***(THIS PAGE IS FOR INFORMATIONAL PURPOSES ONLY)***

**LAND-DISTURBANCE TYPE DETERMINATION AND APPLICABLE REQUIREMENTS**

Using the Land-Disturbance Type Determination Worksheet (attached) found in Chapter 3 of the Henrico County Environmental Compliance Manual (Manual), this project has been determined to be (one of the following):

only a **Virginia Erosion and Sediment Control Program (VESCP)** land-disturbing activity

only a **Virginia Stormwater Management Program (VSMP)** land-disturbing activity

only a **Chesapeake Bay Preservation Act (CBPA)** land-disturbing activity

both a **VESCP** land-disturbing activity and a **VSMP** land-disturbing activity

both a **VESCP** land-disturbing activity and a **CBPA** land-disturbing activity

none of the above – **NO COMMENTS - an Environmental Compliance Plan (ECP) is not required**

Based on Table 5.1 in Chapter 5 of the Environmental Compliance Manual and the land-disturbance determination made above, an ECP must be developed that contains the following components:

General information in accordance with Section 5.3 of the Manual

CBPA requirements in accordance with Chapter 6 of the Manual

An Environmental Site Assessment in accordance with Chapter 7 of the Manual

An Erosion and Sediment Control (ESC) plan in accordance with Chapter 8 of the Manual

A Stormwater Management (SWM) plan in accordance with Chapter 9 of the Manual

A Pollution Prevention Plan in accordance with Chapter 10 of the Manual

Total Maximum Daily Load (TMDL) information in accordance with Chapter 11 of the Manual

A Stormwater Pollution Prevention Plan (SWPPP) in accordance with Chapter 13 of the Manual

Municipal Separate Storm Sewer System (MS4) Program requirements in accordance with Chapter 15 of the Manual

This project has been determined to be a VSMP land-disturbing activity. Therefore, a General Construction Permit (GCP) must be obtained prior to commencement of land-disturbance in accordance with Chapter 12 of the Manual.

***ADDITIONAL COMMENTS:***



***ENVIRONMENTAL COMPLIANCE PLAN - GENERAL INFORMATION (Chapter 5)***

1. The plans must include the most current version of the POD/Subdivision cover sheet (revised 3/21/24) which can be found [here](https://henrico.gov/works/design/plan-approval-process/) .
2. The plan must be prepared by a professional (engineer, architect, landscape architect, or land surveyor) registered in the Commonwealth of Virginia.
3. Provide the engineer’s/surveyor’s/landscape architect’s name, address, e-mail address, telephone number, and fax number.
4. Provide the owner’s and/or developer’s name, address, e-mail address, telephone number, and fax number.
5. The plan must conform to a subdivision plat or plan of development which complies with chapters 19 or 24 of the Code.
6. Provide a tree protection plan which complies with §24-106.2 of the Code and includes all areas designated as forest/open space on the Virginia Runoff Reduction Method (VRRM) worksheets.
7. Provide a comprehensive drainage plan that clearly indicates items such as 1) existing and proposed drainage structures located onsite and those located offsite that will receive drainage from the project, and 3) topography and/or direction of flow.
8. Provide the GPINs of the parcels on which the regulated land-disturbing activity will occur.
9. The minimum size lettering allowable on construction plans is 1/8”.
10. Topography: (Provide on the cover sheet)

Source of the topography

Date of the survey

Name of the Surveyor that performed or oversaw the site survey work

Name of the firm that performed the site survey work

1. The latest copy of the Standard Construction Notes/Details Sheet (revised 9/1/21) must be included with the plans.
2. Provide a complete drainage area map, in acres, including all off-site drainage areas, supported by an outlined contour map.
3. A performance bond for the road and drainage improvements shown on the approved construction plans must be submitted prior to recordation of the subdivision. The bond amount for the road and drainage improvements must be determined using the bond calculation worksheet provided by the County of Henrico Department of Public Works.
4. Provide a list of the performance bond items and quantities for any public road and drainage improvements on the cover sheet.
5. Submit the completed bond calculations worksheet provided by the County of Henrico Department of Public Works for the road and drainage improvements.

