Commercial Site Plan Design/Review Checklist

Project Name: _____

Date: _____ **Reviewed By:** _____

Check boxes ε **Y** = OK/Satisfactorily Addressed

N = Not Addressed or Not Addressed Satisfactorily

N/A = Not Applicable for referenced project

If required item is not addressed or not addressed satisfactorily, enter the plan sheet number on which the item should appear in the column **SHEET**.

Administrative items

Y	N	N/A	
			1. Stormwater Pollution Prevention Plan (SWPPP) included with plan submission
			2. Copy of the Board of Supervisors meeting minutes with zoning approval or a copy of Chesterfield Planning Commission final approval letter included with plan submission.
			3. An erosion and sediment control program administration fee must be included with the plan submission.
			4. A copy of this checklist (filled out in its entirety) must be included with the plan submission.

The plan cover sheet must show the following information:

Y	N	
		1. Full project name.
		2. Latitude and longitude for the project site (In decimal degrees to the fourth decimal place).
		3. Name of receiving channel/waters.
		4. VAHU6 four-digit watershed code.
		5. A north arrow.
		6. A vicinity/location map with existing road names
		7. Plan scale.
		8. The name, "walk-in address" and telephone number of the owner and developer.
		9. The most recent revision date.
		10. The magisterial district the county in which the project is located.
		11. Total on-site impervious area in square feet (excluding paving within the VDOT right-of-way and graveled areas) broken up by phases and parcels.
		12. Total area of impact within the RPA, in square feet.
		13. The plans must bear a signed original certification seal of a profession engineer, certified land surveyor, or architect. The certification seal of the professional engineer, certified land surveyor, or architect must be signed and dated. See Section 18 VAC 10-20-760, Paragraph B.1 of the Board for Architects, Professional Engineers, Land Surveyors, & Landscape Architects Rules and Regulations.
		14. For out-of-state owners, the name, "walk-in" address, and telephone number of a local registered agent representing the owner for service of process must be provided prior to issuance of a land disturbance permit.

Grading and Drainage

Y	N	N/A	Sheet/Comment	
				1. Existing and proposed grading contours must be provided on the plans and must have elevations clearly labeled.
				2. A drainage area map is required for all on-site and off-site drainage areas (Maximum scale of 1"=200'). Both existing and proposed contours are required.
				3. Proposed riprap-lined channels must specify a minimum of 24 inches of VDOT Class I riprap placed over a layer of filter cloth.
				4. In the absence of a detailed soils report, the maximum velocity allowable on bare earth is 3.5 ft/sec. Velocities between 3.5 ft/sec and 4.0 ft/sec require jute lining. Any velocities greater than 4.0 ft/sec require structural lining of either riprap or concrete.
				5. All roof water and downdrains must be collected and discharged in a non-erodible manner.
				6. A VDOT standard endwall is required on all multi-line structures, structures with diameters 30 inches and larger, and when the structure is proposed on a slope of 15% or greater.
				7. A benchmark location referenced to mean sea level must be clearly shown and labeled.

