

Date Received: _____ CRH Plan Review # _____

STORMWATER MANAGEMENT AND EROSION CONTROL CHECKLIST

This checklist applies to the civil/construction plans for all land disturbing plans and projects (whether more or less than one acre) *except for building permit applications for individual single-family residences (See the Stormwater Erosion Control Single Family form).*

Project Name: _____

Address of Project: _____

Parcel Number(s): _____ Total Acreage: _____ Disturbed Acreage: _____

Site Owner/Developer: _____ Phone: _____

Contact Person: _____ Phone: _____ Fax: _____

Contact Mailing Address: _____

E-mail Address: _____

Instructions

A signed "Stormwater Management and Erosion Control Checklist" shall be submitted with all plans. All information is to be placed on the plan and/or included in the Stormwater Report, as applicable. Mark as "n/a" if information does not apply to the site.

GENERAL INFORMATION

- Date and title of plan
- Vicinity map at scale not less than 1"= 1 mile
- Streets and property uses adjacent to the site
- North arrow (all plan sheets)
- Scale no more than 1" = 50' (graphic and numeric)
- Title of the plan
- Boundary lines of the site, where work will be performed including approximate acreage of site
- Add note: "Stormwater mitigation measures shall be implemented in accordance with City of Rock Hill Infrastructure requirements, for water quality and quantity, including temporary controls for the land disturbance phase and permanent measures for post-construction."
- Name and address of property owner, developer or petitioner; the individual responsible for satisfactory completion of work and Individual/Organization preparing plan with seal (include COA for firms).
- Tax map and parcel numbers.
- Time schedule and sequence of construction or phasing.
- Non-residential sites - the total area for each of the following shall be shown on the site plan and included in the SWPPP Report:

Type of Impervious Area	New (SF)	Existing (SF)
Roof		
Asphalt		
Concrete		
Other Hard Surface (gravel, etc.)		
Water Surface (wet pond)		

Total Site Area = _____ Acres

SCDHEC NOTICE OF INTENT (N.O.I) APPLICATION AND LAND DISTURBANCE FEES

- Disturbance less than one acre and not part of L.C.P. (Larger Common Plan) – Complete sections I, II, III, IVA, and VIB. No DHEC fee is required.
- Disturbance for one or more acres, or part of L.C.P. – Complete all sections. \$125.00 DHEC fee is required.
- City of Rock Hill Land Disturbance Fee - \$250 per disturbed acre rounded up to next whole number. (For example: 1.5 ac. of disturbance is equal to 2 x \$250.00 = \$500.00.) Make check payable to City of Rock Hill.

GENERAL SITE FEATURES

- Existing topography, with contour intervals of not greater than five (5) feet.
- Existing contours extending not less than twenty (20) feet outside of site boundary lines.
- Proposed contours of all disturbed areas.
- Grading limits (area of disturbance in acres) clearly delineated: include proposed lots, staging areas, stockpile waste/borrow areas, off-site improvements such as roadway, water, sewer, drainage or wetlands mitigation.
- Soil information (types, hydrologic group, special characteristics).
- Proposed improvements on the site (including any future development planned)
- Proposed and/or existing building(s) location with finished floor elevation(s)
- Proposed minimum finished floor elevation or minimum opening for structures/lots, with relevance to the following: FEMA FIRM Flood Hazard Area, Community Floodplain (locally identified flood-prone areas outside of FIRM zone), Headwater condition or other hydraulically critical controlling features (based on 100-yr storm).
- Proposed and/or existing road(s) location with finished elevations (design curve data; if proposed)
- Borrow, stockpile, topsoil and/or waste areas shown on grading plan
- 100-year FEMA/FIRM flood hazard area and floodway, including elevations. Show limits on plan. Add note of reference for FIRM panel mapping and whether the flood hazard area and floodway impacts site.
- Adjoining lakes, streams, drainage ways, and any impaired waterbodies (identify tributary, etc.).
- Identify concentrated areas of stormwater inflow and adequate drainage outlet(s) for site.
- Area(s) designated for post-construction stormwater mitigation.
- Existing and proposed permanent easements for City maintained drainage systems.
- Existing and proposed permanent easements for privately maintained drainage systems (labeled as “private”).
- Minimum size easement is 20' (for all public easements), centered on facility (additional width may be required based on facility size and depth). Private easements may be reduced to a width of 10', pending facility size and prior approval of Development Services Engineer.