***ADDITIONAL COMMENTS:***



***STORMWATER MANAGEMENT (SWM) PLAN REQUIREMENTS (Chapter 9)***

1. A SWM plan in accordance with Chapter 9 of the Environmental Compliance Manual must be provided.
2. Projects which will be submitted in phases (Section A, Section B, etc.) must address stormwater quality and quantity (where applicable) for the entire project as part of the first phase submittal. BMP calculations, location(s), and design option(s) must be identified on an overall plan and approved by the Department of Public Works prior to any phase plan approval.
3. All pervious lands on the site must be considered to be in good hydrologic condition in accordance with the U.S. Department of Agriculture’s Natural Resources Conservation Service (NRCS) standards.
4. Pre- and post-development site conditions and hydrology must be verified by site inspections, topographic surveys, available soil mapping or studies, and calculations consistent with good engineering practices. The Virginia Stormwater Management Handbook and the Virginia Stormwater BMP Clearinghouse provide guidance that is considered to be appropriate practices.
5. All hydrologic analyses must be based on the ultimate development condition of the upstream drainage area (in accordance with the Planning Department’s Comprehensive Plan) and the ultimate development condition of the proposed project.
6. Proposed residential, commercial, or industrial subdivisions shall apply these stormwater management criteria to the development as a whole. Individual lots in new subdivisions shall not be considered separate development projects, but rather the entire subdivision shall be considered a single development project. Hydrologic parameters shall reflect the ultimate development and shall be used in all engineering calculations.
7. Provide information demonstrating that the technical criterion of this Chapter applies to the entire regulated land-disturbing activity.
8. Provide information demonstrating that all sources of surface runoff and all sources of subsurface and groundwater flows converted to surface runoff have been considered in the development of the SWM plan.
9. Identify the type and location of all points of discharge from the site and the type of features to which stormwater is being discharged.
10. Show the pre-development and post-development drainage areas to each point of discharge
11. Identify the pre-development and post-development site conditions
12. Identify the type, location (including geographic coordinates), acres treated, and the point of discharge for each proposed stormwater management facility
13. Provide hydrologic and hydraulic computations, including runoff characteristics
14. Show the existing and proposed topography of the site
15. Show the locations of existing streams, ponds, culverts, ditches, wetlands, other water bodies, and floodplains
16. Show the location of the A, B, C, or D soil types, forest cover, and other vegetated areas used in the Virginia Runoff Reduction Method worksheets clearly on the plans.
17. Identify the locations of existing and proposed structures, roads, utilities, and easements
18. Show the limits of the regulated land-disturbing activity
19. Provide tabulations of the areas devoted to impervious, forest/open, and other vegetative cover based on both the existing and proposed site conditions
20. Identify (on the cover sheet) and delineate all 6th order Hydrologic Unit Codes (HUCs).
21. Quantify the linear feet of Stream Protection Area (SPA) buffer on the cover sheet.

***ADDITIONAL COMMENTS:***



***STORMWATER QUALITY INFORMATION (Section 9.3.2-3)***

This project is considered:

**New Development** – The complete Virginia Runoff Reduction Method (VRRM) New Development Worksheet must be submitted for review.

**Development on Prior-Developed Lands** – The Virginia Runoff Reduction Method Re-Development Worksheet must be submitted for review.

Provide the VRRM site data & summary sheet tabs on the plans. Submit completed copy of VRRM excel spreadsheet for review via email. *This must be submitted in .pdf format.*

1. Areas designated as forest/open space in the VRRM worksheets must be shown as tree-protection areas.
2. In residential subdivisions, all areas that are not contained in required environmental buffers (RPA, SPA) or jurisdictional wetlands to remain must be considered either impervious area or managed turf.
3. The following information contained in the VRRM worksheets is incorrect and must be revised:



1. Compliance with the pollutant removal requirements is achieved by: (Informational only)

Proposed on-site SWM facilities

Existing on-site SWM facilities

Proposed off-site SWM facilities

Existing off-site SWM facilities

Nutrient offsets

1. Off-site options that are not being constructed as part of this plan must be existing or under construction prior to plan approval.
2. Nutrient offsets are not allowed unless one of the following conditions are met:
   * + 1. The project results in less than five acres of land disturbance.
       2. The post-construction phosphorus nutrient reduction requirement is less than 10 pounds per year
       3. At least 75% of the required phosphorus nutrient reduction requirement is achieved on-site, **OR**:
          1. Alternative site designs have been considered that may accommodate on-site best management practices,
          2. On-site best management practices have been considered in alternative site designs to the maximum extent practicable,
          3. Appropriate on-site best management practices will be implemented, **AND**
          4. Full compliance with post-development non-point nutrient runoff compliance requirements cannot be practicably met on-site.
3. A separate SWM facility review checklist is provided for comments regarding each proposed permanent SWM facility. Checklist will be provided once SWM facilities are specified by the engineer
4. The following information must be provided for each existing permanent SWM facility that is used to demonstrate compliance:

Information to show that the SWM facility was designed in accordance with the existing Part IIB technical criteria

The land-use conditions for the proposed project upon which the SWM facility was designed

The proposed land-use conditions for the project area that the SWM facility serves

Because the land-use conditions have changed since the original SWM facility design, the existing SWM facility must be modified to comply with the new Part IIB technical criteria

1. A letter of availability from the off-site provider must be included in the plans for each offsite compliance measure (SWM facility or nutrient offset) used to demonstrate compliance:
2. The following information must be included on the plans if nutrient offsets are being used to demonstrate compliance:

Letter of final authorization

Notarized affidavit of offset sale

Proof of perpetuity of the offset (a copy of the recorded covenants, restrictions, easement, or other appropriate instrument verifying the stormwater nutrient offsets that have been acquired to meet the construction activity’s required nutrient reductions will be protected in perpetuity)

***ADDITIONAL COMMENTS:***



***LIMITS OF ANALYSIS (Sections 9.3.4 and 9.3.5)***

1. The limits of analysis for each stormwater discharge point must be clearly shown on the plans.
2. Provide supporting information to show how the limits of analyses were determined.
3. All locations where concentrated stormwater flows that (i) contain runoff from the land-disturbing activity, (ii) are created as a result of the land-disturbing activity, or (iii) are increased as a result of the land-disturbing activity (discharge points) must be released into a stormwater conveyance system must be clearly identified on the plans

***ADDITIONAL COMMENTS:***



***CHANNEL PROTECTION (Section 9.3.4)***

1. Each stormwater conveyance system receiving concentrated stormwater flow must be analyzed from the discharge point to a point where either:
   1. The site’s contributing drainage area is less than or equal to 1.0% of the total watershed area; **OR**
   2. The site’s peak flow rate from the one-year 24-hour storm is less than or equal to 1.0% of the existing peak flow rate from the one-year 24-hour storm prior to the implementation of any stormwater quantity control measures.
2. Complete the Channel Protection Compliance Summary table on the Erosion and Sediment Control – Standard Details/Calcs. sheet for each discharge point.
3. Provide supporting information (calculations, etc.) on the plans to show that the entire stormwater conveyance system between the discharge point and the limits of analysis was analyzed. The most restrictive location within the limits of analysis must be listed in the Channel Protection Compliance Summary table to demonstrate compliance with Criteria A.
4. There is a manmade stormwater conveyance system below discharge point(s)      . Revise the Channel Protection Compliance Summary table accordingly.
5. There is a restored stormwater conveyance system below discharge point(s)      . Revise the Channel Protection Compliance Summary table accordingly.
6. There is a natural stormwater conveyance system below discharge point(s)      . Revise the Channel Protection Compliance Summary table to demonstrate compliance with the Energy Balance requirement.