Grading and Drainage - Continued

Y	N	N/A	Sheet/Comment	
				8. The limits of the 100-year flood plain must be shown.
				9. In accordance with Chesterfield County's Flood Plain Management Ordinance, the proposed building must be floodproofed to an elevation equal to 1 foot above the base flood.
				10. Where floodproofing is required, a registered professional engineer or architect shall certify that the floodproofing methods are adequate to withstand the flood depths, pressures, velocities, impact, and uplift forces and other factors associated with the base flood prior to approval of the building permit by the Environmental Engineering Department.
				11. Calculations must be submitted to support the design of all proposed culverts, open ditches, drop inlets, and storm sewers on VDOT standard calculation sheets or other pre-approved methods.
				12. Hydraulic grade line calculations are required to support the design of all proposed storm sewers.
				13. Profiles must be shown for all proposed storm sewers and outfall channels to existing grade.
				14. All **existing** and **proposed** storm sewers, culverts, drop inlets and appurtenances must be assigned a structure number and listed in tabular form on the plan sheet on which they are located.
				15. Invert elevations must be shown for all drainage structures.
				16. The throat length for all curb drop inlets must be shown.
				17. Inlet shaping STD. IS-1 must be specified in the tabular drainage description for each manhole and drop inlet in which it was used in the hydraulic grade line calculations.
				18. Inlet shaping STD. IS-1 is restricted to pipe diameters of 30 inches or less and to situations where one pipe enters the chamber and one pipe exits the chamber. Storm sewers with pipe diameters of 30 inches and above shall qualify for the 50% reduction in junction losses only when pre-cast tees and elbows are used.
				19. A detail must be shown on the plans for inlet shaping STD. IS-1. If inlet shaping cannot be accomplished within the standard structure, then details must be provided for the modifications necessary to the structure to accomplish inlet shaping.
				20. A detail must be provided for any modified inlet/manhole storm structure.
				21. Steps STD. ST-1 must be specified in the tabular drainage description of any structure over 4 feet in height.
				22. Safety Slabs STD. SL-1 must be specified in the tabular drainage description of any structure over 12 feet in height.
				23. Boot connectors must be specified in the tabular drainage description for all plastic pipes that tie into a concrete structure.
				24. Ditches must be paved if the longitudinal slope is less than 0.75%.
				25. Ditches 3 feet in depth or more must be piped.
				26. Top of curb elevations must be shown at the nose of all radial curb and at all appreciable breaks in horizontal or vertical alignment.
				27. Dry gutter or CG-2 is required where runoff flows away from the face of curb. These areas must be cross-hatched and a detail provided on the plan for construction of dry gutter.
				28. The symbol used for dry gutter on the plan view must be shown adjacent to the detail for its construction.
				29. A detail must be shown on the plans which demonstrates the ability to obtain a minimum of 2 feet of horizontal backfill behind the curbing and drop inlets prior to beginning a backslope which cannot exceed 1.5:1 without encroaching onto any adjacent property. The detail must be to scale.
				30. The finished floor elevation of all building structures must be shown.
				31. All existing and proposed drainage easements must be shown.
				32. The deed book and page number of all existing drainage easements must be shown on the plan.
				33. Drainage easements must be shown along any storm-water conveyance system which receives runoff from offsite, from a public right of way or requires improvements on a downstream property owner. Any on site drainage easement must extend through the upstream property line.
				34. A separate plan sheet must be added which only shows all proposed easements and right of way to be dedicated. Metes and bounds must be provided.
				35. Ensure all proposed street names have been approved by the Richmond Regional Planning District Commission.
				36. If phasing is desired, phase lines must be shown and a phased erosion control plan and narrative must be provided.

Grading and Drainage - Continued

Y	N	N/A	Sheet/Comment	
				37. Bituminous curbing (STD. MC-3A) is required along the edge of pavement separating the different
				38. All areas of proposed pavement must be stippled.
				39. A pavement design cross-section is required to be shown on the plans.

				40. The radius of all radial curbing must be shown.
				41. Unless a VPDES permit is obtained from DEQ, the carwash must be connected to the sanitary sewer.
				42. Due to the high possibility for spills of oil, gas, anti-freeze, etc. associated with fueling islands, all drainage from the fueling area must drain to an oil-grit separator followed by a filtering system that is designed to remove petroleum products (such as StormFilter). Design calculations must be submitted and details provided on the plans for both the separator and the filter.
				43. The fuel pump area must be completely covered by a canopy. Stormwater runoff from the canopy must not drain into the fueling area.
				44. All pools must discharge into the sanitary sewer.
				45. Approval of the site plan by the private utility company in relation to its easement and facilities therein must be provided prior to site plan approval.
				46. A street sign fee of $150 per road intersection must be provided prior to issuance of a land disturbance permit.
				47. Streetlighting:
				A. Streetlights shall be provided at the developer's expense at any and all entrances and exits of commercial/industrial developments. Lighting shall be provided as specified in this paragraph
				B. In addition to the actual installation cost of any such lights or lights, the developer shall pay to the county an operational offset fee equivalent to the cost of five years operation and maintenance for each required streetlight installed based upon the supplying utility's monthly charge for same per light at the time of installation plus a $50 administration fee. Refer to the Streetlight Policy for acceptable lighting types/styles.
				C. Additional, non-required streetlights, beyond any specifically required in paragraph 44.a., above, shall be cost estimated, funded, and operated at developer expense. Non-required lighting shall be strictly limited to internal intersections where roads are identified as intended to be accepted into and maintain through the state secondary road system. Such non-required installations will not be considered for future inclusion into the county streetlight program.
				D. Payment of the operational offset fee, as described above, will be required at a time not later than plan approval. Payment for the costs of streetlight installation and the $50 administrative fee will be required at time of receipt of the project cost from the supplying utility.