EROSION CONTROL & SEDIMENTOLOGY MEASURES

- Location of temporary and permanent vegetative and structural stormwater sediment control measures (include sediment ponds, silt fence, and construction entrance/exit, concrete truck wash out area, etc.).
- Construction drawings and details for temporary and permanent measures.
- Design calculations for sediment basins/traps and other erosion/sediment control measures.
- Sedimentology is required for sites disturbing one (1) acre or more. All BMP's shall meet a removal efficiency of 80% suspended solids or 0.5 ml/l peak settleable solids concentration, whichever is less.
- Analysis method for all temporary erosion control BMP's shall be SCS Type II 24-hr, 10-yr storm.
- 2 and 10-yr flow rates (disturbed condition) shall not exceed the pre-developed rate of restriction at all property line points of discharge.
- Pre-development curve numbers (CN) must reflect an undisturbed condition.
- Use minimum CN of 88 for disturbed conditions, or justify with calculations.
- Time of Concentration (Tc) limitations: sheet flow maximum flow length is 300' for pre-development and 50-100' for post-development; maximum shallow concentrated flow length is 100-300'.
- Sedimentology shall be based on eroded particle characteristics for a minimum 12" horizon depth.
- Sediment traps & basins, including skimmer type facilities, shall have a length equal 2X the width.
- Sediment Trap: Attach CRH Sediment Trap Check List.
- Sediment Basin: Attach CRH Sediment Basin Check List.
- Skimmer Basin: Attach CRH Skimmer Basin Checklist.
- Storm drain inlet protection, pre and post, including temporary measures for pre-final grade (weep/slot drains) and final grade (final asphalt lift)
- Maintenance schedule, requirements and responsible person(s) for temporary measures
- Soil Preparation Schedule
- Seeding Schedule

- Erosion Control Matting required on the back side of all detention/sediment basins (immediate and timely installation)
- Areas and acreage to be vegetatively stabilized
- Planned vegetation with details of plants, seed, mulch, fertilizer
- Specifications for permanent and temporary vegetation
- Method of soil preparation
- Specifications for seeding mixes and rates, type of sod, seedbed preparation, time and fertilizer applications, and mulching and related data
- ECB (erosion control blanket) Class A slope stabilization – max slope 2:1, temp. life span 1-3 yrs
- TRM (turf reinforced mat) Type 1 slope stabilization – max slope 2:1
- TRM Type 2 slope stabilization – max slope 1.5:1
- TRM Type 3 slope stabilization – max slope 1:1
- TRM Type 4 slope stabilization – 1:1 or greater

STORMWATER DETENTION FACILITIES GENERAL REQUIREMENTS

- Calculations shall be run for the 2, 10, 25, 50 and 100 year storms. The analysis method shall be based on the SCS 24-hr Type II storm. However, the SCS 6-hr storm distribution is recommended for drainage areas less than 50 acres.
- 24-hr distribution Intensity in inches: 2yr – 3.6; 10yr – 5.3; 25yr – 6.3; 50yr – 7.1; & 100yr – 7.9.
- 6-hr distribution Intensity in inches: 2yr – 2.5; 10yr – 3.7; 25yr – 4.4; 50yr – 4.9; & 100yr – 5.5.
- 2, 10 & *25yr flow rates for the post-development condition shall not exceed pre-development rates at all property line points of discharge. (* Required, if the downstream receiving system cannot adequately pass the 25-yr storm. Downstream improvements will be considered as an option in lieu of mitigating for the 25yr event, at the developer's expense.)
- Additional mitigation measures will be required when extra-ordinary known or identifiable downstream limiting conditions exist (as required by the CRH and/or determined by the design engineer).
- Evaluation of downstream capacity shall focus on known or identifiable restriction(s) and/or use the 10% rule (evaluation of point downstream where site area is equal to 10% of watershed).
- Pre-development and post-development volumes, velocities, and inflow/outflow hydrographs.
- Pre-development and post-development peak flow rates at all existing and proposed points of detention basin discharge, and property line point(s) of discharge, as applicable.
- Design calculations for outlet structure anti-floatation blocks.
- Time of concentration (Tc) limitations: sheet flow component maximum flow length shall be 300' for pre-development and 50-100' for post-development; maximum shallow concentrated flow length is 100-300' (calculations required).
- Basin minimum freeboard (100yr storm) - one foot below top of dam.
- Basin minimum freeboard for regulatory storm – 6" below emergency spillway (10 or 25yr storm).
- Design calculations and construction details of stormwater detention facilities. (Attach CRH Stormwater Mitigation Worksheet).
- Emergency spillway required for all basins constructed with a dam or berm (50yr storm capacity).
- Minimum dam/berm width for basins is 5 feet.
- Emergency outlet or spillway discharges into an adequately defined outlet.
- Note on the Grading & Drainage Plan: "Stormwater mitigation measures will be certified by the design engineer".
- Maintenance schedule, requirements and responsible person(s) for permanent measures (shown on plan and included in SWPPP Report).
- Permanent detention/WQ facilities, with a depth two feet or greater, shall be fenced (4' min. h.)