***ADDITIONAL COMMENTS:***



***FLOOD PROTECTION (Section 9.3.5)***

1. Each stormwater conveyance system receiving concentrated stormwater flow must be analyzed from the discharge point to a point where either:
   1. The site’s contributing drainage area is less than or equal to 1.0% of the total watershed area; **OR**
   2. The site’s peak flow rate from the ten-year 24-hour storm is less than or equal to 1.0% of the existing peak flow rate from the ten-year 24-hour storm prior to the implementation of any stormwater quantity control measures;

**OR**

* 1. The stormwater conveyance enters a mapped floodplain, the RPA, the SPA, or any other dedicated riparian buffers (other riparian buffers (not RPA or SPA) must extend downstream and be connected to a floodplain, RPA, or SPA.).

1. Complete the Flood Protection Compliance Summary table on the Erosion and Sediment Control – Standard Details/Calcs. sheet for each discharge point.
2. Provide supporting information (calculations, etc.) on the plans to show that the entire stormwater conveyance system between the discharge point and the limits of analysis was analyzed. The most restrictive location within the limits of analysis must be listed in the Flood Protection Compliance Summary table to demonstrate compliance with Criteria A.
3. There is evidence of localized flooding below discharge point(s)      . Revise the Flood Protection Compliance Summary table accordingly.

***ADDITIONAL COMMENTS:***



***50/10 DETENTION (Section 9.3.6)***

1. This project falls within the limits of a 50/10 detention area. Provide supporting calculations to show that the post-developed peak flow from the site for a 50-year-24hr storm event does not exceed the pre-developed peak flow rate for a 10-year-24hr storm event.
2. Complete the 50/10 detention requirements summary table on the ESC/ESA sheet.
3. This project may opt out of the 50/10 detention requirements if information is provided showing that there are no existing homes located within the 50-year floodplain downstream of the proposed development.
4. The project area appears to have been shown as “developed” during the Comprehensive Drainage Study (circa 1970s). 50/10 detention is not required if the proposed impervious cover does not exceed the amount from the study.
5. The 50/10 detention requirements do not apply to subdivisions or plans of development for single-family, detached, residential structures.

***ADDITIONAL COMMENTS:***



***INCREASED VOLUMES OF SHEET FLOW (Section 9.3.7)***

1. Increased sheet flow volumes resulting from the land-disturbing activity must be identified and evaluated for potential impacts to downstream properties or resources.
2. Increased sheet flow volumes that will cause or contribute to erosion, sedimentation, and/or flooding of downstream properties or resources must be diverted to a SWM facility or stormwater conveyance system that conveys the runoff without causing erosion, sedimentation, or flooding.

***ADDITIONAL COMMENTS:***



***DESIGN STORMS AND HYDROLOGIC METHODS (Section 9.3.8)***

1. The prescribed design storms are the 1-year, 2-year, and 10-year 24-hour storms using the site specific rainfall precipitation frequency data recommended by the U.S. National Oceanic and Atmospheric Administration (NOAA) Atlas 14. Partial duration time series shall be used for the precipitation data.
2. The U.S. Department of Agriculture’s Natural Resources Conservation Service (NRCS) synthetic 24-hour rainfall distribution and models must be used to conduct the hydrologic analyses. These include, but are not limited to TR-55 and TR-20, hydrologic and hydraulic methods developed by the U.S. Army Corps of Engineers, or other standard hydrologic and hydraulic methods.
3. The Rational Method may only be used to evaluate peak discharges (storm sewer sizing, etc.) for drainage areas of 200 acres or less.
4. The Modified Rational Method may only be used for evaluating volumetric flows to stormwater conveyances for drainage areas of 200 acres or less..

***ADDITIONAL COMMENTS:***



***SWM FACILITY MAINTENANCE (Section 9.5)***

1. Individual maintenance agreements are required for each SWM facility type prior to plan approval. See individual SWM facility comment sheets for further information.
2. A SWM facility maintenance fund payment of $100.00 per lot per SWM facility must be paid prior to subdivision recordation.
3. The SWM facility maintenance fund payment amount is $     . (Please keep in mind that this amount is based on the current plan submittal and may change as the plan is revised.)

***ADDITIONAL COMMENTS:***



***GENERAL CONSTRUCTION PERMIT (GCP) (Chapter 12)***

1. A General Construction Permit (GCP) is required for the proposed land-disturbing activity.
2. A draft Registration Statement must be submitted for all proposed VSMP land-disturbing activities as part of the plan submittal and review process.
3. Submit a final copy of the Registration Statement with the required signatures to the Review Engineer. The Department of Public Works cannot enter the Registration Statement data into DEQ’s online permitting system until the Review Engineer has signed the plans. Because the DPW signatures cannot be completed until DEQ has issued the GCP, this may cause delays in the approval process.
4. The Registration Statement indicates an estimated land disturbance amount of       acres. Based on this amount, a GCP Issuance Fee of $      must be submitted to the Department of Public Works prior to plan approval. This fee includes the State of Virginia’s portion of the Permit Issuance Fee.