Erosion Control

Y	N	N/A	Sheet/Comment	
				1. The erosion control plan and sequence/narrative must be divided into a minimum of two phases.
				A. Phase I shall show the minimal amount of clearing to include dimensions for construction of all perimeter-control devices, and strategically placed sediment traps and basins, associated diversions and diversion dikes, and spoil and borrow areas for the installation of erosion control measures. Phase I shall also show an appropriately sized staging/laydown area.
				B. Phase II will include all remaining clearing, grading, and installation of remaining erosion control devices, installation of temporary and permanent improvements, and temporary and permanent seeding and stabilization.
				2. If timbering is required on the project, it should be incorporated into the erosion control plan/narrative and should not begin until after the issuance of a land disturbance permit and the installation of the approved erosion control devices.
				3. A detailed sequence of construction is required which coordinates the installation and removal of the erosion and sediment control measures with construction of the remainder of the project.
				4. A note must be added to the construction sequence which requires the owner to give the county inspector 48 hours notification to schedule an on-site pre-construction meeting for the issuance of a land disturbance permit. This note should be the first step in the erosion control narrative/sequence of construction.
				5. A note must be added to the sequence of construction stating that the VSMP construction activity operator and the environmental inspector (or authorized representative) must attend the pre-construction meeting.

Erosion Control - Continued

Y	N	N/A	Sheet/Comment	
				6. A note must be added to the sequence of construction stating that the certified responsible land disturber (CRLD) must attend the pre-construction meeting.
				7. Steps must be included in the sequence of construction events for installation of storm sewer, drop inlets, inlet protection, curb & gutter, and building construction.
				8. Provisions must be made in the sequence of construction to allow all proposed sediment traps and basins to remain in place until all onsite contributing areas are stabilized.

				9. The sequence of construction and erosion control legend must be shown on the erosion control plan sheet(s).
				10. The construction entrance must be graphically shown on the plans and constructed as wide as the proposed permanent entrance.
				11. Erosion control measures must be provided for the project for the initial clearing, grubbing and grading operations. The drainage areas must be outlined for each phase and the sediment trapping facilities designed on the worst case scenario.
				12. The sediment basin(s) must be designed in accordance with Std. & Spec. 3.14 of the VESCH. Sediment basin design calculation sheets must be submitted with all design data addressed and shown on construction details included on the plans.
				13. The drainage area, spillway length, and dimensions necessary to achieve the required storage volumes in accordance with Std. & Spec. 3.13 must be shown. The elevations of the trap bottom, top of wet volume, top of dry volume, and top of embankment must be shown on the sediment trap detail.
				14. Specify if the length and width dimensions for the sediment trap(s) refer to the bottom or top of the excavated area.
				15. All the information necessary for construction of the sediment trap(s) must be shown on the sediment trap detail.
				16. Safety fence (Std. & Spec. 3.1) is required around all sediment traps and sediment basins.
				17. A minimum 10-foot break must be provided in the low area of the silt fence. The break must be backfilled with stone to within 1 foot of the top of the silt fence to serve as an overflow. A detail must be provided.
				18. In the absence of a detailed soils report, the maximum velocity allowable on bare earth is 3.5 ft/sec. velocities between 3.5 ft/sec and 4.0 ft/sec require a jute lining and any velocities greater than 4.0 ft/sec require a structural lining of either rip rap or concrete.
				19. The following note must be added to the erosion control plan: "All vegetative and structural erosion and sediment control practices will be constructed and maintained according to minimum standards and specifications of the Virginia Erosion and Sediment Control Handbook and Virginia Regulation 9VAC25-840-40. "
				20. All erosion and sediment control measures, Std. & Spec. numbers, details, and notes must be cross-referenced and must correlate with the 1992 edition of the Virginia Erosion and Sediment Control Handbook and Minimum Standards.
				21. Standard symbols must be used to represent erosion control measures on the plan. Please refer to the first page of the practice found in Chapter III of the Virginia Erosion and Sediment Control Handbook.
				22. A detail must be shown on the plans for each structural erosion control measure. Details can be found in Chapter III of the Virginia Erosion & Sediment Control Handbook.
				23. The following note must be added to the erosion control plan: "The contractor shall inspect all erosion control measures periodically and after each runoff producing rainfall event. Any necessary repairs or cleanup to maintain the effectiveness of the erosion control devices shall be made immediately. ”
				24. The following note must be added to the erosion control plan: "All disturbed areas are to drain to approved sediment control measures at all times during land disturbing activities and during site development until final stabilization is achieved."
				25. The following note must be added to the erosion control plan: "The contractor is responsible for the installation of any additional erosion control measures necessary to prevent erosion and sedimentation as determined by the Environmental Engineering Department."
				26. Erosion control Minimum Standard #1, found in the current edition of the Virginia Erosion and Sediment Control Handbook, must be added to the plans and all other notes which are in conflict must be adjusted or removed.

