

## Chapter 2: Drainage

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## **SECTION 200    General Provisions**

### **200.1 Purpose**

The purpose of this chapter is to establish minimum stormwater management and erosion and sediment control requirements to protect properties, safeguard the general health, safety, and welfare of the public residing in watersheds within this jurisdiction, while protecting aquatic resources. Additionally this chapter seeks to conserve land, water, air and other natural resources of the County by establishing requirements for the control of erosion and sedimentation. This chapter aims to meet that purpose through the following objectives:

1. Require that land development and land conversion activities control the after-development runoff characteristics in order to reduce the magnitude and frequency of flooding, siltation, stream bank erosion, and property damage;
2. Establish minimum design criteria for the protection of properties and aquatic resources downstream from land development and land conversion activities from damages due to increases in volume, velocity, frequency, duration, and peak flow rate of stormwater runoff;
3. Establish minimum design criteria for measures to minimize nonpoint source pollution from stormwater runoff which would otherwise degrade water quality; and
4. To reduce flood damage in an effort to safeguard public health, safety and property.

### **200.2 Applicability**

This chapter shall be applicable to all subdivision, site plan, land disturbance or land use conversion applications, unless otherwise exempted by state or federal law. This chapter also applies to land development activities that are smaller than the minimum applicable criteria if such activities are part of a larger common plan of development, even though multiple separate and distinct land development activities may take place at different times on different schedules.

To prevent the adverse impacts of stormwater runoff, the county has developed a set of performance standards that must be met at all development sites. These standards apply to any permanent land development that disturbs one (1) acre or more of area or is part of a larger Common Plan of Development.

Economic hardship is not a sufficient reason to grant an exception from the requirements of this chapter.

### **200.3 General**

Determination of flooding and channel erosion impacts to receiving streams and/or drainageways due to land development projects shall be measured at each point of discharge from the development project and such determination shall include any runoff from the balance of the watershed which also contributes to that point of discharge.

Properties and waterways downstream of any land development project shall be protected from localized flood damage due to increases in the volume, velocity and peak flow rate of stormwater runoff in accordance with the minimum design standards set out in this chapter.

To protect stream channels from degradation, specific channel protection techniques shall be provided as specified in the Virginia Stormwater Management Handbook (VSMH).

In new subdivisions, all SWM/BMP facilities shall be placed in a common area and an easement unless prior approval has been obtained from the VESMP Administrator. The placement of SWM/BMP facilities on existing lots of records is acceptable when the installation of the facility is required by the Fauquier County Erosion and Stormwater Management Ordinance (Chapter 11 Fauquier County Code of Ordinances). This provision does not preclude use of Low Impact Development (LID) practices on individual lots.

Stream restoration and relocation projects that incorporate natural channel design concepts are not man-made channels and shall be exempt from any flow rate capacity and velocity requirements for natural or man-made channels as defined in any regulations promulgated pursuant to the *Code of Virginia*, §62.1-44.15:54 or 62.1-44.15:65.

Should a land-disturbing activity associated with an approved SWM plan in accordance with this chapter not begin within the 180-days following approval and plat recordation or cease for more than 180 days, the County may evaluate the existing approved erosion and sediment control plan and stormwater management plan to determine whether the plan still satisfies local program requirements and ensure all design factors are still valid. If the Administrator finds the previously filed plan inadequate, an updated and amended plan shall be submitted and approved prior to resuming land-disturbing activities, and a new performance bond shall be posted. Any facility specifically designed to be regional in nature shall not be subject to the above criteria providing no modifications or changes to land use designations can be demonstrated.

Construction of drainage improvements, stormwater management facilities or modifications to natural channels shall comply with all applicable laws and regulations.

#### **200.4 Compatibility with Other Permit and Ordinance Requirements**

This chapter is not intended to interfere with, abrogate, or annul any other ordinance, rule or regulation, statute, or other provision of law. The requirements of this chapter should be considered minimum requirements, and where any provision of this chapter imposes restrictions different from those imposed by any other ordinance, rule or regulation, or other provision of law, whichever provisions are more restrictive or impose higher protective standards for human health or the environment shall be considered to take precedence.

The applicant shall assure that all applicable permits have been acquired for the project prior to issuance of a land disturbing permit. Evidence of approval of all necessary permits, such as but not limited to: U.S. Army Corps of Engineers, Virginia Department of Environmental Quality, Virginia Department of Conservation and Recreation, Virginia Marine Resources, etc. shall be provided.

#### **200.5 Severability**

If the provisions of any article, section, subsection, paragraph, subdivision or clause of this chapter shall be judged invalid by a court of competent jurisdiction, such order of judgment shall not affect or invalidate the remainder of any article, section, subsection, paragraph, subdivision or clause of this chapter.

#### **200.6 Reference Documents**

The latest edition of the following documents shall be used to guide the design of drainage, stormwater management and related elements;

1. Virginia Stormwater Management Handbook (VSMH), latest version
2. Virginia Department of Transportation (VDOT) Drainage Manual
3. Virginia Department of Transportation (VDOT) Road and Bridge Standards
4. Virginia Department of Transportation (VDOT) Structure and Bridge Manual
5. Virginia Stormwater BMP Clearinghouse website

#### **SECTION 200.7 Definitions**

***"Accelerated Erosion"*** means erosion caused by development activities that exceeds the natural processes by which the surface of the land is worn away by the action of water, wind, or chemical action.

***"Adequate Channel"*** means a channel that will convey the designated frequency storm event neither overtopping the channel banks nor causing erosive damage to the channel bed or banks.

***"Administrator"*** means the VESMP Administrator.

***"Agreement in lieu of a Plan"*** means a contract between the VESMP authority and the owner or permittee that specifies methods that shall be implemented to comply with the requirements of this article for the construction of a (i) single-family detached residential structure or (ii) farm building or structure on a parcel of land with a total impervious cover percentage, including the impervious cover from the farm building or structure to be constructed, of less than five percent; such contract may be executed by the VESMP authority in lieu of a formal soil erosion and stormwater management plan.

**"Applicant"** means a person submitting a soil erosion control and stormwater management plan to a VESMP authority for approval in order to obtain authorization to commence a land disturbing activity under this chapter.

**"Aquatic Bench"** means a 10- to 15- foot wide bench around the inside perimeter of a permanent pool that ranges in depth from zero to 12 inches. Vegetated with emergent plants, the bench augments pollutant removal, provides habitats, conceals trash and water level fluctuations, and enhances safety.

**"Best Management Practice or BMP"** means schedules of activities, prohibitions of practices, including both structural and nonstructural practices, maintenance procedures, and other management practices to prevent or reduce the pollution of surface waters and groundwater systems.

1. "Nonproprietary best management practice" means both structural and nonstructural practices to prevent or reduce the pollution of surface waters and groundwater systems that are in the public domain and are not protected by trademark or patent or copyright.

2. "Proprietary best management practice" means both structural and nonstructural practices to prevent or reduce the pollution of surface waters and groundwater systems that are privately owned and controlled and may be protected by trademark or patent or copyright.

**"Bioretention Basin"** means a water quality BMP engineered to filter the water quality volume through an engineered planting bed, consisting of a vegetated surface layer (vegetation, mulch, ground cover), planting soil, and sand bed, and into the in- situ material.

**"Bioretention Filter"** means a bioretention basin with the addition of an underdrain collection system beneath the planting bed.

**"Board"** means the Fauquier County Board of Supervisors.

**"Building"** means any structure, either temporary or permanent, having walls and a roof, designed for the shelter of any person, animal, or property, and occupying more than 100 square feet of area.

**"Certified Inspector"** means an employee or agent of Fauquier County who (i) holds a certificate of competence from the State Board in the area of project inspection or (ii) is enrolled in the State Board's training program for project inspection and successfully completes such program within one year after enrollment.

**"Certified Plan Reviewer"** means an employee or agent of Fauquier County who (i) holds a certificate of competence from the State Board in the area of plan review, (ii) is enrolled in the State Board's training program for plan review and successfully completes such program within one year after enrollment, or (iii) is licensed as a professional engineer, architect, landscape architect, land surveyor pursuant to Article

1 (§ 54.1-400 et seq.) of Chapter 4 of Title 54.1 of the *Code of Virginia*, or professional soil scientist as defined in 54.1-2200 of the *Code of Virginia*.