***ADDITIONAL COMMENTS:***



***STORMWATER POLLUTION PREVENTION PLAN (SWPPP) (Chapter 13)***

1. The following information must be provided so that it can be included in the SWPPP binder that will be distributed at the pre-construction meeting: (link: <https://henrico.gov/works/forms/> under SWPPP the heading “SWPPP Tabs for Plan Review/Approval”)

Tab 1 - SWPPP title sheet

Tab 3 - Required SWPPP Components table

Tab 4 - SWPPP narrative

Tab 7 – ECP and Other Incorporated Plans

Tab 8 - Pollution Prevention Plan Information

Tab 9 - TMDL table 9.1

Tab 14 – SWPPP Termination Information (Permanent SWM facility info.)

Tab 15 – Registration Statement

Tab 16 – GCP - General Construction Permit(2009 & 2014)

***ADDITIONAL COMMENTS:***



***PROJECTS ASSOCIATED WITH AN APPROVED MASTER PLAN:***

1. Provide a note on the cover sheet indicating which master plan this project is associated with.
2. Provide a key map showing previously approved sections/phases labeled and shaded out.
3. Provide all sheets associated with water quality and water quantity sheets from the approved master plan.
4. This project is associated with a grandfathered or previously permitted master plan and must be updated to meet the Part IIB criteria.
5. This project is associated with a VRRM regulations master plan. Please update the master plan sheets by showing revision clouds around any values that have changed from the most current master plan.

***ADDITIONAL COMMENTS:***



***ROAD DESIGN:***

1. Provide classifications for all roads.

Include the projected vehicles per day (VPD) for all roads.

Provide the typical section for all roads as provide in the Design Manual

Provide pavement sections for all roads that match the road classification.

1. Provide a minimum 50’ vertical curve to tie the proposed road grade into the existing edge of pavement at intersections.
2. Provide K-values for all vertical curves in accordance with the Design Manual. Also, show the design speed for all roadways.
3. A minimum nine (9) feet wide pedestrian shelf is required behind all curb and gutter in the County right-of-way unless otherwise noted in the additional comments below.
4. Curb and gutter, pavement widening, and related drainage items are required along all frontage on public rights-of-way.
5. Show the full typical section for pavement widening on the plans, showing the centerline of pavement, right-of-way limits, proposed pavement width, elevations, grade percentage, and underdrains.
6. Provide cross-sections, at a minimum of 25 feet intervals, showing the existing and proposed pavement elevations throughout the limits of all pavement widening. All existing and proposed cross-slopes must be provided, as well as pavement overlays and milling. (All cross-sections must be shown at a scale of 1”=10’ vertical and 1”=10’ horizontal.)
7. Pavement cross-sections for road widening must meet the following criteria:

Minimum proposed cross slope is 1.5%

Maximum proposed cross slope is 3.0%

There can be no more 1.0% difference between the existing and proposed pavement cross slopes

1. Pavement overlays, pavement buildup, and/or milling, must be clearly shown on the plans. When overlays are required in curb and gutter sections, the curb lanes must be edge milled prior to the overlay to eliminate pavement build-up at the edge of pavement and to provide a smooth tie-in to the edge of gutter. In ditch sections, shoulders and driveways must be tied into the finished elevation of the pavement overlay.
2. Provide profiles along the full length of widening showing the road centerline, existing edge of pavement, and proposed top of curb. The profile must include all drainage structures within the right-of-way. (All profiles must be shown at a scale of 1”:1’ vertical and 1”:50’ horizontal.)
3. All proposed curb and gutter must have a minimum 0.5% longitudinal slope.
4. Provide cross-sections of the roadway showing the limits of pavement, curb and gutter, guard rail, end treatments, fill slopes, easement limits, and any drainage structures at all locations where Traffic Engineering is requiring guard rail.
5. UD-4 underdrains are required along the entire length of all proposed roads and/or road widening within the public right-of-way unless waived by the Director of Public Works.
6. UD-2 underdrains are required in all raised grass medians and islands located in the public right-of-way.
7. CD-2 underdrains are required for all vertical sags located within the public right-of-way.
8. Show the location of all underdrains on the plans.
9. Private roads and driveways within multi-family developments should be constructed in accordance with County roadway pavement standards. Provide projected vehicles per day and pavement sections for all private roads and driveways.
10. Provide horizontal curve data for all public roadways and rights-of-way on the plans.
11. Delineate and provide the 100-year backwater elevation at all roadway/culvert crossings on the plans.
12. The 100-year storm may not overtop the centerline of the road by more than six inches.

***ADDITIONAL COMMENTS:***



***GRADING:***

1. The following issues must be addressed regarding lot grading:

An overall (one page) lot drainage map must be included in all subdivision plans at a minimum scale of 1”=200’, and must include the following:

Flow direction arrows for each lot

Show the minimum finished floor elevation (MFF) for each lot based on the required grading to ensure proper drainage. House locations must be shown for all lots with grading plans. The MFF must be at least 3.0 feet above finished grade.

Lots which have special building permits requirements must be identified on the construction plans as follows: NBP1, NBP2, NBP3.

**NBP1** – All areas of required grading (including low-lying areas and wetlands to be impacted) and drainage swales, as indicated on the plans, shall be constructed concurrently with the road construction. Certification of the construction by the engineer of record is required prior to issuance of Building Permits for lots identified as NBP1. *The required certification must be attached to the Building Permits for these lots.* This applies to lots      .

