than 4"				
e	Calculations demonstrating non-erosive for 25-year storm (Erosion Control Req.)				



<b>24. SCM-SPECIFIC: DRY POND (secondary SCM)</b>		✓	N/A	✓	N/A
a	Documentation of lowest point min. 6" above SHWT				
b	Depth of temporary pool max. 10'				
c	Bottom of dry pond graded uniformly to flow toward outlet structure without low or high spots, other than an optional low flow channel				
d	Inlet(s) and outlet located to avoid short-circuiting				
e	Pretreatment devices, such as gravel verges, filter strips, grass swales, or forebays, provided to settle sediment and prevent erosion				
f	Calculations demonstrating design volume draw down between 2 and 5 days <i>Note: min. 2 day not required for dry ponds in low-density developments for peak flow attenuation.</i>				
g	Includes small permanent pool near outlet orifice to reduce clogging and keep away floating debris; screen or other device to prevent large debris from entering outlet structure ( <i>including orifices and bypass openings</i> ); detail provided				
h	Dam structure, including front and back embankment slopes, to be planted with non-clumping turf grass; trees and woody shrubs not allowed; Noted on plans				

<b>24. SCM-SPECIFIC: PIPE STORAGE (not a water quality SCM)</b>		✓	N/A	✓	N/A
a	Documentation of lowest point min. 6" above SHWT				
b	Outlet device is designed to prevent clogging and has orifice protection, if orifice is proposed				

<b>25. SCM-SPECIFIC: STORMFILTER</b>		✓	N/A	✓	N/A
a	System sized in conjunction with upstream closed detention to provide capture and treatment of 75% of the first 1" of rainfall; no upstream open retention or upstream infiltration; treatment directed to the cartridges				
b	Media flow rate 1 gpm/sf of media surface				
c	System Pretreatment Credit 30%, if system includes minimum sediment sump with dimensions min. 4' diameter by 2' depth				
d	Perlite media specified				
e	Maintenance specified to be performed per Contech Operations and Maintenance instructions by Certified Maintenance Providers – included in O&M Manual				

<b>26. SCM-SPECIFIC: SILVA SUSPENDED PAVEMENT WITH BIORETENTION</b>		✓	N/A	✓	N/A
a	BUA fraction of contributing drainage area min. 75%				
b	Lowest point of Silva Cell system min. 2' above SHWT <sup>18</sup>				
c	Inlet protection pretreatment provided, such as Trashguard, catch basin insert, grate, or linear radial screens; pretreatment measures designed for access by typical methods and equipment				
d	Design volume calculations: Storage up to 6" above filter media surface and within aggregate layers up to 12" above Silva Cell decks; total depth of storage above top of filter media surface max. 18"				
e	Surface area of Silva Cell system equal to design volume divided by effective storage depth				
f	Influent stormwater evenly distributed over media surface via distribution pipes from tree wells or catch basins, or via direct infiltration through a permeable pavement				
g	Underdrain with internal water storage installed; IWS min. 18" below subgrade surface				
h	Specified tree plantings specified, and consider eco-regional location, hardiness under wet conditions, and suitability in urban environment				
i	Media depth min. 25"				

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<b>26. SCM-SPECIFIC: SILVA SUSPENDED PAVEMENT WITH BIORETENTION (cont.)</b>		✓	N/A	✓	N/A
j	Media specified to be a homogeneous soil mix with approx. 75-85% medium to coarse washed sand, 10% fines, and 5-10% organic matter; media P-index max. 50; media specified to not be mechanically compacted				
k	Aggregates used above Silva Cell decks as bedding, base, or sub-base layers specified to be double washed and free of fine particles and debris at installation				
l	Media to be maintained to allow at least 1"/hr drawdown at planting surface; at least two inspection ports and monitoring wells installed to measure internal drawdown rates and inspect soil media for sufficient drawdown/function				
m	Min. one clean-out pipe provided on each underdrain line and distribution line (if included in design); all clean-out pipes to be capped				
n	Catch basin or overflow inlet to be used downslope of any inlets in the right-of-way to ensure bypass or overflows will not create flooding				
o	Maintenance specified to be performed per the Silva Cell Operation and Maintenance Manual				

<b>27. SCM-SPECIFIC: FILTERRA</b>		✓	N/A	✓	N/A
a	System size based on providing treatment of 1" design water quality volume				
b	Ponding depth for design water quality volume 9" above media layer for standard designs				
c	For units up to 48sf in media surface area, 4" underdrain connected; for larger surface areas up to maximum standard sizes, 6" underdrain connected				
d	Standard Filterra media depth 21" <sup>19</sup> , mulch depth 3"				
e	Planting specified to be provided by Contech Engineered Solutions				
f	System configuration selected appropriately to meet site needs				
g	Designed in offline configuration, or contains internal bypass systems provided by Contech				
h	Project activation to be provided by Contech; operations and maintenance to be carried out per Contech Operations and Maintenance Manual				