STORM DRAINAGE SYSTEM

- Design calculations and construction details for storm drainage system including culverts, ditches, swales, gutters, etc. (storm drain schedule should include pipe material, size, invert, slope, length, flow, capacity, velocity, & hw/d, inlet flow and capacity, runoff area, runoff coefficient)
- Design calculations, cross sections and method of stabilization of existing and proposed channels (include temporary linings)
- Design calculations and construction details of energy dissipation at critical points of hydraulic transition, such as culvert outlets, significant changes in grade, direction or flow velocity. (for rip-rap aprons, include stone sizes (diameter) and apron dimensions)

- The through drainage and private drainage system shall be sized to convey flows for the twenty-five (25) year storm.
- For drainage areas, 20 acres or less, the rational method applies and a frequency adjustment factor (Cf) of 1.1 shall be used.
- For drainage areas greater than 20 acres, the SCS 24 hour storm analysis is required.
- Roadway cross-drain culverts shall be sized in accordance with the following (Cf = frequency correction factor):
 - Residential & Collector Roads – 25yr Storm, Cf = 1.1
 - Thorough Fare – 50yr Storm, Cf = 1.2
 - Highway – 100yr Storm, Cf = 1.25
- Evaluation of downstream impact is required for upsizing of existing cross-drain culverts. Contact CRH Infrastructure Division for additional requirements.
- All storm drainage pipes located within rights-of-way or City easements shall be a minimum 18" inches in diameter.
- Headwater requirements for culverts are as follows:
 - Hw/d = 1.5 – pipe cross-section area of 30 sq ft, or less
 - Hw/d = 1.2 – pipe cross-section area greater than 30 sq ft
 - Contact CRH Infrastructure Division for exceptions to the above requirements
- Storm drainage system profiles are required for all public and private through drainage systems.
- Underground utilities shown and labeled in plan and profile.
- Drainage flow patterns identified with flow arrows for proposed and/or existing drainage ways.
- Reinforced concrete pipe is required in street rights-of-way or permanent City easements. Alternative pipe materials may be used in other areas, pending prior approval by the City.
- Details for all drainage structures should be shown on the plans. Catch basins can be either frame, grate and hood or SC DOT Type 16, 17, & 18.
- Minimum cover for Class III RCP is two feet and for Class IV RCP is one foot. Pipe cover is measured from the top of pipe to the "subgrade" of the pavement section.
- No open ditches in front yard of proposed residences. Drainage pipe should extend a minimum of thirty (30) feet from the rear of the house.
- Side slopes for ditches shall be no greater than two to one (2:1). Flatter side slopes are preferred. Calculations shall verify ditch capacity for flow and erodibility.
- Headwalls or flared end sections are required at inlets and outlets of all pipe systems.
- Maximum pipe length between drainage structures is 500 feet.
- Maximum depth of publically maintained drainage structures shall be 8 feet (where feasible)
- The minimum elevation drop across the invert of catch basins, manholes, junction boxes, etc. shall be 0.1 feet.
- All junction boxes, manholes, SC DOT Type 9 catch basins need to have manhole access (no blind structures).
- Minimum pipe slope is 0.5 percent (0.5' per 100 feet). If topography or existing limitations prevent the use of 0.5% slope, verify a minimum pipe scarring velocity of 2.5fps.
- Maximum pipe velocity at outfall is 10fps.
- Structures and materials shall comply with the City Standard Specifications and Details.
- Existing and proposed drainage patterns (include off-site areas that drain through project)
- Size and predominant land use of drainage areas (acreage)
- Plan indicating delineated drainage area (include off-site drainage)
- Size and location of existing and proposed drainage system, including culverts, ditches, & swales.
- Composite drainage areas delineated for each component of the drainage system.
- Roadway spread calcs are required at all catch basins and critical points. The max spread is 6' from edge of pavement. Calcs shall be based on 10-yr frequency (rational method) flow, 5 min. Tc.
- Minimum 20' storm drainage easement is required for all systems traversing across lots or conveying through drainage. Easements shall be labeled as private. Public easements will be required, at the discretion of the City.