**“Certified Program Administrator”** means an employee or agent of Fauquier County who (i) holds a certificate of competence from the State Board in the area of program administration or (ii) is enrolled in the Board's training program for program administration and successfully completes such program within one year after enrollment

**“Channel”** means a natural stream or manmade watercourse with a definite defined bed and banks that conducts continuously or periodically flowing water.

**“Chesapeake Bay Preservation Act Land-Disturbing Activity”** means a land-disturbing activity including clearing, grading, excavating that results in land disturbance equal to or greater than 2,500 square feet and less than one acre in all areas of jurisdictions designated subject to the regulations adopted pursuant to the Chesapeake Bay Preservation Act.

**“Clean Water Act or CWA”** means the federal Clean Water Act (33 U.S.C. §1251 et seq.), formerly referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972, Public Law 92-500, as amended by Public Law 95-217, Public Law 95-576, Public Law 96-483 and Public Law 97- 117, or any subsequent revisions thereto.

**“Clearing”** means any activity which removes the vegetative ground cover, including but not limited to, root mat removal or topsoil removal.

**“Construction activity”** means any clearing, grading, or excavation associated with large construction activity or associated with small construction activity.

**“Common Plan of Development or Sale”** means a contiguous area where separate and distinct construction activities may be taking place at different times on different schedules.

**“Conceptual Stormwater Management Plan”** means a document(s) containing material conceptually describing methods for complying with the requirements of this Ordinance.

**“Constructed Wetlands”** means areas intentionally designed and created to emulate the water quality improvement function of wetlands for the primary purpose of removing pollutants from stormwater.

**“Control Measure”** means any best management practice or stormwater management facility, or other method used to minimize the discharge of pollutants to state waters.

**“Dam Height”** is defined as the vertical distance from the streambed at the downstream toe of slope of the dam embankment to the top of the dam.

**"Dedication"** means the deliberate granting of property by its owner for general public use.

**"Department or DEQ"** means the Virginia Department of Environmental Quality.

**"Detention"** means the temporary storage of storm runoff in a stormwater management practice with the goals of controlling peak discharge rates and providing gravity settling of pollutants.

**"Detention Facility"** means a detention basin or alternative structure designed for the purpose of temporary storage of stream flow or surface runoff and gradual release of stored water at controlled rates.

**"Developer"** means a person who undertakes land disturbance activities.

**"Development"** means land disturbance and the resulting landform associated with the construction of residential, commercial, industrial, institutional, recreation, transportation or utility facilities or structures or the clearing of land for non-agricultural or non-silvicultural purposes.

**"District or Soil and Water Conservation District"** means a political subdivision of the Commonwealth, , organized in accordance with the provisions of Article 3 (§ 10.1-506 et seq.) of Chapter 5 of Title 10.1 of the Code of Virginia, as amended.

**"Drainage Easement"** means a legal right granted by a landowner to a grantee allowing the use of private land for drainage and stormwater management purposes.

**"Erosion and sediment control plan"** means a document containing material for the conservation of soil and water resources of a unit or group of units of land. It may include appropriate maps, an appropriate soil and water plan inventory and management information with needed interpretations, and a record of decisions contributing to conservation treatment. The plan shall contain all major conservation decisions to ensure that the entire unit or units of land will be so treated to achieve the conservation objectives.

**"ESM plan"** means a soil erosion control and stormwater management plan, commonly referred to as the erosion control and stormwater management plan.

**"Erosion Impact Area"** means an area of land not associated with current land-disturbing activity but subject to persistent soil erosion resulting in the delivery of sediment onto neighboring properties or into state waters. This definition shall not apply to any lot or parcel of land of 10,000 square feet or less used for residential purposes.

**"Excavating"** means any digging, scooping, or other methods of removing earth materials.

**"Flooding"** means a volume of water that is too great to be confined within the banks

or walls of the stream, water body or conveyance system and that overflows onto adjacent lands, causing or threatening damage.

**"Grading"** means any excavating or filling of earth materials or any combination thereof, including the land in its excavated or filled condition.

**"Grassed Swale"** means an earthen conveyance system which is broad and shallow with erosion resistant grasses and check dams, engineered to remove pollutants from stormwater runoff by filtration through grass and infiltration into the soil.

**"Hydrologic Soil Group or HSG"** means a Natural Resource Conservation Service classification system in which soils are categorized into four runoff potential groups. The groups range from A soils, with high permeability and little runoff production, to D soils, which have low permeability rates and produce much more runoff.

**"General Permit"** means a state permit authorizing a category of discharges under the CWA and the VESMA within a geographical area.

**"Impervious Cover"** means a surface composed of material that significantly impedes or prevents natural infiltration of water into soil.

**"Impoundment Capacity"** is defined as the volume capable of being impounded at the top of the dam.

**"Infiltration"** means the process of percolating water into the soil.

**"Infiltration Facility"** means a stormwater management facility that temporarily impounds runoff and discharges it via infiltration through the surrounding soil. While an infiltration facility may also be equipped with an outlet structure to discharge impounded runoff, such discharge is normally reserved for overflow and other emergency conditions. Since an infiltration facility impounds runoff only temporarily, it is normally dry during nonrainfall periods. Infiltration basin, infiltration trench, infiltration dry well, and porous pavement shall be considered infiltration facilities.

**"Jurisdictional Wetland"** means an area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation.

**"Land Conversion Activities"** means any activity that result in a modification to the current or natural condition.

**"Land Development or Land Development Project"** means a manmade change to the land surface that potentially changes its runoff characteristics.

**"Land Disturbance or Land-Disturbing Activity"** means a man-made change to the land surface that may result in soil erosion from water or wind and movement of sediments into state waters or onto lands in the state and/or potentially changes its runoff characteristics including clearing, grading, transporting, filling of land or excavation

except that the term shall not include those exemptions specified in Section 11-5 of the County's Erosion and Stormwater Management Ordinance.

**"Land Disturbance Permit or LDP"** means a permit issued by Fauquier County authorizing land disturbing activity for disturbances equal to and greater than 10,000 square feet. Evidence of general permit coverage shall be provided where applicable prior to issuance. An LDP permit shall be required prior to commencement of land disturbance.

**"Landowner"** means the legal or beneficial owner of land, including those holding the right to purchase or lease the land, or any other person holding proprietary rights in the land.

**"Land Use Conversion"** means a change in the primary usage of the land (i.e. change from forestry to non-forestry usage) or a change in the vegetative cover (i.e. from tree to grass). The Land Use Conversion that is of importance to this Ordinance is that in which changes the runoff characterization of the land, and thus becomes a "Land Disturbance".

**"Layout"** means a conceptual drawing sufficient to provide for the specified stormwater management facilities required at the time of approval.

**"Linear Development Project"** means a land development project that is linear in nature such as, but not limited to, (i) the construction of electric and telephone utility lines, and natural gas pipelines; (ii) construction of tracks, rights-of-way, bridges, communication facilities and other related structures of a railroad company; and (iii) highway construction projects; (iv) construction of stormwater channels and stream restoration activities; and (v) water and sewer lines. Private subdivision roads or streets shall not be considered linear development projects.

**"Local Program"** means a statement of the various methods adopted pursuant to the Virginia Erosion and Stormwater Management Act and implemented by a locality to manage the runoff from land development projects and shall include an ordinance with provisions to require the control of after-development stormwater runoff rate of flow, water quality, the proper maintenance of stormwater management facilities, and minimum administrative procedures consistent with this chapter.

**"Locality"** means Fauquier County.

**"Maintenance Agreement"** means a legally recorded document that acts as a property deed restriction, and which provides for long-term maintenance of storm water management practices.

**"Minor Modification"** means modifications and amendments to an existing general permit before its expiration not requiring extensive review and evaluation including, but not limited to, changes in EPA promulgated test protocols, increasing monitoring frequency requirements, changes in sampling locations, and changes to compliance dates within the overall compliance schedules. A minor general permit modification or amendment does not substantially alter general permit conditions, substantially

increase or decrease the amount of surface water impacts, increase the size of the operation, or reduce the capacity of the facility to protect human health or the environment.