<b>28. SCM-SPECIFIC: BAYFILTER</b>		✓	N/A	✓	N/A
a	Calculations for flow rate or volume based sizing provided. Flow rate - System size calculated using flow rate created by water quality storm event (1") divided by total inflow area; Volume based - if using upstream retention/detention, storage system and filter sized to capture and treat 75% of first 1" of rainfall				
b	Media flow rate max. 0.5 gpm/sf of media surface area				
c	System Pretreatment Credit 30%, if system includes minimum sediment sump with dimensions min. 4' diameter by 2' depth				
d	Maintenance specified to be performed per BaySaver Operation and Maintenance Instructions and performed by Certified Maintenance Providers				

<b>29. SCM-SPECIFIC: PROPRIETARY SCMS - STORMTECH</b>		✓	N/A	✓	N/A
a	Manufacturer's details show isolator row features (e.g. filter fabric type and locations) for chambers used on project				
b	Plan features overall layout view showing configuration of StormTech system and connections between isolator row, inlet structure, and header manifold(s)				
c	Total number and type of chambers (incl. # isolator row chambers); details for headers, underdrains, section views, profile views included in plan; dimensions/elevations present on profile and plan views correspond to calculations				

d	Details for inlet and outlet structures with elevations that correspond to calculations, as applicable				
<b>CONTINUED ON NEXT PAGE</b>					
<b>29. SCM-SPECIFIC: PROPRIETARY SCMS – STORMTECH (continued)</b>		✓	N/A	✓	N/A
e	Locations and details for inspection ports as required on all chamber rows, both isolator rows and non-isolator rows				
f	Outlet orifice protection provided, unless there is no direct piped connection between inlet and outlet device (e.g. water flows through stone to get from inlet to outlet orifice)				
g	Bypass mechanism or description in narrative of how water will be conveyed from large storm events, if bypass not provided				
h	Construction bypass or other mechanism for keeping system offline during construction				
i	Stage/storage calculations or input to chamber wizard features of software package				
j	Calculations showing that the water quality volume will be treated by the isolator row before bypass occurs <sup>20</sup>				
k	Demonstrated drawdown of WQV within 5 days				
l	Calculations show peak influent flow rate for 1” rainfall event (OR 1-year, 24-hour storm) can be handled by isolator row (capacity of isolator rows using current standard design is 2.5gpm/sf) <sup>21</sup>				
n	Maintenance access provided for all isolator rows				
o	Documentation of lowest point min. 6” above SHWT				

<b>30. SCM-SPECIFIC: PROPRIETARY SCMS - OTHER<sup>22</sup></b>		✓	N/A	✓	N/A
a	Description of the proprietary SCM, including the physical, chemical, and biological treatment mechanisms employed.				
b	Expected treatment capabilities, including existing monitoring studies				
c	Description of any components that may contain nutrients or metals that might contribute to increased pollutant concentrations in the effluent.				
d	Typical design criteria used for proper siting, site preparation, design, and construction of the system, specifically including a description of any pretreatment requirements or recommendations, description of sizing methodology and technical design specifications based on a design maintenance frequency of no more than once a year; description of bypass provisions incorporated in the equipment or installation.				
e	Contact information for technical experts for the manufacturer of the proprietary SCM to whom questions can be directed.				
f	Details of the proprietary system components in plans				
g	Results of research studies conducted by independent entities, such as state universities or regulatory agencies, demonstrating technology meets TSS Removal Standards for Primary SCMs in <a href="#">Section F-1 of the NCDEQ Stormwater Design Manual</a> . See endnotes for more information required. <sup>23</sup> Contact information and credentials for entity conducting studies provided.				
h	Detailed maintenance schedule and procedures to ensure device meets stated TSS removal rates in perpetuity				

**NOTES**

<sup>1</sup> If built-upon area (BUA) is proposed off-site, please provide clarification in narrative about how ownership and maintenance of that BUA will be provided. The parcel on which the BUA is proposed may need to be included in the permit. Please contact the Stormwater Administrator for additional clarification if this applies to your project.

<sup>2</sup> Land disturbance should cover entire common plan of development, including full build-out of the development covered by the permit. Land disturbance includes the road/driveway/parking areas, buildings, septic area, demolition, utility connections, tree clearing, grubbing, grading, and construction staging and access.

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<sup>3</sup> Bioretention cells and infiltration systems are preferred SCMs for discharge to trout streams due their ability to reduce surface runoff temperatures. Dry ponds can be approved if detention time is reduced to the extent practicable (preferably discharging within 24 hours) and shade trees are provided where feasible (if discharge within 24 hours is not possible). If other SCM types are proposed discharging to trout streams, please contact the Stormwater Administrator for guidance on requirements.

<sup>4</sup> See 15A NCAC 2H .1003(1) for calculation options (also found in [Section E-1 of the NCDEQ Stormwater Design Manual](#)) To be considered existing, built-upon area must be built or have an established vested right prior to the adoption of the stormwater ordinance on September 27, 2006. If claiming existing BUA that is not shown on the 2006 Buncombe County aerial imagery, provide support of established vested right in application package. BUA which is demolished, and the site has been revegetated, outside the scope of the common plan of development is no longer considered existing.