Erosion Control - Continued

Y	N	N/A	Sheet/Comment	
				27. Table 3.31-B and Table 3.32-D, found in the current edition of the Virginia Erosion and Sediment Control Handbook, must be provided on the erosion control plan sheets.
				28. The exact limits of land disturbance must be shown.
				29. For projects meeting VSMP Part IIC technical criteria, an MS-19 analysis must be performed at each point of concentrated discharge and at the downstream property line. The location of each analysis must be shown and labeled on the erosion control plan sheets.

				30. Culverts downstream of the detention basin must be analyzed for adequacy based on the 10-year storm. Existing inadequate culverts in county easements and under state roads into which a project drains must be enlarged or on site detention based on the ultimate development of the contributing watershed provided to achieve minimum 10-year performance of the pipe(s). A drainage area map must be provided for both onsite and offsite drainage areas.
				31. When using the modified rational method for approximating an outflow hydrograph, method “I” must be used instead of method “T”.
				32. Storms of multiple durations must be investigated to determine the maximum volume requirements. To use this method, leave the td field (storm duration) blank when entering data for the modified rational option.
				33. A temporary slope drain (Std. & Spec. 3.15) must be provided to convey runoff from the top of the finished slope to the bottom and then into a sediment trapping facility where fill sections are greater than 4 feet.
				34. Inlet protection (Std. & Spec. 3.7) is required for all drop inlets.
				35. The detail for curb inlet protection must be the one shown on Plate 3.7-8 of Std. & Spec. 3.7.
				36. The detail for grate inlet protection must be the one shown on Plate 3. 7-3 of Std. & Spec. 3.7.
				37. Notes a through e of Minimum Standard 16 must be provided on the plans.
				38. A detail must be shown which provides for placement of excavated trench material on the uphill side of the trench while silt fence and stockpiled materials are placed on the downstream side.
				39. Any off-site utility line(s) must be shown on the erosion control plan sheets with silt fence on the downstream side.
				40. Any soil stockpile area must be located on the plans. Silt fence must be provided around the perimeter.
				41. Blanket and matting must be specified on all Exposed slopes 3:1 or steeper that are 5 feet or greater in height.
				42. A 10-foot bench shall be provided every 15 vertical feet on side slopes 3:1 or steeper.
				43. Each sediment trap and sediment basin must be assigned an alpha or numeric designation and their installation sequence individually noted in the erosion control narrative.
				44. All silt must be cleaned from the sediment basin prior to conversion to the SWM/BMP. A note must be provided in the erosion control narrative.
				45. The following note(s) must be added to or adjacent to the sequence of construction if applicable to the project:
				A. All offsite drainage easements must be recorded prior to issuance of a land disturbance permit for this project.
				B. A quit claim, subordination of rights agreement or satisfactory commitment thereof by the private utility company for the location where rights-of-way will cross the private utility easement must be provided prior to issuance of a land disturbance permit for this project.
				C. A construction performance bond must be provided for the improvements within the proposed right-of-way prior to issuance of a land disturbance permit for this project.
				D. All onsite drainage easements including stormwater/BMP drainage easements must be recorded prior to issuance of a building permit for this project.
				E. Prior to issuance of a land disturbance permit, a surety for the construction of the permanent BMP must be posted with environmental engineering.
				F. The stormwater/BMP facility must be certified by a professional engineer prior to release of the BMP performance bond and issuance of any occupancy certificates.
				G. BMP certification documentation must include the following:
				1) As-built survey of the facility