***“Natural Channel Design Concepts”*** means the utilization of engineering analysis and fluvial geomorphic processes to create, rehabilitate, restore, or stabilize an open conveyance system for the purpose of creating or recreating a stream that conveys its bankfull storm event within its bank and allows larger flows to access its bankfull bench and its floodplain.

***“Nonpoint Source Pollution or NPS”*** means pollution such as sediment, nitrogen, phosphorous, hydrocarbons, heavy metals, and toxics whose sources cannot be pinpointed but rather are washed from the land surface in a diffuse manner by stormwater runoff.

***“Nonpoint Source Pollutant Runoff Load or Pollutant Discharge”*** means the average amount of a particular pollutant measured in pounds per year, delivered in a diffuse manner by stormwater runoff

***“Off-Site Facility”*** means a stormwater management measure located outside the subject property boundary described in the permit application for land development activity.

***“On-Site Facility”*** means a stormwater management measure located within the subject property boundary described in the permit application for land development activity.

***“Operator”*** means the owner or operator of any facility or land disturbing activity subject to regulation under the County’s Erosion and Stormwater Management Ordinance.

***“Owner”*** means the owner or owners of the freehold of the premises or lesser estate therein, including a mortgagee or vendee in possession, assignee of rents, receiver, executor, trustee, lessee or other person, firm or corporation in control of a property. The owner is responsible for the preparation, submission, approval, and implementation of the ESM plan.

***“Percent Impervious”*** means the impervious area within the site divided by the area of the site multiplied by 100.

***“Permittee”*** means the person to whom the Land disturbance Permit or VESMP Authority Permit is issued as applicable.

***“Person”*** means any individual, partnership, firm, association, joint venture, public or private corporation, trust, estate, commission, board, public or private institution, utility, municipality, governmental body including federal, state, or local entity as applicable, cooperative, county, city, town or other political subdivision of the Commonwealth, any interstate body or any other legal entity.

***“Plan-Approving Authority”*** means Fauquier County.

**"Planning Area"** means a designated portion of the parcel on which the land development project is located. Planning areas shall be established by delineation on a master plan. Once established, planning areas shall be applied consistently for all future projects.

**"Post-development"** refers to conditions that reasonably may be expected or anticipated to exist after completion of the land development activity on a specific site or tract of land.

**"Pre-development"** refers to the conditions that exist at the time that plans for the land development of a tract of land are submitted to the VESMP authority. Where phased development or plan approval occurs (preliminary grading, demolition of existing structures, roads and utilities, etc.), the existing conditions at the time *prior to* the commencement of land disturbing activity shall establish pre-development conditions

**"Program Authority"** means Fauquier County.

**"Redevelopment"** means the process of developing land that is or has been previously developed.

**"Regional (watershed-wide) Stormwater Management Facility or Regional Facility"** means a facility or series of facilities designed to control stormwater runoff from a specific watershed, although only portions of the watershed may experience development.

**"Regulations"** means the Virginia Erosion and Stormwater Management Program (VESMP) Permit Regulations, 9VAC 25-875, as amended.

**"Responsible Land Disturber or RLD"** means an individual holding a certificate of competence issued by DEQ who will be in charge of and responsible for carrying out the land-disturbing activity in accordance with the approved plan. The RLD may be the owner, applicant, permittee, designer, superintendent, project manager, contractor, or any other project or development team member. The RLD must be designated on the plan or permit as a prerequisite for plan approval by the Plan-Approving Authority.

**"Runoff or stormwater runoff"** means that portion of precipitation that is discharged across the land surface or through conveyances to one or more waterways.

**"Site"** means the land or water area where any facility or land-disturbing activity is physically located or conducted including adjacent land used or preserved in connection with the facility or land-disturbing activity.

**"Stabilization"** means for the purpose of this section, stabilization is defined as an establishment and persistence of seventy (75) percent or more living overall perennial vegetation of the intended species mix and a maximum contiguous bare area of less than 500 square feet that effectively limits sheet and rill erosion and stabilizes the soil surface.

**"Stabilized"** means land that has been treated to withstand normal exposure to natural

forces without incurring erosion damage.

**“State”** means the Commonwealth of Virginia.

**“State Board”** means the State Water Control Board.

**“State application” or “application”** means the standard forms, including any additions, revisions, or modifications to the forms, approved by the administrator and the department for applying for a permit.

**“State Water Control Law”** means Chapter 3.1 (§62.1-44.2 et seq.) of Title 62.1 of the Code of Virginia.

**“State Waters”** means all water, on the surface and under the ground, wholly or partially within or bordering the Commonwealth or within its jurisdiction, including wetlands.

**“Stop Work Order”** means an order issued which requires that all land disturbing activity on a site be stopped.

**“Stormwater”** means precipitation that is discharged across the land surface or through conveyances to one or more waterways and that may include stormwater runoff, snow melt runoff, and surface runoff and drainage.

**“Stormwater Extended Detention Basin or Extended Detention Basin”** means a stormwater management facility which temporarily impounds runoff and discharges it through a hydraulic structure over a period of time to a downstream conveyance system for the purpose of water quality enhancement or stream channel erosion control. While a certain amount of outflow may also occur via infiltration through the surrounding soil, such amounts are negligible when compared to the outlet structure discharge rates and, therefore, are not considered in the facility’s design. Since an extended detention basin impounds runoff only temporarily, it is normally dry during non-rainfall periods.

**“Stormwater Management Easement”** means a legal right granted by a landowner to a grantee allowing the use of private land for stormwater management purposes.

**“Stormwater Management Facility”** means a control measure that controls stormwater runoff and changes the characteristics of that runoff including, but not limited to, the quantity and quality, the period of release or the velocity of flow.

**“Stormwater Management or SWM”** means the use of structural or non-structural practices that are designed to reduce storm water runoff pollutant loads, and/or peak flow discharge rates and control discharge volumes.

**“Stormwater Management Plan or SWM Plan”** means a document(s) containing material describing methods for complying with the requirements of Section 11-77 of the County’s Erosion and Stormwater Management Ordinance.

***"Stormwater Pollution Prevention Plan or SWPPP"*** means a document that is prepared in accordance with good engineering practices and that identifies potential sources of pollutants that may reasonably be expected to affect the quality of stormwater discharges from the construction site, and otherwise meets the requirements of this Ordinance. In addition the document shall identify and require the implementation of control measures, and shall include, but not be limited to the inclusion of or the incorporation by reference of, approved erosion and sediment control plan, an approved stormwater management plan, and a pollution prevention plan and WLA, as required

***"Stormwater Retention Basin"*** means a man-made basin which contains a permanent pool of impounded water like a lake or natural pond. The wet pond is designed to hold a permanent pool above which storm runoff is stored and released at a controlled rate. The release is regulated by an outlet device designed to discharge flows at various rates similar methods employed in a Stormwater Extended Detention Basin.

***"Stormwater Runoff"*** means flow on the surface of the ground, resulting from precipitation.

***"Subdivision"*** means the same as defined in Section 2-39 of Fauquier County Subdivision Ordinance.

***"Total Maximum Daily Load or TMDL"*** means the sum of the individual wasteload allocations for point sources, load allocations (LAs) for nonpoint sources, natural background loading and a margin of safety. TMDLs can be expressed in terms of either mass per time, toxicity, or other appropriate measure. The TMDL process provides for point versus nonpoint source trade-offs.

***"Transporting"*** means any moving of earth materials from one place to another, other than such movement incidental to grading, when such movement results in destroying the vegetative ground cover either by tracking or the buildup of earth materials to the extent that erosion and sedimentation will result from the soil or earth materials over which such transporting occurs.

***"Virginia Erosion and Stormwater Management Act" or "VESMA"*** mean Article 2.3 (§ 62.1-44.15:24 et seq.) of Chapter 3.1, State Water Control Law, of Title 62.1 of the Code of Virginia.

***"Virginia Stormwater BMP Clearinghouse Website"*** means a website that contains detailed design standards and specifications for control measures that may be used in Virginia to comply with the requirements of the Virginia Stormwater Management Act and associated regulations.

***"Virginia Erosion and Stormwater Management Program" or "VESMP"*** means a program established by the VESMP authority for the effective control of soil erosion and sediment deposition and the management of the quality and quantity of runoff resulting from land-disturbing activities to prevent the unreasonable degradation of properties, stream channels, waters, and other natural resources. The program shall

include such items as local ordinances, rules, requirements for permits and land-disturbance approvals, policies and guidelines, technical materials, and requirements for plan review, inspection, and enforcement consistent with the requirements of the VESMA.