**NBP2** – All lots that include storm sewer. A certified plat identifying the storm sewer easement and the location of the installed drainage improvements must be submitted by the engineer of record prior to the issuance of a Building Permit for those lots identified as NBP2. (NOTE: Lots not built on by the time of road acceptance must have the easements staked and flagged for review prior to road acceptance). *The required certification must be attached to the Building Permits for these lots.* This applies to lots      .

**NBP3** – All lots that contain or are adjacent to lots that contain sediment basins/traps. Building permits will be delayed until the sediment basins/traps are removed.

Add a note to the plans stating that all lots are to be graded at the time of road construction.

Provide the Building Permit Special Requirements table (a summary of the above information) on the cover sheet.

1. Show all  existing and  proposed contours at a maximum interval of two feet (i.e.: road fill/cut, lot grading, wetland/WOUS grading, etc.).

***ADDITIONAL COMMENTS:***



***CURB AND GUTTER / STORM SEWER:***

1. Curb and gutter is required on both sides of each road in the subdivision if any of the following apply:

There is less than 0.5% grade within any block of any road in the subdivision.

25% of the roads within a subdivision have 1.0% or flatter grade.

25% of the lots within a subdivision have less than 80 feet of road frontage.

1. Henrico County Curb and Gutter is required around all temporary cul-de-sacs.
2. Henrico County standard curb and gutter is required around all interior driveways and around all parking areas.
3. Roll-faced curb is only allowed on roadways that are Class I-IV (0-1000 VPD). The pavement width must be at least 32’ (36’ f/c-f/c).
4. If roll-faced curb is used, two (2) inlets with 100% collection efficiency must be provided on both sides of the road on descending grades before all cul-de-sacs with descending grades.
5. Provide CG-12 curb ramps at all intersections where there is existing or proposed sidewalk.
6. Provide top of curb elevations around:  all cul-de-sacs  all curb returns
7. All entrances must be CG-9D and labeled as such on the plans.
8. Roll-faced curb is not allowed for parking areas.
9. The maximum depth of flow along roll-faced curb is four inches.
10. Curb cuts are not permitted along drive aisles.
11. All medians less than six feet wide must be VDOT Std. MS-1. For turn lanes being constructed on existing roads, the old median must be removed entirely and the solid raised median poured on the asphalt base course in accordance with the standards for MS-1 Median. Standard MS-1A or variations of the same are not be permitted.
12. Valley gutters are not allowed in the public right-of-way.
13. Provide profiles based on field-run elevations for all storm sewers located outside of the right-of-way limits.
14. Provide an itemized list (including descriptions) of all drainage structures on the plan.
15. Stormwater must be collected on-site in curb drop inlets.
16. Provide the following information for all curb and gutter/storm sewer systems:

Depth and spread in all gutters based on a two-year storm.

Maximum allowable gutter flow spread for a 2-year storm is:

Major and minor arterial roads 8 feet

Collector Road 10 feet

Local Roads 12 feet

Length of inlet throats (sized for 10-year storm)

Inlet placement based on the maximum allowable spread during a 2-year storm

Type of material (RCP Class III or better in County easements or right-of-way)

Diameter (minimum 15 inches)

Velocity (minimum allowable of 2 fps for 2-year storm) (maximum of 15 fps for 10-year storm)

Capacity (based on 10-year storm event)

Hydraulic grade line computations noting elevations at key points (drop inlets, manholes, etc.)(indicate where inlet shaping is to take place) including details showing how the starting water surface elevation was obtained

Concrete flume transition details from curb to ditch

Details of non-standard structures

Longitudinal slope (minimum allowable is 0.3%)

Maximum length between structures is 300 feet for pipes less than 48” diameter

Indicate whether inlet shaping, steps, and/or O-ring pipe are proposed

Provide storm sewer information/calculations in tabular format on the plans.

Pipe slopes greater than 16% require anchor blocks at every other joint in accordance with VDOT Special Design Drawing No. A-73 and MA-73.

1. Provide adequate cover for all storm sewers. The minimum allowable cover is:

Nine (9) inches for storm sewer in the right-of-way

Six (6) inches for storm sewer in easements

1. Provide the following information for all culverts:

Inverts based on field-run elevations

Lengths

Type (RCP Class III or better in County easements or right-of-way)

Headwater calculations

Inlet and outlet protection

Outlet velocity (10-year storm)

Diameter

Design cover

Provide the completed VDOT standard culvert form

1. DI-3 series inlets must be designed so that the minimum depth of the inlets is equal to or greater than the diameter of the pipe plus 2.67’ (32”).
2. DI-4 series inlets are required for all storm sewers greater than 30” diameter.
3. The maximum throat length for curb drop inlets in cul-de-sacs is six feet.
4. Drop inlets are not allowed in the radius of intersections.
5. No more than 0.5 cfs may be directed onto a public right-of-way during a 10-year storm.
6. Provide specific construction details, including dimensions, elevations, inverts, etc. for JB-1 and any non-standard VDOT inlets.