Erosion Control - Continued

Y	N	N/A	Sheet/Comment	
				2) Certification form providing as-built elevations/dimensions of BMP elements (including, but not limited to: underdrains, gravel layer, media layer, mulch, outfall structure, gravel diaphragm, underground detention structures, etc. See Environmental Engineering webpage for downloadable PDF forms
				3) Certification form providing as-built volumes for stormwater quality and quantity (1-, 2-, 10-, and 100-year, as applicable
				4) Photographic documentation shall be provided which covers the BMP construction and installation process
				5) The certification documentation must be stamped and signed by a professional engineer, certified land surveyor, or architect

				H. A VDOT land use permit is required for this project prior to issuance of a land disturbance permit.
				I. At the time of the pre-construction meeting, two standard signs must be installed on each side of the construction access. These signs should state either “Construction Entrance Ahead” or “Trucks Entering Highway”.
				J. The riser and barrel pipe associated with the sediment basin must be on-site prior to issuance of a land disturbance permit.
				K. The limits of the RPA must be surveyed and flagged in the field with optic orange safety fence (Std. & Spec. 3.1 of the VESCH) prior to issuance of a land disturbance permit.

Chesapeake Bay Preservation Act/Virginia Stormwater Management Program Regulations

Y	N	N/A	Sheet/Comment	
				1. Show on the first sheet, using a highly visible note, how compliance with the Chesapeake Bay Preservation Ordinance (for part IIC projects) or the Virginia Stormwater Management Regulations (for part IIB projects) has been accomplished. The note must list the method of compliance to include the type(s) of BMP(s).
				2. If applicable, a resource protection area determination (RPAD) must be submitted to the Water Quality Section for review and/or approval prior to plan submission.
				3. A Stormwater compliance sheet(s) is required for projects utilizing part IIC of the current VSMP regulations. The following information is required to be shown on the sheet(s):
				A. The CBPA/MS-4 compliance table. (See Appendix I of the Chesapeake Bay Chapter in the Environmental Engineering Reference Manual)
				B. The BMP size, location, and grading plan (1” = 20’).
				C. BMP and outlet structure profile and details. The profile must specify the water quality, 2-, 10-, and 100-year water surface elevations with their respective volumes, if applicable.
				D. Details and specifications for manufactured BMPs.
				E. RPA/RMA limits and all non-tidal wetlands
				F. Area of the RMA (in acres)
				G. Percent impervious calculations/assumptions
				H. Incremental drainage areas to each BMP, the impervious area within each drainage area, and the percent impervious area of each BMP drainage area.
				I. Proposed easement locations.
				4. A stormwater compliance sheet(s) is required for projects utilizing part IIB of the current VSMP regulations. The following information is required to be shown on the sheet(s):
				A. The Stormwater Compliance and Stormwater Outfall tables for part IIB (available on the Environmental Engineering webpage under ”Document and Forms”).
				B. DEQ Virginia Runoff Reduction Method (VRRM) Spreadsheet showing compliance (locked, 2011 version from DEQ must be submitted)
				C. Energy Balance and outfall analysis for each outfall for the project.
				D. Delineation of the soil types (include hydrologic soil group) and the three land cover conditions (forested/open space, managed turf, impervious).
				E. Natural vegetated area easements for areas claimed as forested/open space in the VRRM spreadsheet that is not encompassed by a BMP easement, RPA, or within a Planning buffer/tree save area.

Chesapeake Bay Preservation Act/Virginia Stormwater Management Program Regulations - Continued

Y	N	N/A	Sheet/Comment	
				F. BMP size, location, and grading plan (1”=20’).
				G. BMP and outlet structure profile and details. The profile must specify the treatment volume, 1-year, 2- year, 10-year, and 100-year water surface elevations with their respective volumes.
				H. Details and specifications for manufactured BMPs.
				I. Incremental drainage areas to each BMP and the land cover types within each BMP drainage area.
				J. Drainage area map showing:
				1) The drainage area(s) to where the site outfall(s) meet energy balance for the channel protection analysis and where the site meets 10-year post to 10-year pre for flood protection.
				2) Where the site is 1% or less than the entire drainage area or;
				3) Where the unattenuated flow is 1% or less than the flow at that point or;