***“Virginia Erosion and Stormwater Management Program authority” or “VESMP authority”*** means Fauquier County, approved by the department to operate the VESMP.

***“VESMP Authority Permit or Permit”*** means an approval to conduct a land-disturbing activity issued by the VESMP authority for the initiation of land-disturbing activity after evidence of general permit coverage has been provided where applicable. A VESMP Authority Permit shall be issued prior to commencement of land disturbance.

***“VESMP Program Administrator or VESMP Administrator”*** means an employee or agent of Fauquier County who (i) holds a certificate of competence from the Board in the area of program administration or (ii) is enrolled in the Board's training program for program administration and successfully completes such program within one year after enrollment and is responsible for administering the VESMP on behalf of Fauquier County.

***“Waste Load Allocation or WLA”*** means the portion of receiving surface water's loading or assimilative capacity allocated to one of its existing or future point sources of pollution. WLA's are a type of water quality-based effluent limitation.

***“Watercourse”*** means a permanent or intermittent stream or other body of water, either natural or man-made, which gathers or carries surface water.

***“Watershed”*** means a defined land area drained by a river, stream, drainage ways or system of connecting rivers, streams, or drainage ways such that all surface water within the area flows through a single outlet.

## **SECTION 201 Stormwater Hydrology**

### **201.1 Design Storm Frequencies and Duration**

#### **201.1.1 General**

For storm drainage systems that are located within public right-of-ways and/or will be included for maintenance under the state highway system, the rainfall frequencies required by the VDOT drainage manual shall be used, with the exception that no system shall be designed for less than a ten (10) year storm event unless allowed elsewhere in the Design Standards Manual (DSM).

The VDOT Drainage Manual shall be used for the design of inlets or catch basins unless the conditions require the design for a larger storm event as determined by the County. The ten (10) year storm event and the actual time of concentration shall be used for the design of grate inlets. The grate inlets shall be designed using a fifty percent (50%) clogging factor.

The specified design storms for stormwater management facilities shall be defined as a 24-hr storm using the site specific rainfall precipitation frequency

data recommended by the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 unless using the Modified Rational Method, in which case the storm of critical duration should be used.

### **201.1.2 Overland Relief**

All storm drainage designs for open channels, culverts, and storm drains shall be designed to provide overland relief to convey the 100-year storm event where there is the possibility of flooding residences, commercial or industrial buildings, overtopping primary roads, experiencing significant economic loss, or catastrophic failure. Where justified by the consequences of failure, the minimum design frequency shall be increased.

## **201.2 Drainage Area**

Drainage areas should be identified on a topographic map. The 5-foot contour topographic maps available from the Fauquier County GIS Department are often appropriate to delineate drainage areas that extend beyond the site development area.

When designing a drainage system, the flow path is not necessarily the same before and after land disturbing activities have been completed. Therefore, the travel time path shall be reflective of the actual conditions both before and after the land disturbing activities.

In some cases, runoff from a portion of the drainage area that is highly impervious may result in a greater peak discharge than would occur if the entire area were considered. In this case, adjustments can be made to the drainage area by disregarding those areas where flow time is too slow to add to the peak discharge.

To prevent small drainage areas from skewing the time of concentration calculation results, when establishing sub drainage areas for analysis, the largest sub drainage area should be no greater than 5 times the area of the smallest sub drainage area.

## **201.3 Time of Concentration (T<sub>c</sub>)**

### **201.3.1 General**

The following methods shall be used to determine the time of concentration for drainage areas; however, the results shall be reviewed for reasonableness and the results shall be revised if needed to provide a time of concentration that will best represent the study area. Actual conditions for the pre-developed condition shall be verified by field evaluation.

### **201.3.2 Overland Flow**

The length of overland flow shall be reflective of actual conditions and shall be no greater than 150 feet unless approval from the Program Administrator is obtained. Overland flow shall be calculated using TR-55 methodology or using the Seelye chart<sup>1</sup>. Acceptable roughness coefficients (Manning's n-values) for sheet flow are provided in Table 201.1.

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<sup>1</sup> Data Book for Civil Engineers – Design; Volume 1, by E. E. Seelye

### **201.3.3 Shallow Concentrated Flow**

The maximum allowable length for shallow concentrated flow shall be 1000 feet. Shallow concentrated flow shall be calculated using TR-55 methodology or the Kirpich nomograph.<sup>2</sup>

### **201.3.4 Channelized Flow and Pipe Flow**

Channelized flow and pipe flow shall be calculated using TR-55 methodology or the Kirpich nomograph. 2

## **201.4 Selection of Methodologies**

### **201.4.1 General**

The Natural Resources Conservation Service (NRCS) synthetic rainfall distribution and models, including but not limited to Technical Release Number 20 (TR-20) and Technical Release Number 55 (TR-55), the USACE's HEC-1 and HEC-HMS software, as well as other NRCS applications are preferred and acceptable for all stormwater management and floodplain analyses. The NRCS method must be used where drainage areas are equal to or greater than 200 acres, or where times of concentration are 20 minutes or longer. The Rational Method may be used to determining peak discharge for drainage areas are equal to or less than 200 acres. The Modified Rational Method may be used to determine peak discharge rates for drainage areas equal to or less than 200 acres AND when the time of concentration is less than 20 minutes. Other hydrologic methods may be approved by the VESMP Administrator for specific applications provided that it demonstrates alternatives are appropriate for the purpose intended.

### **201.4.2 Rational and Modified Rational Methods**

#### **A. Runoff Coefficient**

The Runoff Coefficient (C) is a variable of the Rational Method that requires significant judgment and understanding for proper selection. A range of C-values for a given land use is provided in Exhibit 201.3.

#### **B. Average Rainfall Intensity**

Rainfall intensity (I) shall be determined by utilizing VDOT Hydraulic Design Advisory HDA 05-03, adopted June 21, 2005.

Rainfall intensities shall be determined using the following formula:

$$I = B / (t_c + D)^E \text{ where:}$$

I = Rainfall intensity for a given recurrence interval, in inches per hour

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<sup>2</sup> Study by P. Z. Kirpich, published in Civil Engineering

B, D, E = As taken from HDA 05-03 table for Fauquier County based on the designated storm frequency.

Storm Recurrence Interval	B	D	E
2 year	54.24	11.50	0.85
5 year	54.80	11.50	0.80
10 year	48.34	10.00	0.74
25 year	41.03	8.25	0.66
50 year	35.44	6.50	0.60
100 year	31.38	5.00	0.55

### 201.4.3 NRCS Method

A. If the drainage basin is greater than 20 acres and/or the basin contains areas of different land uses, the drainage basin should be divided into sub-basins. Each sub-basin should have similar land uses.

B. 24-hour Rainfall and Distribution

The 24-hour rainfall is determined from NOAA's Atlas 14 Rainfall Data listed in the table below.

Average Recurrence Interval (years) for a 24-hour storm duration	Precipitation Frequency Estimates (inches)
1	2.59
3	3.14
5	4.02
10	4.79
25	5.97
50	7.01
100	8.18

Source: NOAA ATLAS 14 Rainfall Data, Station ID: 44-8888.  
\*Subject to change with increase in historic record.

C. Curve Number (CN) Tables containing CNs for various types of cover and soils conditions are available in TR-55. The urban runoff CNs are based upon the given percent impervious area. If the proposed land-use has a higher percent impervious area than the given values, the runoff CNs shall be recomputed based on the proposed percent impervious area.

When calculating existing rates of runoff (pre-construction), assume that all cover types are in good hydrologic condition.

## **201.5 Pre Development Conditions**

### **201.5.1 Site Development**

Pre-development hydrologic calculations for land disturbing activities shall consider the site conditions that have existed for the 5-year period before the site plan application and shall use the site condition that results in the lowest peak rate of runoff, and the lowest percent impervious area.

As an example, if a site was originally wooded and was cleared and converted to grassland 4-years before the submission of the site plan, then the pre-development condition used in the calculations would be wooded in good condition.