***ADDITIONAL COMMENTS:***



***ON-SITE CHANNELS / WETLANDS:***

1. All channels with less than 100 acres of contributing drainage area must be piped or otherwise eliminated. If the environmental regulatory agencies will not issue a permit to impact jurisdictional channels that fall under this policy, the standard form letter attached to the September 12, 2005 policy letter must be completed and submitted. Copies must also be sent to the appropriate environmental regulatory agency.
2. Open channels, except for roadside ditches, are not permitted unless specifically mandated by local, state and/or federal requirements.
3. Provide a typical yard swale detail. All yard swales must meet the following criteria:

Longitudinal slope must be at least 1%

Minimum side slope ratio is 3:1

Maximum depth is 18 inches

No longer than 150 feet without a drop inlet

1. Provide a cross-section for all channels (existing and proposed, natural and man-made) used for stormwater conveyance. Additional cross-sections will be required where channel characteristics change. The following information must accompany each cross-section:

Depth

Side slopes (no steeper than 3:1 for *proposed* channels)

Channel Lining (with Manning’s “n” value)

Flow elevations for the 2-year, 10-year and 100-year (if applicable) storm events

The limits of wetlands on both sides of the channel

Longitudinal slope (minimum 1.0% for *proposed* non-paved channels, minimum 0.3% for *proposed* paved channels)

Scale must be 1”:1’ Vertical, 1”:5’ Horizontal

1. The following information and supporting calculations must be provided for each cross-section provided for all channels (existing and proposed, natural and man-made) used for stormwater conveyance:

Q2  Q10  Q100  Qcapacity

V2  d10

1. The minimum allowable V2 for paved channels is 2 fps.
2. Provide a profile based on field-run elevations for all channels used for stormwater conveyance.
3. The following information and supporting calculations must be provided for all wetland systems:

Q10  Qcapacity (within the limits of the wetlands)  V2  Vallowable

The limits of the 10-year storm must be delineated on the plan view in relation of the limits of the wetlands.

Demonstrate that the wetland system has an outlet and will not act as an impoundment.

Provide a profile based on field-run elevations for all wetland systems used for stormwater conveyance.

1. Provide a profile of the roadside ditches on the Road Profile Sheet.

***ADDITIONAL COMMENTS:***



***SURVEY:***

1. Provide four (4) reference coordinate points tied to the Geodetic Control Network (GCN) with coordinates in the Virginia State Plane Coordinate System (distributed near the corners of the site). All features must be tied to the four reference points (if floating on the site, they must be tied to a property corner or property line in two different locations). All County GIS monuments within the site must be identified on the plans.
2. A minimum of two benchmarks must be established and shown on the construction plans in areas that will not be disturbed during construction. For linear projects such as road widening, benchmarks must be placed no farther apart than 500 feet and tied into the survey base line.
3. Right-of-way and baseline must be established in the field by the consultant and clearly shown on the plans. They must be clearly tied to monuments/benchmarks.
4. Provide stations at the centerline of all drainage structures located within the right-of-way limits.
5. Provide a note on the plans stating that all utility poles, fire hydrants, and other above ground obstacles located within the public right-of-way and in conflict with the proposed sidewalk shelf, curb and gutter and/or the pavement widening shall be relocated at the developer’s expense prior to Henrico County staking the curb and gutter.

***ADDITIONAL COMMENTS:***



***EASEMENTS / AGREEMENTS:***

1. Show the location, width, and recordation information for all existing drainage easements.
2. All proposed drainage easements must be a minimum of 16 feet wide.
3. The Deed Book and Page Number must be provided for all proposed off-site drainage easements prior to plan approval.
4. For commercial/multi-family projects, only runoff that is considered “public” can be contained in a County maintained drainage easement. Stormwater from off-site drainage areas that do not contain “public” water must be contained in private drainage easements.
5. Provide a drainage easement through all lakes, ponds, and/or BMP basins that will contain public water. The easement must be at least 16 feet wide and must take the most direct route from the inlet(s) to the outlet(s).
6. Provide a BMP/SWM Maintenance Agreement. This agreement can be found on the Department of Public Works web page at: <https://henrico.gov/works/forms/> .
7. A maintenance agreement must be provided between the developer and the County of Henrico prior to plan approval for irrigation, landscaping, lighting, stamped pavers, etc. within the County right-of-way. This agreement can be found on the Department of Public Works web page at:

<https://henrico.gov/works/forms/> .

1. Provide executed documentation from all private utility companies (power, gas, etc.) that authorizes land disturbance within their easements.
2. Provide evidence (copies of certified letters) that property owners have been notified that work is/will be conducted in the off-site drainage easement located on their property.

***ADDITIONAL COMMENTS:***



***MISCELLANEOUS:***

1. Show the size and location of all existing drainage structures, pipes, roof drains, swales, ditches, curbs, and channels and the direction of flow in each.
2. Show the location of all roof drains and pipes conveying runoff from roof areas and landscape areas.
3. The drainage system conveying runoff from roof areas and landscape areas in the vicinity of the building must be designed in accordance with the current edition of the International Plumbing Code. The following statement must be added to the plans:

*The roof / landscape drainage system has been designed in accordance with the current edition of the International Plumbing Code.*

1. Provide material type, size and elevations for all pipes and structures in the roof / landscape drainage system.
2. The drainage system conveying runoff from roof areas and landscape areas in the vicinity of the building must tie into the storm sewer system at a structure (inlet, manhole, junction box, etc.).
3. Provide details for all retaining walls. Add the following note to the plans: “Plan approval does not include approval of the retaining wall design. Contact the Department of Building Inspections for approval requirements of the retaining wall. Building Inspections will determine the retaining wall design approval”. A professional seal is required if the retaining wall is in the right-of-way.
4. Provide evidence that VDOT has reviewed the current scope of work shown on the plan and has no comments regarding the proposed work.