				4) Where the flow from the site and its downstream area reaches a natural stormwater conveyance system for the 2-year storm, and where the flow from the site and its downstream area reaches a documented floodplain (county or FEMA) for the 10-year storm.
				K. Provide channel and flood protection calculations.
				L. Proposed easement locations.
				M. All SWM/BMP areas that are to utilize runoff reduction in the design shall be protected from construction traffic for the duration of the project. If construction traffic is to impact the SWM/BMP area then compost amendments or underdrains shall be used. These areas shall be marked on the plans and in the field to prevent construction traffic impacts.
				5. DEQ non-proprietary BMP design specifications must be met for each non-proprietary BMP proposed with the project. Design specifications are found in the DEQ BMP Clearinghouse.
				6. If compliance with the Chesapeake Bay Act is through the overall impervious area being less than 16% of the site (for part IIC), a Temporary Reduced Imperviousness Best Management Practices easement agreement must be recorded which encompasses the entire pervious boundary used for CBPA compliance.
				7. Resource protection area (RPA) limits must be established from all perennial water bodies and the associated connected and contiguous wetlands.
				8. Please provide a letter from the recognized wetland expert regarding the accuracy of the wetlands delineation portrayed on the site plan that is the basis for the RPA limits establishment. Suggested wording is “I have viewed the site plan for _____ dated _____, 20__ by _____ and find that it portrays an accurate representation of my field delineation of the wetlands located adjacent to (creek name if known) _____. ”
				9. The required line type for RPA designation must include the letters “---RPA---RPA---“.
				10. The limits of the RPA must be shown on the grading plan sheets, the erosion control plan sheets, and the Chesapeake Bay Compliance sheet(s)/Stormwater compliance sheet(s).
				11. Signage must be provided for all RPA and Natural Vegetated Areas to remain or to be established. A sign detail must be provided.
				12. The erosion control and CBPA Compliance sheets must specify the placement of plastic optic orange safety fence (Std. & Spec. 3.1 of the VESCH) along the RPA limits. The limits of the RPA and placement of the safety fence shall be survey located.
				13. Vehicular safety measures are required along parking spaces and drive aisles adjacent to retention and detention facilities.
				14. All permitted utility line crossings within the RPA must minimize the amount of disturbance. Permanent easements must be seeded with the approved RPA native seeding mixtures and temporary clearing outside the permanent easement (but within the RPA limits) must be replanted with woody vegetation.
				15. All points of concentrated inflow to the SWM/BMP facility must tie into the basin at the normal water surface or below. If the outfall is submerged, a minimum of 3 feet is required between the invert of the inflow structure and the bottom of the basin.
				16. A standard ES-1 endsection or endwall is required for all pipes 30 inches or greater in diameter entering and exiting the SWM/BMP facility.
				17. The entire basin must be enclosed within an SWM/BMP easement which extends 8 feet beyond the 100-year WSE or downstream toe of dam, whichever applies.
				18. A minimum 20-foot wide access easement must be provided from the SWM/BMP easement to a public right-of-way for future maintenance.
				19. Metes and bounds must be provided on the plan sheet for SWM/BMP easements and access easements.

Chesapeake Bay Preservation Act/Virginia Stormwater Management Program Regulations - Continued

Y	N	N/A	Sheet/Comment	
				20. A minimum 12-foot wide ramp must be provided from the access gate to the bottom of the SWM/BMP facility. The slope cannot exceed 6:1.
				21. All SWM/BMP facilities which are 4 feet or less in depth and 1 acre-foot or less in surface area must provide a safety bench or be enclosed within a 6 foot high perimeter fence. A vegetative barrier may be substituted for the fence, however a performance bond must be provided for the cost and installation of the plant materials. A gate must also be provided which aligns with the 20-foot access easement.