### **201.5.2 Redevelopment**

Pre-development hydrologic calculations for redevelopment projects shall consider the site conditions that have existed for the 5-year period before the site plan application and may use the site condition that results in the highest peak rate of runoff, and the highest percent impervious area.

As an example, if a site originally contained a building and was 60-percent impervious and the building was demolished and removed 4-years before the submission of the site plan changing the impervious percentage to 40-percent, then the pre-development condition used in the calculations for both water quantity and quality may be based on the 60-percent impervious area.

## **201.6 Drainage Area Analysis**

When determining the stormwater management requirements for quantity control, an analysis of the pre- and post-development site conditions must be conducted. Individual lots or parcels in a residential, industrial, or commercial development shall not be considered to be separate development projects, except as provided for in the Fauquier County Erosion and Stormwater Management Ordinance. The drainage area analysis shall reflect the ultimate development conditions of the property where the land disturbing activity is being permitted.

To prevent the undersizing of stormwater management components, upstream property conditions shall be considered in the drainage area analysis. Stream channel and improvements to any conveyance system shall be analyzed based on the ultimate development conditions. Design of drainage infrastructure shall be based on current zoning development and the associated anticipated densities of percent impervious area.

When a project site contains or is divided by multiple drainage areas, stormwater management of each drainage area must be addressed separately. Over detention of flow from one area is not an effective solution to achieving water quantity goals. Improving the channel immediately downstream is not effective in controlling the actual flow release from the site being developed, nor does it reduce the impact of the flow on properties further downstream.

## SECTION 202 Open Channels

### 202.1 Design Methodology and Criteria

#### 202.1.1 Design Flow

Design flows for open channels must be contained within the channel.

#### 202.1.2 Channel Velocity

The lining of channels shall be designed to withstand the erosive effects from the 2-year storm event. A table of channel roughness coefficients (Manning's n-values) for channels and natural streams are provided in Exhibits 202.1 and 202.2 respectively. The final design velocities shall be within the limitations for the selected channel lining, as presented in Table 202.1 and Exhibit 202.3.

Where open channels receive flow from storm drains, culverts, or other open channels, or in other areas where channel velocity may cause scouring or erosion, outlet protection or energy dissipation may be necessary to reduce the potential for severe erosion.

**TABLE 202.1 Maximum Velocity Based on Channel Lining**

Channel Lining	Maximum Velocity (Design Storm)	
	Erosion Resistant Soils <sup>1</sup>	Easily Erodible Soils <sup>2</sup>
Vegetative Lined Channels		
Tall Fescue Grass Mixtures	6 fps	4 fps
Kentucky Bluegrass	6 fps	4 fps
Annual and Perennial Rye	4 fps	3 fps
Sod	4 fps	3 fps
Geosynthetic Lined Channels		
VDOT EC-2		4 fps
VDOT EC-3, Type A		7 fps
VDOT EC-3, Type B		10 fps
Other	Per Manufacturer's Recommendations	
Riprap	Dependent on stone size and thickness, see HEC-15 for design of riprap channels	
Concrete	None	

<sup>1</sup> Erosion resistant soil includes those with a high clay content and high plasticity, silty clay, sandy clay, and clay.

<sup>2</sup> Easily erodible soils include those with a high content of fine sand or silty, lower plasticity or non-plastic, sand, silt, sandy loam, and silty loam with an erodibility factor (K) greater than 0.35.

### **202.1.3 Channel Slope**

Open channels must be graded to drain with no standing water following a rain event. The minimum allowable slope shall be 2-percent for vegetated-lined and riprap-lined open channels and 1-percent for a concrete open channel, other than roadside ditches within VDOT's right of way.

The maximum allowable grade for a stormwater channel shall be dependent on the channel lining materials and its ability to withstand erosion during the design storm.

### **202.1.4 Channel Location and Width Restrictions on Residential Lots**

Residential lots in which lot size is less than thirty thousand (30,000) square feet shall be graded in such a manner that surface runoff does not cross more than two (2) lots before it is collected in a storm sewer system or a designed stormwater conveyance channel. All surface drainage must be contained in an adequate easement once it is discharged from the third residential lot.

## **202.2 Channel Adequacy**

- A. Projects not requiring Construction General Permit coverage under the VESMP Regulations shall meet the requirement of 9VAC25-875-560.19 for stream channel erosion prevention criteria and flood protection criteria.
- B. Projects obtaining Construction General Permit coverage under the Virginia Erosion and Stormwater Management Program (VESMP) Permit Regulations shall meet the requirements of 9VAC25-875-600 for channel protection and flood protection criteria.

## **202.3 Maintenance Requirements**

The permittee is responsible for maintenance of open channels until construction is complete, including final clean up and site stabilization, to the satisfaction of the County. After the completion of construction, the property owner is responsible for maintenance of open channels, unless otherwise described in a recorded deed of easement or maintenance agreement.

No one shall fill, modify, or construct structural modifications which impairs or restricts flow in open channels, except as shown on an approved plan.

## **202.4 Floodplain Studies**

A detailed floodplain study shall be performed for all drainage areas greater than 100 acres that do not currently have a detailed FEMA Flood Insurance Study flood profiles or elevations. Drainage easements must be designated on site to preserve the

inundation zone. Calculations shall be based on land use as outlined in the Comprehensive Plan.

All Floodplain Studies shall be prepared utilizing NRCS Hydrology unless otherwise approved by the VESMP Administrator. NRCS Hydrology consists of Technical Release Number 20 (TR-20) and Technical Release Number 55 (TR-55) including the USACE HEC-1/HEC-HMS software, and other NRCS applications.

Construction of drainage improvements, stormwater management facilities, and/or modifications within a Federal Emergency Management Agency (FEMA) designated Special Flood Hazard Area (SFHA) shall be avoided to the maximum extent practicable. When this is unavoidable, all improvements or modifications shall be in compliance with all applicable regulations under the National Flood Insurance Program, 44 CFR Part 59 and shall be engineered for structural integrity during the 100-year storm event by the primary flooding source or secondary source, whichever yields the most conservative design. Any construction activity proposed in the SFHA will require the submission of a detailed Floodplain Study including all the supporting documentation of the effective (if applicable), and the pre- and post-development conditions, for review by the County. Calculations for the pre-development condition shall be based on what exists just prior to development and not ultimate conditions based as outlined in the Comprehensive Plan. Modifications to the effective regulatory floodplain will require final FEMA determination at the owner's expense.

## **SECTION 203 Culverts**

### **203.1 Design Methodology and Criteria**

- A. Culverts shall be designed with a headwater to culvert diameter ratio of less than 2.0 for a 10-year frequency storm, unless otherwise restricted by VDOT.
- B. In addition, the ponded overland relief area of a 100-year frequency storm with the culvert 100% clogged shall be shown to not flood adjacent buildings/structures.
- C. Minimum culvert performance is determined by analyzing both inlet and outlet control for a given flow and using the highest resulting headwater.
- D. Culverts under public roads shall be provided with end sections or endwalls in accordance with the outlet protection requirements of the VDOT Drainage Manual.
- E. The minimum velocity in a culvert barrel must be adequate to prevent siltation at low flow rates. At a minimum this velocity shall be 3 feet per second for a 2-year storm event.
- F. For drainage, all closed conduit and culvert design should be in accordance with the latest version of the VDOT Drainage Manual.

### **203.2. Materials**

Culverts, both public and private, shall be constructed of materials as follows:

- A. All public culverts and culverts within VDOT right-of-way shall be VDOT approved materials in accordance with VDOT IIM-LD-121.15 and VDOT Standard PC-1.
- B. Private culverts not in the VDOT right-of-way may be:
  - Reinforced concrete pipe (RCP) or
  - Corrugated metal pipe (CMP) or
  - Corrugated high-density polyethylene (HDPE) with an integrally formed smooth interior is allowed for sizes 48-inch diameter or smaller.
- C. Manning's n-values shall be representative of the culvert material specified. See Exhibit 203.1 for recommended values.

### **203.3 Culvert Sizes**

The minimum culvert size shall be 15-inch diameter.

The maximum length of a culvert shall be 300 feet. A culvert longer than 300 feet shall have manholes or junction boxes and shall fall under the requirements of Section 204.

### **203.4 Debris and Trash Racks**

In general, trash racks or debris deflectors shall not be used where other site modifications may be made to prevent excessive trash or debris from entering the culvert. However, they may be required at specific locations, by Fauquier County, where large amounts of storm debris may be anticipated.