***ADDITIONAL COMMENTS:***



***EROSION AND SEDIMENT CONTROL (ESC) PLAN REQUIREMENTS (Chapter 8)***

1. Submit an ESC plan in accordance with Chapter 10 of the County Code. A complete plan review cannot be provided until this information has been submitted. Once this information has been submitted, additional comments may follow.
2. The preliminary limits of disturbance necessary for installation of the initial ESC measures must be clearly indicated on the plans. This area of disturbance must be the minimum necessary to allow installation of the initial ESC measures and should include all areas necessary for installing the initial ESC measures, including stockpiles, borrow areas, staging areas, etc.
3. The preliminary limits of disturbance are too large. They must be the minimum amount of disturbance necessary to install the initial ESC measures.
4. The ultimate limits of disturbance must be clearly indicated on the plans.
5. Silt fence is required and must be shown on the plans.
6. Silt fence is needed in additional areas, as noted in the Additional Comments section below.
7. Temporary sediment trap(s) is (are) required and must be shown on the plans.
8. Temporary sediment basin(s) is (are) required and must be shown on the plans.
9. The sediment basin/trap design details information table on the ESA sheet must be completed.
10. The sediment trap must have at least one foot of freeboard between the top of dam and the dry storage elevation.
11. The sediment basin must have at least one foot of freeboard between the top of dm and the 25-year storm elevation (for sediment basins that have emergency spillways).
12. Because there is no emergency spillway, the sediment basin must have at least two feet of freeboard between the top of dam and the 25-year storm elevation.
13. There is not enough space between the sediment basin riser crest and the dewatering device elevation. The anti-vortex device must extend at least 8” below the riser crest. Therefore, the dewatering device invert must be at least 8” plus the dewatering device diameter (in inches) below the riser crest.
14. If the sediment basin is in an area where there will be a permanent SWM basin, the plans must address the possibility of using the permanent riser structure for the sediment basin. In addition to the standard sediment basin riser detail, provide a detail and supporting design calculations (sediment basin design table) showing how the dewatering and wet/dry storage volume requirements will be met. Also, the detail must address the permanent dewatering orifices, etc. (when they will be installed or if they will be installed and blocked/plugged).
15. If more than one sediment basin riser detail is shown on the plans (in accordance with comment #38), the sequence of construction must reference the location of each of the sediment basin riser details.
16. Provide a drainage area map for all sediment basins/traps based on Phase I and Phase II ESC plan contributing drainage areas. The basins/traps must be sized for the largest of the contributing drainage areas.
17. All sediment basins/traps must be designed so that the wet storage volume elevation does not back water into the permanent storm sewer.
18. Baffles are required for all sediment basins/traps that do not meet the required 2:1 flow length to width ratio.
19. All sediment basins/traps must drain to an adequate outfall in accordance with MS-19 of the Virginia Erosion and Sediment Control regulations. Provide supporting information to show that this requirement is being met.
20. Complete the “Outfall Adequacy for Sediment Basins/Traps” table located on the Erosion and Sediment Control – Standard Details/Calcs. sheet for each sediment basin/trap.
21. Stockpiles and appropriate ESC measures must be shown on the plans or the narrative must state that no stockpiles will be located on the site.
22. ESC blanket/matting (B/M) is required for all proposed slopes that are steeper than 3:1.
23. All concentrated flow down fill slopes must be contained within an adequate temporary or permanent channel, flume, or slope drain structure.
24. An ESC narrative/sequence of construction must be included on the plans and must appropriately sequence the installation and maintenance of ESC measures throughout construction.
25. The ESC sequence of construction must state that a pre-construction meeting with the Environmental Inspector must occur prior to any land disturbance on the site.
26. The ESC sequence of construction must state that if construction does not commence for 180 days following the pre-construction meeting or if the project is dormant for 180 days during the construction phase, a new pre-construction meeting is required before construction can re-start.
27. The ESC sequence of construction must clearly indicate that land disturbance outside the preliminary limits of disturbance may not occur until the initial ESC measures installation has been approved by the Environmental Inspector.
28. The ESC sequence of construction must clearly indicate that all diversions, sediment basins/traps, and stockpiles must be seeded and mulched immediately upon construction.
29. The ESC sequence of construction must include a statement that no erosion and sediment control measures can be removed without approval of the Environmental Inspector for the project.
30. The ESC plan/sequence of construction must clearly show how runoff will be diverted into sediment basin(s) or trap(s) during all phases of construction (storm sewer, diversions, channels, etc.).
31. The sequence of construction must clearly indicate that the SWPPP mailbox must be installed prior to the pre-construction meeting for all projects proposing one acre or more of land disturbance.
32. Lots adjacent to or containing a sediment basin or trap that will not be converted to a BMP must be identified on the cover sheet, the plan sheet, and with notes stating that building permits will not be issued for these lots until the basins or traps have been removed.
33. ESC measures must be shown for all lots adjacent to or containing WOUS/wetlands, SPA, and/or RPA. Add a note to the ESC plan sheet stating that these measures will be installed prior to dwelling construction.
34. All land disturbance associated with utility construction, including appropriate ESC measures, must be clearly indicated on the plans.
35. Provide a construction entrance at all access points to the site.
36. Unless a barricade is provided to prevent vehicular access, a construction entrance is required at all access points.
37. A vehicle wash rack(s) is required at all locations where construction vehicles will leave the site.
38. A water supply is required for the wash rack. Clearly show how the water will be provided.
39. The wash area for the wash rack must drain to a sediment basin/trap.
40. Provide inlet protection for all inlets.
41. All outlet protection must be designed in accordance with Std. & Spec. 3.18 of the Virginia Erosion and Sediment Control Handbook, Third Edition, 1992.
42. Show the dimensions for all outlet protection (length, width, and depth, including filter fabric lining).
43. Clearly label all areas of Temporary Seeding (TS) and Permanent Seeding (PS) on the plans.
44. All disturbed area is subject to the Temporary Seeding (TS) requirements and must be clearly labeled as such on the Phase II ESC plan.
45. Show all ESC measures (silt fence, sediment basins/traps, diversions, etc.) on the Phase II ESC plan.
46. A variance request must be submitted in writing because Minimum Standard (MS)       is not being met      .