				22. All SWM/BMP facilities which are more than 4 feet in depth or more than 1 acre-foot in surface area must provide both a safety bench and an aquatic bench, or be enclosed within a 6-foot high perimeter fence. A vegetative barrier may be substituted for the fence, however a performance bond must be provided for the cost and installation of the plant materials. A gate must also be provided which aligns with the 20-foot access easement.
				23. A 50-foot vegetative perimeter yard is required around the basin measured from the 100-year water surface elevation or the downstream toe of dam, whichever applies, between the basin and any residential parcel. This area must be included within the limits of the SWM/BMP easement.
				24. A profile view must be provided for the SWM/BMP facility which shows all the detail construction information which will be necessary for its future certification.
				25. The required storage volumes for water quality and water quantity must be shown on the profile view of the basin.
				26. The top of the dam for the BMP must be at least 8 feet wide. Dimension and label in the profile view.
				27. The 2-, 10-, and 100-year water surface elevations must be shown for all SWM/BMP facilities on the plan and profile views.
				28. A shallow marsh planting plan must accompany the BMP design. The required marsh volume is not included in the BMP volume. The types of wetland vegetation to be used must also be included. It is recommended that the wetlands bottom not be planted until the site is stabilized. At that time, the planting layout may be modified based on the “actual” water levels and bottom elevations. The water quality section must be involved in any layout modifications. (Part IIC criteria - Chesterfield County BMP Design 3 only)
				29. Perforations in the riser must be precast, not field made. A note must be provided on the riser detail.
				30. A minimum of 1 foot of freeboard is required between the top of the embankment and the staged 100-year water surface elevation if an emergency spillway is present. Two (2) feet of freeboard is required if there is no emergency spillway.
				31. The emergency spillway must be paved if it is used to convey any portion of the 10-year storm. If the emergency spillway is in "fill", then it must be paved to convey the 100-year storm.
				32. All barrel and riser assemblies must be "o-ring" concrete pipe, no smaller than 15 inches in diameter.
				33. A trash rack must be provided for the riser assembly. A detail is required.
				34. A detail must be provided on the plan showing the method of securing the metal trash rack/anti vortex device to the concrete riser pipe.
				35. The embankment must have an impermeable clay core keyed into the natural ground. Please show a detail.
				36. A gate valve (minimum 12” diameter) must be provided to facilitate draining the BMP for maintenance.
				37. The length to width ratio in BMP basins (water quality) shall be a minimum of 3:1. Calculations are required per the methodology outlined in Section 3.14 of the VESCH.
				38. Outlet protection must be provided in accordance with Std. & Spec. 3.18 for all pipes discharging into the SWM/BMP facility. A detail must be shown for keying Class I rip-rap into the ground at least 2 feet and placing it over filter cloth. Dimensions must be shown on the plan view.
				39. The use of a low flow concrete channel in a BMP cannot be approved. Please use EC-1 Type “A” at the outlet end of the inflow pipe. The invert out of the inflow pipe and the elevation of the first row of perforations in the riser should be at the same elevation.

Chesapeake Bay Preservation Act/Virginia Stormwater Management Program Regulations - Continued

Y	N	N/A	Sheet/Comment	
				40. The side slopes in SWM/BMP facilities shall be no steeper than 3:1. Label on the profile view.
				41. SWM/BMP facilities which are greater than 8 feet in depth must have a surface area of at least 1 acre. Water quality volumes for CBPA compliance applies only to those areas which are less than 8 feet in depth.
				42. Provisions must be made in the erosion control narrative for conversion of the sediment basin into a SWM/BMP facility after the upstream areas are fully stabilized. All existing silt must be removed from the basin.
				43. Several soil borings must be made within the limits of the infiltration trench (if proposed) to a depth of at least 5 feet below the bottom of the trench. A percolation test must be performed to determine if the infiltration rate of this soil is acceptable.

				44. A minimum of two observation wells are required for infiltration trenches.
				45. Provisions must be made in the erosion control narrative for the SWM/BMP facility to be observed by a professional engineer during construction. "As built" information will be required for future certification of the facility. Certification is required prior to release of the SWM/BMP performance bond and any certificate of occupancy.
				46. Condominium projects require a BMP maintenance fee of $250 per unit prior to issuance of a land disturbance permit.
				47. A copy of the permit from the Virginia DCR must be provided for any regulated dam/impounding structures (25 feet or greater in height, creating an impounding capacity of 15 acre-feet or greater, OR 6 feet or greater in height creating an impounding capacity of 50 acre-feet or greater).
				48. A dam failure analysis must be performed for the 100-year storm on any impounding structure upstream of residential properties.

Upper Swift Creek Watershed

Any project located within the Upper Swift Creek Watershed must also address the following requirements.