<sup>5</sup> If there is an existing low-density stormwater permit on the PIN, the low-density phase of the development must remain low-density, and calculations and/or narrative demonstrating this must be provided.

<sup>6</sup> Required for all projects, except single family home construction on a lot of record prior to September 27, 2006 resulting in total impervious area less than 15% on the lot. If this exception is met, please reach out to the Stormwater Administrator to confirm your project still needs a stormwater permit prior to submitting.

<sup>7</sup> Stormwater runoff shifting is evaluated based on drainage area shifting at each discharge point from the site. Shifts of less than 2% of the total drainage area at the discharge point from the site or 0.1 acres, whichever is greater, are considered negligible and are therefore approvable.

<sup>8</sup> Projects can elect to meet low-density water quality standards if the project has a density of less than two dwelling units per acre or less than 24% impervious. Projects that meet the density thresholds to qualify for low-density water quality standards, but cannot meet the low-density standards in the project design can elect to meet high density standards instead. If this option is selection, please clarify this in the narrative. Water quality standards not required for projects with less than one acre of disturbance; however, if greater than one acre of disturbance occurs (including in common plan of development), retrofitting for water quality standards may be required.

<sup>9</sup> If 3:1 side slopes cannot be accommodated, calculations and results of an on-site soil investigation can be provided demonstrating that the soils and vegetation will remain stable in perpetuity. It is recommended to contact the Stormwater Administrator to determine specific requirements for this prior to submittal. If riprap is proposed, support demonstrating that turf reinforcement is not a viable option to provide vegetated channels.

<sup>10</sup> If streams are not shown to their full extents as shown on the maps listed, documentation of jurisdictional determination from USACE or stream origin determination from NCDEQ required showing that limits of jurisdictional streams on-site match plans.

<sup>11</sup> Water quality standards not required for projects with less than one acre of disturbance; however, if greater than one acre of disturbance occurs (including in common plan of development), retrofitting for water quality standards may be required.

<sup>12</sup> Net added impervious area is required to be treated in a primary SCM to the maximum extent practical. There may be areas where impervious area cannot be captured (typically at entrances). If this area must be captured for net added impervious compliance, but cannot feasibly be captured due to site constraints, the net added impervious area for this 'bypass' may be added to the design volume calculations of another SCM on the site. Please clarify how this is accounted for in the narrative.

<sup>13</sup> If streams are not shown to their full extents as shown on the maps listed, documentation of jurisdictional determination from USACE or stream origin determination from NCDEQ required showing that limits of jurisdictional streams on-site match plans.

<sup>14</sup> There are limited exceptions to this. See Section [A-9 of the NCDEQ Stormwater Design Manual](#). Buncombe County follows the NCDEQ definition of BUA. See Section [A-4 of the NCDEQ Stormwater Design Manual](#).

<sup>15</sup> If outlet protection dimensions are determined using the NCDEQ Erosion Control Manual Figure 8.06a or 8.06b, confirmation that outlets can be installed level (zero % slope) for length  $L_a$  is required and should be noted on the detail, and curves cannot be extrapolated. NYDOT outlet protection method is intended for discharge to defined channels and should not be used for calculations for discharge to flat areas.

<sup>16</sup> Infiltration systems designed for meeting water quantity requirements for low-density developments can use low end of NRCS Soil Survey infiltration rate for location of SCM in lieu of this requirement.

<sup>17</sup> Only applicable for water quality filter strips, not outlet protection filter strips

<sup>18</sup> The separation may be reduced to no less than 1' if the applicant provides a hydrogeologic evaluation prepared by a licensed professional.

<sup>19</sup> Shallower depths may be allowed under special circumstances.

<sup>20</sup> If SCS method using the 1" storm is the calculation method used for this, runoff from directly connected built-upon area must be calculated separately from the remainder of the project and added together, per Section B of the NCDEQ Stormwater Design Manual. This also applies when hydrograph software is used to route the 1" storm through the SCM.

<sup>21</sup> Calculations for the 1-year, 24 hour storm required if flow above the water quality volume must pass through the isolator row to enter detention (e.g. no by-pass provided).

<sup>22</sup> Approval of proprietary SCMs is made on a case-by-case basis, and is not guaranteed. Due to the increased review requirements and intensity for proprietary SCMs, review times may be delayed.

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<sup>23</sup> Includes descriptions of the research sites and their HSG and quality assurance plans utilized. Studies must have been conducted on at least two sites, one of which is located in NC. Studies must have sampled performance for at least 15 storm events over one year, which at least 3 events in each season, each with a min. of 0.10 inches. Full storm hydrograph flow-weighted composite sampling of both influent and effluent monitored. Median influent TSS between 50-150 mg/L. 70% or more of hydrograph's volume represented by sample collection for each storm event. Quality Assurance Plan information provided and entity conducting research certifies it was followed. Report includes raw water quality data; summary of water quality data and removal calculations; influent and effluent volume data from each discrete storm event; storm event information, including storm depth, date, duration, antecedent period, peak 5-minute rainfall intensity; summary and interpretation of monitoring results; statistical analysis of the monitoring data; proposed runoff volume reduction rates; and proposed minimum design criteria.