### **203.5 Environmental Considerations**

Where compatible with good hydraulic engineering, a culvert shall be located in "dry" conditions. Where this is not possible, the culvert shall be located to minimize impacts to streams or wetlands.

When a culvert is set in a perennial stream the invert of the culvert shall be set below the normal flow line of the stream as required in the VDOT Drainage Manual. The slope of the culvert shall not exceed the slope of the natural stream.

### **203.6 Maintenance Requirements**

The permittee is responsible for maintenance of culverts until construction is complete, including final clean up and site stabilization, to the satisfaction of Fauquier County. After the completion of construction, the property owner or responsible party is responsible for maintenance of all culverts not located in public easements, unless otherwise described in a recorded deed of easement or maintenance agreement.

No one shall modify culverts in any way that impairs or restricts flow, except as shown on an approved plan.

## **SECTION 204 Storm Drains**

### **204.1 Hydrology**

Calculations establishing the design flow shall be submitted with the Stormwater Management Plan. Design flows shall be based on ultimate build-out of the contributing watershed based on the current Comprehensive Plan.

### **204.2 Design Flows**

The following minimum storm frequencies shall be used:

- A. Inlets  
Inlets shall be designed for the 10-year storm.
  
- B. Storm Drains  
Storm drains shall be designed for the 10-year frequency design storm event. To allow for clogging, grate inlets used at sump locations shall be designed using a 50% clogging factor.
  
- C. Storm Drain Slope  
To deter the settling of debris and sediment in the storm drain pipe, the minimum design slope of a closed conduit shall be 0.5%.
  
- D. Pipe Size  
All stormwater conveyance pipes shall be a minimum of 15-inch diameter. Pipe size shall not be reduced along the direction of the flow, except as required for proper operation of stormwater management facilities. In general, there may not be a reduction in pipe size greater than one standard increment along the direction of flow.
  
- E. Access  
Regardless of pipe size, a cleanout access point, either an inlet, manhole, or junction box shall be provided at a maximum of every 300 feet of pipe.

### **204.3 Determination of Hydraulic Grade Line**

The hydraulic grade line shall not exceed any critical elevation during the design storm. Critical elevations include rising above the ground elevation at inlets or other structures, or reaching an elevation where storm flow could back-up to cause flooding damage.

### **204.4 Overland Relief**

In all Service Districts, drainage systems shall be designed to provide, as a minimum, overland relief from the 100-year rainfall event without increasing the flood potential for nearby buildings. Calculations shall be provided to show appropriate overland relief when the primary drainage system is adjacent to buildings. In lieu of

calculations, the plans must indicate a minimum of 1 foot of overland relief provided between the relief point and the lowest entry point of any building.

#### **204.5 Materials**

##### **A. Storm Drain Pipe**

Storm drain pipe, both public and private storm drain systems, shall be constructed of materials as follows:

- Storm drains in the VDOT right-of-way shall be VDOT approved materials in accordance with VDOT IIM-LD-121.15 and VDOT Standard PC-1.
- Storm drains not in the VDOT right-of way shall be reinforced concrete pipe (RCP) or High Density Polyethylene (HDPE).

#### **204.6 Maintenance Requirements**

The permittee is responsible for maintenance of storm drains until construction is complete, including final clean up and site stabilization, to the satisfaction of the County. After the completion of construction, the property owner or responsible party is responsible for maintenance of all storm drains not located in public easements, unless otherwise described in a recorded deed of easement or maintenance agreement.

No one shall modify inlets or other structures, pipe entrances, or pipes in any way that impairs or restricts flow, except as shown on an approved plan.

### **SECTION 205. Stormwater Management**

#### **205.1 Centralized Facilities**

Centralized treatment and storage facilities are considered a “last resort” after all other practices have been applied and runoff requirements have still not been fully met.

#### **205.2 Design Flow Rates**

Projects obtaining Construction General Permit coverage under the VESMP Regulations shall meet the requirements of Chapter 875, Part V, Article 3 of the Virginia Erosion and Stormwater Management Regulations for channel protection and flood protection criteria.

#### **205.3 Design Flows and Storage Volumes**

To properly design stormwater detention facilities, a flow routing computer program shall be used with appropriate elevation – discharge - storage relationship for the design storm events.

#### **205.4 Detention Facility Locations**

Stormwater detention facilities should not be constructed within a Federal Emergency Management Agency (FEMA) designated SFHA. If this is unavoidable, the facility shall comply with all applicable regulations under the National Flood Insurance Program, 44 CFR Part 59. Any construction activity proposed within a SFHA will require the submission of a detailed Floodplain Study including all the supporting documentation of the effective (if applicable), as well as the pre- and post- development conditions for review by the County. Modifications to the effective regulatory floodplain will require final FEMA determination at the owner's expense. See Fauquier County Zoning Ordinance, Article 5 for Special Exception requirements.

A minimum separation of 50' from the computed 100-year water surface elevation shall be provided between drainfields and SWM/BMP facilities, except for wet ponds. A minimum separation of 100' shall be provided between drainfields and wet ponds.

In subdivisions, all SWM/BMP facilities shall be placed in a common area unless prior approval has been obtained from the VESMP Administrator. In no case shall SWM/BMP facilities be on individual lots except where permitted in the County's Erosion and Stormwater Ordinance. This provision shall not preclude the use of Low Impact Design (LID) practices such as bioretention facilities, dry wells, etc. on individual lots.

All Stormwater Management Ponds shall have their toe of embankment established a minimum of 10 feet from all property lines. A "No Plant Zone" area shall be established extending a minimum of 10 feet beyond the embankment toe and abutment contact and shall be included in a Stormwater Management maintenance easement. Trees, shrubs, and any other woody plants are not to be planted in the "No Plant Zone" area. In no case shall hydrophilic trees or shrubs, such as those in the maple, sycamore or willow species, be used within 25 feet of the embankment toe and abutment contacts.

SWM and BMP facilities shall not be located in required buffer areas unless authorized by the Zoning Administrator.

#### **205.5 Embankments and Emergency Spillways**

Stormwater basin earthen embankments that are not covered by the Impounding Structure Regulations (4 VAC 50-20-10 et seq.) shall be designed and constructed to maintain structural integrity during the 100-year frequency storm event. When applicable, Virginia Dam Safety regulations shall apply.

Embankment side slopes shall be no steeper than 3:1 unless prior approval is obtained from the VESMP Administrator.

An emergency spillway shall be provided for all embankments. The emergency spillway may be separate or incorporated into the design of the principal spillway. Weirs and orifices used to attenuate storms of lesser frequency than the 100-year storm event shall be considered to be 100% clogged for the design of the emergency

spillway. Each outlet on control structures shall have a trash rack or debris control device.

Embankments must provide at least one foot of freeboard from the maximum 100- year storm water surface elevation to lowest point on the top of the embankment.

A geotechnical study shall be required for all stormwater basins with constructed embankments greater than 6 feet in height as measured from the toe of the embankment.

All dry stormwater detention facilities shall be empty within 72 hours following the storm event.

Due to the tendency of clogging, the minimum orifice diameter shall be 1 inch.

All riser structures shall be cast-in-place or precast concrete, unless a substitute material has been approved by the County. VDOT standards for riser structures may be found in the VDOT Standards.

Outflows from stormwater detention/retention facilities shall be discharged to an adequate channel as specified in Section 202.2.

Stormwater basin embankments shall be vegetated. Selection and plant installation shall be in accordance with the standards of the Virginia Stormwater Management Handbook (VSMH) or BMP Clearinghouse. Trees and shrubs shall not be planted on a stormwater basin berm, dam, or emergency spillway.

Underground facilities shall not be permitted in single family detached subdivisions.

The construction of underground facilities shall be monitored throughout their construction. Upon completion, a licensed Professional Engineer shall certify that the facility has been built according to the approved plan. The Engineer's certification shall also include a statement that the facility is functioning as designed.