***ADDITIONAL COMMENTS:***



***POLLUTION PREVENTION PLAN (PPP) REQUIREMENTS (Chapter 10)***

1. The standard Pollution Prevention Plan sheet (found [here](https://henrico.gov/works/engineering-environmental-services/)) must be included with the plan set.
2. All appropriate information on the standard PPP sheet must be completed.
3. Any other plans referenced in the plans must be identified on the PPP sheet.
4. The locations of control measures to address the following items (as identified on the standard PPP sheet) must be clearly indicated on the plans (Not applicable is an acceptable response):

Leaks, spills, and other releases

Equipment/vehicle washing

Vehicle fueling and maintenance

Discharge from storage, handling, and disposal of construction products, materials, and waste

Discharges from other potential pollutant sources

Discharges from concrete related wash activities

Discharges of soaps, detergents, solvents, and wash water from construction activities such as cleanup of stucco, paint, form release oils, and curing compounds

Discharges of hazardous, toxic, and sanitary waste (portable toilets)

***ADDITIONAL COMMENTS:***



***MS4 PROGRAM REQUIREMENTS (Chapter 15)***

1. The dumpster pad must be located so that it does not drain directly into the storm sewer. In accordance with the County’s NPDES permit, only rainwater may enter the storm sewer system.
2. Trash racks are required on storm sewer inlets. Rebar must be located to provide a two-inch maximum clear space and must be either galvanized or epoxy coated. Trash racks must be noted in the list of drainage descriptions and details must be provided on the plans.
3. Concentrated runoff from dog parks is not an allowed discharge in accordance with the County’s NPDES permit and may not discharge to the County’s MS4 storm sewer system. Discharges that do not drain to the County’s MS4 system and ultimately drain to State waters must obtain a discharge permit from the Virginia Department of Environmental Quality.
4. Only drainage from the top (not covered) parking deck level is considered rain water and may connect directly to the storm sewer (an oil/water separator is not required). The floor drains from all covered levels must drain to the sanitary sewer and cannot connect to the storm sewer, even if they are treated by an oil/water separator.
5. Community car wash areas cannot drain to the storm sewer.
6. An Oil/Water Separator (OWS) is required for this project. The following comments will apply if the wastewater will be diverted to the storm sewer system:

The OWS must be designed according to the American Petroleum Institute (API) standards.

If the engineer will design the OWS, the design calculations and details must be submitted for review.

If a pre-manufactured OWS will be used, the following information must be submitted for review:

The design calculations for sizing the OWS

Q = A x I

Where: Q = the design flow to the OWS

A = the area draining to the OWS

I = the amount of rainfall (1.6 in/hr under the canopy)

(2.8 in/hr outside of the canopy)

A statement from the manufacturer indicating the OWS is designed per the API standards.

A detail drawing of the OWS must be shown on the plans.

A trench drain system must be installed to divert the wastewater to the OWS.

The trench drain must fully encompass the area that produces wastewater.

The area that produces wastewater must be covered. The canopy must be labeled and the trench drain must be located inside the drip edge of the canopy.

The area that produces wastewater must be graded so that the runoff from the surrounding area will not enter the trench drain. Spot grades around the fueling pad must be shown on the plans.

1. The plans must include a note on the plan **cover sheet** stating how the storage of bulk waste fat/oil/grease (FOG) will be addressed – either by using bins/barrels for storage or by using an indoor grease extraction unit.
2. If barrels/bins are used for FOG storage, the plans must clearly show the location of the barrels/bins.
3. The barrels/bins must be stored “under roof” to eliminate rainfall intrusion.
4. A floor drain is required where the barrels/bins are located. The floor drain must discharge to the sanitary sewer.
5. Provide a detailed grading plan for the FOG storage area showing that the area “under roof” will drain to the floor drain and that the area that is not “under roof” will drain away from the storage area.

***ADDITIONAL COMMENTS:***



***ENVIRONMENTAL COMPLIANCE BOND (Chapter 16)***

1. Provide an Environmental Compliance bond and two copies of the standard Environmental Compliance Agreement. All Bonds must be cash, letter of credit, or certificate of deposit. Information and the forms for the Environmental Compliance Agreement can be found at: <https://henrico.gov/assets/ENVIRONMENTAL-COMPLIANCE-AGREEMENT-003.pdf>
2. Provide an itemized list, including quantities, of all ESC devices on the plans. The list must include the total amount of land disturbance and the approximate volume of any stockpiles.
3. The Environmental Compliance bond amount is set at $     .
4. The Environmental Compliance Bond and Agreements must be submitted together as **one package*.***

***ADDITIONAL COMMENTS:***



***ADDITIONAL COMMENTS***

Additional comments may follow upon review of a subsequent submittal.

The Design Division has completed its review and has no comments at this time.

***OTHER REVIEW AGENCIES***

Additonal comments will be provided from the *Construction Division*

Additonal comments will be provided from the *Environmental Division*

Additional comments will be provided by the *Traffic Engineering Division*

Additonal comments will be provided from the *Design Division regarding floodplain*

**Reviewed by:**

**Date Reviewed:**

**Phone Number: (804)**

**E-mail:** *@henrico.gov*