POST CONSTRUCTION WATER QUALITY

- Water Quality (WQ) mitigation is required for all sites (80% TSS removal)
- Traditional retention/detention ponds shall mitigate the following volume of runoff for the entire area draining to pond, as follows: (1/2" x Area) for wet ponds and (1" x Area) for dry basins.
- WQ detention basin draw-down time shall be 24-hr minimum and 72-hr maximum. Note, draw-down time cannot be based on a routed 1/2" or 1" storm - separate calcs are required
- Detention pond WQ outlet devices must be factored into the overall pond outlet rating table configuration

- Combination Detention Pond & Sand Filter/Enhanced Dry Swale (rate based WQ measure): Attach appropriate Checklist
- Bio-Retention: Attach Bio-Retention Checklist
- Stormwater Wetlands: Attach Stormwater Wetlands Checklist
- Prefabricated Devices: Allowed on a case by case basis. Field and lab test documentation must be provided for verification of performance. Contact the City for pre-approval of all prefabricated devices.
- Details and calcs for all WQ BMP's.
- Anti-clogging measures required for all WQ basin outlets - less than 12" in diameter.
- Measures to protect permanent WQ BMP(s) from construction phase silt contamination
- Level Spreader & Vegetated Filter Strip: Attach CRH Level Spreader & Vegetated Filter Strip Design Checklist
- Sand Filter: Attach CRH Sand Filter Checklist
- Enhanced Dry Swales: Attach CRH Enhanced Dry Swale Design Checklist
- Infiltration Trench or Natural Infiltration Areas: Not Allowed (soil types found in this geographical region are not conducive to infiltration)
- Provisions for mosquito control required for all wet ponds. Acceptable measures are 6-8' of depth for most fishery requirements, fountain for adequate water movement, maintenance plan for seasonal stocking of appropriate "mosquito" fish measures, etc.
- WQ BMP's shall be located to mitigate runoff from their prescribed drainage area and not located "on-line" with the through drainage system.

STORMWATER REPORT (SWPPP)

- Stormwater or SWPPP Report (Storm Water Pollution Prevention Plan): Attach CRH Stormwater Mitigation Worksheet
- Table of Contents
- A complete Narrative with a description of the following: Site Location; Overall Watershed (river or creek basin, proximity to impaired stream, etc.); Project Scope; Terrain & Existing Conditions (topography relief, floodplain, soil types, etc.); Drainage Patterns & Receiving Waterway (property line points of discharge and reception); Downstream Conditions; Adjoining Land Conditions; Stormwater Mitigation Analysis (methods & applications used for detention, water quality, erosion control, drainage system, etc.); Summary of Impact (pre vs post for all storms with % increase or decrease at critical points of interest); Soil Types; and any other pertinent information.
- Supporting calculations for Erosion Control and Sedimentology Measures
- Supporting calculations for Stormwater Detention Facilities
- Supporting calculations for Post-Construction Water Quality
- Supporting calculations for Storm Drainage System (public & private)
- Supporting calculations for Vegetative Stabilization
- Maintenance Schedule & Requirements for Post-Construction BMP's
- Pre and Post-Development Drainage Maps
- Analysis Model Diagram (Flow Chart)
- Analysis Input Data (hydrology, outlet structure rating table, etc.)
- Construction Sequence
- Soils Map
- Location Map
- USGS Quad Map
- FEMA FIRMette Map
- 8-1/2x11 or 11x17 of Detention Basin Grading Plan
- 8-1/2x11 or 11x17 of Detention Basin Outlet Structure (with storm level elevations shown)
- Waters of the State (Delineation, Permits, etc.)
- Engineer's Seal & Signature
- Company Certificate of Authorization
- CRH Stormwater Mitigation Worksheet
- DHEC N.O.I. (copy)
- Stormwater Management & Erosion Control Checklist
- Stormwater Sediment Control Certification
- Stormwater Management Device Permanent Maintenance & Responsibility Agreement
- 8-1/2x11 or 11x17 map of all lots subject to Minimum First Floor Elevation (include elevation)
- Flood Study, if required

OTHER INFORMATION

- Four (4) copies of plans and one (1) copy of calculations are needed for initial review (see Civil Site Construction Plans Checklist).
 - o *Note: Five (5) copies of plans, a pdf copy of plans, an additional site plan, and one (1) copy of calculations are needed upon approval of plans.
- Completed Stormwater Sediment Control Certification
- Completed Stormwater Management Device Permanent Maintenance & Responsibility Agreement
- All necessary construction easements
- As-Built drawings (including digital copy), prior to plat approval & C.O.
- SCDHEC NPDES Permit
- Digital pdf copy of plans and calcs for final approval. Please add bookmarks with the sheet number to each page of your .pdf file.

Provisions of all required information are not a guarantee of approval. This list contains the minimum amount of information necessary for the review of a site development plan. The Approving Authority may reasonably require supplemental reports, data and additional information. If you have questions concerning this checklist please refer to the City of Rock Hill's Stormwater Management Design Manual (release date is pending) or contact the Planning and Development Department at (803) 329-5515.

APPLICANT'S CERTIFICATION

"I certify to the best of my knowledge that these plans contain all information required as referenced on this application."

Signature of Engineer: _____

Printed Name: _____

Address: _____

Phone Number: _____

Email: _____

(South Carolina Certificate of Authorization)

(Engineer's Seal & Signature)