The following note shall be provided on all plans utilizing underground facilities:

*“Construction inspections are required throughout construction by the design engineer or other qualified professional to ensure that stormwater management facilities are being constructed in accordance with the approved design plan.”*

All ponds shall have trash racks at the low-flow orifice controlling the extended drawdown period. Trash racks shall be required at the tops of drop inlet spillways to protect against clogging of the spillway under any operating level. They shall be removable as a unit. The trash rack shall be in accordance with the Virginia BMP Clearinghouse.

The use of a gabion basket is not acceptable design for isolating a forebay from a dry stormwater facility without prior approval from the VESMP Administrator.

Emergency Spillways and their outfall channels shall safely convey flow from the 100-year storm event to a receiving channel. Receiving channels do not have to be adequate for the flow from a 100-year storm.

### **205.6 Access**

Access to remote SWM/BMP facilities must be provided via an all-weather vehicular traversable route contained within appropriate easements. Access roads shall be a minimum of 8 feet wide.

<u>Access Roads</u>	<u>Treatment</u>
<u>Percent of Grade Road</u>	
0% - 3.49%	grass
3.5 % - 6.99%	compacted gravel mix (21-A)
7.0% - 12.0%	pavement

## **SECTION 206 Energy Dissipation**

### **206.1 General**

Permanent outlet protection at culvert and stormdrain discharge points shall be designed in accordance with VDOT methods. The type of outlet protection selected shall meet VDOT velocity limitations.

### **206.2 Maintenance Requirements**

The permittee is responsible for maintenance of energy dissipation structures until construction is complete, including final clean up and site stabilization, to the satisfaction of the County. After the completion of construction, property owners or responsible parties are responsible for maintenance of all energy dissipation structures located in private easements, unless otherwise described in a recorded deed of easement or maintenance agreement.

## **SECTION 207 Stormwater Pollutant Removal Practices**

### **207.1 General**

Proposed residential subdivisions or commercial or industrial parks shall apply stormwater quality management criteria to the land development project as a whole. Individual lots in new subdivisions shall not be considered separate land development projects, but rather the entire subdivision shall be considered as a single land development project. Hydrologic parameters shall reflect the ultimate land development as outlined in the Comprehensive Plan and shall be used in all engineering calculations.

Where stormwater quality requirements must be implemented, calculations must be provided demonstrating adequate stormwater treatment is provided.

### **207.2 Stormwater Quality Calculations**

Projects obtaining Construction General Permit coverage under the VESMP Regulations shall meet the requirements of Chapter 875, Part V, Article 3 of the Virginia Erosion and Stormwater Management Regulations for water quality criteria.

To receive stormwater quality credit, the BMP must be constructed and maintained to DEQ standards as detailed in the BMP Clearinghouse website.

### **207.3 Structural BMPs**

Due to regional geology and soil conditions, stormwater infiltration BMPs may not be applicable for many sites in Fauquier County. Thus, stormwater infiltration practices, or practices having an infiltration component will not be allowed unless the applicant provides sufficient evidence based on field investigations that an infiltration BMP will work as designed.

All SWM/BMP facilities shall be designed for the total contributing drainage area.

No facility shall have slopes and/or embankments steeper than 3:1 (H:V) without prior approval of the VESMP Administrator.

All Stormwater Management Ponds shall have their toe of embankment established a minimum of 10 feet from all property lines. A “No Plant Zone” area shall be established extending a minimum of 10 feet beyond the embankment toe and abutment contact and shall be included in a Stormwater Management maintenance easement. Trees, shrubs, and any other woody plants are not to be planted in the “No Plant Zone” area. In no case shall hydrophilic trees or shrubs, such as those in the maple, sycamore or willow species, be used within 25 feet of the embankment toe and abutment contacts.

A minimum separation of 50’ from the computed 100-year water surface elevation shall be provided between drainfields and SWM/BMP facilities, except wet ponds. A minimum separation of 100’ shall be provided between drainfields and wet ponds.

SWM and BMP facilities shall not be located in required buffer areas unless authorized by the Zoning Administrator.

Every stormwater treatment practice shall consider acceptable forms of water quality pretreatment. The applicability of pretreatment will be at the discretion of the VESMP Administrator.

All wet facilities shall have an aquatic bench at least 10' wide with slopes not to exceed 1:10 (V:H) slope or 1' water depth.

No more than one (1) penetration shall be allowed through a dam structure without prior approval of the VESMP Administrator.

All SWM/BMP ponds must be constructed prior to 70% completion (based on performance guarantee) of the approved project. When ponds are used as temporary sediment controls, the facility must be converted once 90% stabilization has been established.

The Seasonal High Water Table shall be incorporated in the design of a SWM/BMP Facility if deemed critical to the proper function of a SWM/BMP Facility.

Stormwater management facilities dependent on infiltration shall have the infiltration rate determined by field testing in accordance with methods described in the Appendix of the Design Specifications for Infiltration Practices on the Virginia Stormwater BMP Clearinghouse website.

## **SECTION 208 Stormwater Hot Spots**

### **208.1 General**

Stormwater discharges from land uses or activities with higher potential pollutant loadings, known as "hotspots", may require a greater level of stormwater treatment or the use of specific structural BMPs and pollution prevention practices. Greater concentrations of sediment, hydrocarbons, traces metals, pesticides, and other toxics than are found in typical stormwater runoff may qualify a site for designation as a hot spot. The following land uses and activities are designated as stormwater hotspots:

1. Vehicle salvage yards and recycling facilities;
2. Vehicle fueling stations;
3. Vehicle service and maintenance facilities;
4. Vehicle and equipment cleaning facilities;
5. Fleet storage areas (bus, truck, etc.);
6. Industrial sites (for SIC codes contact VA DEQ);
7. Marinas (service and maintenance areas);
8. Outdoor liquid container storage;
9. Outdoor loading and unloading facilities;
10. Public works storage areas;
11. Facilities that generate or store hazardous materials;
12. Commercial container nursery;
13. Golf courses;
14. Chemical storage; and
15. Dry cleaning operations.

### **208.2 Design Restrictions**

Stormwater BMP practices having an infiltration component are prohibited, even with pretreatment, in stormwater hotspot areas. Stormwater detention facilities shall be separated a minimum of four feet from the seasonal high groundwater table, or utilize

an impermeable liner. The property owner must conform with all applicable laws and regulations relevant to any chemicals or hazardous materials used on these sites. Industrial operations shall be conducted to minimize exposure of chemical storage containers to stormwater, and contain any runoff as required by law where this cannot be avoided.

These sites must also meet DEQ VSMP and VPDES permit requirements, where applicable.

## **SECTION 209 Easements**

### **209.1 Drainage and Stormwater Management Easements**

If drainage or stormwater management improvements are found to have been constructed outside of the easement; then, the permittee will be responsible for vacating the original easement and recording a new easement, in the proper location, at the permittee's expense.

Easements shall not split property lines. Where an open channel or storm drain system runs parallel to a property line, it shall be offset from the property line an adequate amount so that the easement is totally contained on the property that contains the open channel or storm drain and not split onto the adjacent property.

The location of drainage easements shall allow for the adequate use and enjoyment of the individual residential lots. To the maximum extent practical, drainage easements serving lots less than one-half (1/2) Acre shall not bisect the lot and shall be located along the property lines. On such parcels, consideration may be given for the on-lot location of drainage easements where a contiguous area of the lot, exclusive of the drainage easement, contains at least seventy-five (75) percent of the required minimum lot area specified for the district in which located as determined by the Zoning Administrator.

Residential lots in which lot size is less than thirty thousand (30,000) square feet shall be graded in such a manner that surface runoff does not cross more than two (2) lots before it is collected in a designed stormwater conveyance system. All surface drainage must be contained in an adequate easement once it is discharged from the third residential lot.

No buildings, foundations, structures, or walls, not associated with the storm drainage system or stormwater management facility shall be located within a drainage easement. In addition, easements that contain open channels shall not be obstructed by fences or vegetation.

A storm drainage easement shall be provided for the exit channel of all emergency spillways, sufficient to convey the maximum emergency spillway flow to an existing downstream receiving channel.

For all Site and Subdivision Plans, the maximum computed 100-year water surface elevation must be contained within the Stormwater Management Easement.

Storm drainage easements shall not be located within 10 feet of the rear wall of any individual single-family residential structure.

Underground utility lines and structures shall be kept at least 5-feet horizontal from drainage pipes, structures, and channels, except at utility crossings. Utility crossings at drainage easements shall be at as near 90-degree as possible.