Y	N	N/A	Sheet/Comment	
				1. A BMP maintenance fee in the amount of $1,500 per impervious acre is required for commercial development. Payment must be received prior to issuance of a land disturbance permit.
				2. Condominium and apartment projects require a BMP maintenance fee of $100/unit. Payment must be received prior to issuance of a land disturbance permit.
				3. Redevelopment sites not currently served by water quality BMPs must reduce the level of phosphorus by at least 30% after redevelopment (with consideration of pervious and impervious land cover). Additional calculations may be required to determine equivalent load removal using VSMP Part IIB water quality criteria.
				4. Redevelopment sites currently served by a water quality BMP must reduce the post-development phosphorus level by at least 20% (with consideration of pervious and impervious land cover). Additional calculations may be required to determine equivalent load removal using VSMP Part IIB water quality criteria.
				5. Additional erosion control measures other than the Minimum Standards contained in the Virginia Erosion and Sediment Control Handbook will be required if it is determined that such measures are necessary for protection of sensitive environmental features and/or water resources.
				6. Enhanced perimeter protection measures are required (super silt fence, sediment basins and traps sized 25% larger than minimum standards, etc.)
				7. Any utility relocations must be incorporated into the erosion and sediment control plan and narrative.
				8. For sites over 5 acres of disturbance, a monthly erosion and sediment control report from the CRLD must be submitted to Environmental Engineering by the first of each month.
				9. All new construction and substantial improvements of nonresidential structures and accessory buildings shall be located outside the floodway fringe and shall be set back at least 25 feet horizontal distance from the outermost boundary of the base flood area, wetlands, Resource Protection Areas and 100-year floodplains where the contributing drainage area exceeds 100 acres, provided however, that when LID practices as determined by the director of Environmental Engineering are used adjacent to wetlands, floodplains, and Resource Protection Areas the setback may be reduced to 5 feet.
				10. An alternative means of defining pavement edges as determined by the director of environmental engineering may be substituted for curb and gutter when Low Impact Development practices are used.

Upper Swift Creek - Continued

Y	N	N/A	Sheet/Comment	
				11. The design and construction of the SWM/BMP which will be a county maintained facility will be subject to independently documented geotechnical approval. The services which must be provided by the independent geotechnical engineering firm shall include full time geotechnical inspection paid for by the developer. That full time inspection shall include but not be limited to the following:
				A. Participation/input into the design process as necessary to facilitate the approval process of the independent geotechnical consultant.
				B. Observation, testing and documentation of:
				1) Suitable subgrades to receive compacted structural fill for earth dam construction.
				2) The cut off trench, spillway pipe, drainage blanket, riser structure and concrete chute spillway
				3) Fill placement and field density testing to evaluate/verify proper compaction.

				4) Reinforcing steel, if required, to evaluate its conformance with the project plans and specifications.
				12. The facility certification process shall be performed by an engineering/surveying professional acceptable to the county at the owner's expense.
				13. The name of the geotechnical professional who will provide the geotechnical approval of the SWM/BMP will be furnished on the land disturbance permit.

Nonpoint Nutrient Offsets

Y	N	N/A	Sheet/Comment	
				1. Nonpoint nutrient offset must satisfy the following conditions:
				A. Site area less than 5 acres or;
				B. Total phosphorous reduction required is 10 lbs. or less or;
				C. The site meets 75% of the required reduction on site or;
				D. Alternative site designs have been considered and it is not able to meet the requirement through on site treatment, economics is not a reason to not achieve reduction on site.
				2. Prior to plan approval, documentation of the owner's acquisition of the nonpoint nutrient offsets must be provided in a certification from the offset broker documenting the number of phosphorous nonpoint nutrient offsets are acquired and the associated ration of nitrogen nonpoint nutrient offsets at the offset generating facility. Note that the nonpoint nutrient offsets used for water quality compliance must be generated within the same or adjacent eight digit hydrologic unit code as define by the United States Geological Survey as the site. Nonpoint nutrient offsets outside this area may only be used if it is determined that no nutrient offsets are available within this area. In such cases, the nonpoint nutrient offsets must be generated within the same tributary.
				3. Provide a hydrologic unit map showing the location of the project and the offset-generating facility.
				4. The CBPA / VSMP compliance note on the cover must specify the number of phosphorous nonpoint nutrient offsets acquired and the offset generating facility.

ADDITIONAL COMMENTS (Use additional pages if necessary) :