Where a storm drainage system terminates or starts short of a property line, adequate drainage easements shall be dedicated to allow for maintenance and future extension of the system through the property. Drainage easements shall not split property lines.

Drainage easements at the inlet and outlet of all culverts and storm drain inlets shall include the areas inundated by the headwater during the 10-year storm.

The easement shall extend a minimum of 10 feet from culvert inlets and outlets and storm drain inlets to allow for maintenance access.

Where steep slopes and/or deep fills exist, additional easement area may be required to allow for proper access.

Storm drain easements shall cross private driveways at perpendicular angles to the extent practical.

Where an energy dissipator will be owned by a public jurisdiction or agency, a drainage easement must encompass the entire energy dissipator.

### **209.2 Drainage Easement Widths for Culverts and Storm Drains**

<u>Pipe Diameter</u>	<u>Minimum Easement Width</u>
15" – 23"	15'
24" – 32"	20'
33" – 48"	25'

<u>Pipe Depth</u>	<u>Additional Easement Width</u>
0' – 9.9'	0'
10'-19.9'	10'
20'+	20'

Note: Pipe depth measured from finish grade to invert.

### **209.3 Access Easements for Stormwater Management Facilities**

Access easements giving the County the right to access private property for the purpose of inspecting, and if necessary to maintain or repair private stormwater management facilities are required for all private stormwater management facilities. This includes stormwater management basins, filter strips, bioretention trenches, underground detention areas, and all other BMP's.

Maintenance and Access Easements - The owner must ensure access to drainage improvements and/or stormwater treatment practices at the site for the purpose of inspection and repair by securing all the maintenance easements needed on a permanent basis. These easements will be recorded and will run with the land in all transfers, assigns, assumptions, or other of title to the property.

All drainage improvements and/or stormwater management facilities must be located within a drainage easement and shall be maintained by the landowner, an Owners or Homeowners Association, or other legal entity approved by the Board of Supervisors. Maintenance responsibilities shall be established in the required Deed of Dedication, in a form acceptable to the County Attorney.

All stormwater structures and BMPs shall be accessible. All access easements shall connect to a public road or right of way.

#### **Access Road and Easement Width**

Minimum Access Road Width = 8'

Minimum Access Road Easement = 10'

#### **209.4 Maintenance of Easement Areas**

Ownership of land within easements shall remain with the property owner. The property owner shall have the responsibility of maintaining the easement areas free of any obstructions or use that would interfere with the rights or privileges granted by recorded deed or maintenance agreement.

The property owner shall not alter the existing ground elevations or in any way redirect or obstruct stormwater flow, except as shown on an approved plan. Any alterations to easements resulting in obstruction or redirection of flow will be returned to existing elevations immediately at the cost of the property owner.

### **SECTION 210 Maintenance of Stormwater Management Facilities**

#### **210.1 Responsibility for Maintenance**

Maintenance of stormwater management facilities is the responsibility of the permittee during construction until all work is completed, including final clean up and site stabilization, to the satisfaction of the County. At the completion of construction, maintenance of stormwater management facilities becomes the responsible party or land owner's responsibility in accordance with the executed Maintenance Agreement.

The County is not responsible for maintaining private stormwater management facilities.

### **210.2 Maintenance Agreements**

A legally binding maintenance agreement specifying the parties responsible for the proper maintenance of all stormwater management facilities shall be secured prior to issuance of any permits for land disturbance activities.

Responsibility for the operation and maintenance of stormwater management facilities, after the completion of construction, shall remain with the responsible party or property owner and shall legally pass to any successor or owner.

The maintenance agreement shall include a project specific appendix that lists all stormwater management facilities present on the property; the minimum frequency of inspections and maintenance, and the routine maintenance that is to be performed for each stormwater management facility. The project specific appendix to the maintenance agreement is to be prepared by the applicant and submitted to the County with the Stormwater Management Plan for review. See Exhibit 210.2 for sample Stormwater Management BMP Facilities Maintenance Schedule.

When landscaping is a component of the stormwater management facility, a project specific maintenance schedule for the landscaping shall be provided that is reflective of the plant species that are used. The landscaping maintenance schedule shall contain guidance regarding methods, frequency, and time of year for landscape maintenance and fertilization.

A sample Maintenance Agreement is provided as Exhibit 210.1.

In addition, the applicant shall also establish easements for stormwater management facilities and grant the County the right of access for periodic inspections.

### **210.3 Inspection and Maintenance Records**

The responsible party or property owner shall maintain records of stormwater management facilities' inspections and maintenance activities, and submit copies to the County, in accordance with the requirements of Section 211.

## **SECTION 211 Inspection and Enforcement**

### **211.1 General**

Inspections shall be performed during and after construction by the permittee as required by the approved plan or associated permits.

### **211.2 Construction Inspections**

Construction of storm drainage systems and stormwater management facilities shall comply with the approved final Stormwater Management Plan. Erosion and control measures shall be implemented in accordance with the approved Erosion and Sediment Control Plan. Any changes to the approved design require a resubmittal to the County of Fauquier for approval. Inspections shall be performed by the permittee to ensure that construction conforms to the approved plans and specifications. Additional inspections will be performed by Fauquier County to confirm compliance.

Exhibit 211.1 shall be used as a Stormwater Management Construction Inspection Checklist during construction.

### **211.2.1 Notifications to Fauquier County**

The permittee shall notify Fauquier County 48 hours in advance of the start of construction and of the construction of critical components of a stormwater management facility. The following are examples of, but not limited to, critical components:

- Before the start of construction;
- Before installing a stormwater pond embankment;
- Before installing pond outlet structures;
- Before setting any concrete BMP structures, not including precast drop inlets or manholes;
- Before installing energy dissipation structures and any outlet structure into a jurisdictional stream (perennial or intermittent flow);
- Before installing any infiltration or bioretention BMP; or
- Any other key BMP component as determined by Fauquier County

### **211.2.2 Periodic Inspections**

The permittee is responsible to perform adequate inspection of the construction activities to confirm that the site is in compliance with the approved erosion and sediment control plan and that the construction of storm drainage systems and Stormwater management facilities and BMPs are in conformance with the approved Stormwater Management Plan.

Upon completion of construction, the permittee must certify that the completed project is in accordance with the approved plans and specifications and must provide documentation of regular inspections sufficient to adequately support compliance. All permittee inspections shall be documented and written reports prepared that contain the following information:

- The date and location of the permittee inspection;
- Whether construction is in compliance with the approved Stormwater Management Plan;
- Variations from the approved construction specifications;
- Corrective actions that have been taken to correct previous violations;
- Any violations that exist or corrective actions that have not been completed; and
- The name and signature of the person who performed the inspection.

Fauquier County shall have the right to conduct periodic inspections during construction. Upon request from Fauquier County, the permittee shall provide copies of inspection reports for designated time periods.

If the County finds any violations, the permittee shall be notified in writing of the nature of the violation and of the required corrective actions. In conjunction, the County may issue an order requiring that all or part of the land

disturbing activities permitted on the site be stopped until the specified corrective measures have been taken.

If the County determines that there is a repeated failure to comply with the approved plans and specifications, enforcement action may be taken.

### **211.2.3 Final Inspection and As-Built Documentation**

Prior to final acceptance of the project the permittee is required to submit to Fauquier County as-built documentation, confirming that the storm drainage systems and stormwater management facilities and practices that have been constructed conform to the approved Stormwater Management Plan. In addition, once the as-built documentation has been submitted, a final inspection will be conducted by the County to confirm that the as-built documentation conforms to the actual construction.

As-built documentation shall include the following:

- A. As-built survey conducted following construction, certified by a registered land surveyor or professional engineer. The survey shall include enough information to verify that storage capacities in ponds and other stormwater management structures are no less than the storage volume required by the approved Stormwater Management Plan. For retention and detention structures, a stage- storage summary table with design values and as-built values shall be included. The survey shall verify inverts and sizes of pipes, culverts, and outlet structures. Maximum tolerance shall be  $\pm 0.1$  feet for structures and  $\pm 0.5$  feet for finished grades.
- B. The permittee's inspection log records with copies of all inspection test results documenting compliance with the approved Stormwater Management Plan.
- C. Stormwater Management Plans which illustrate the approved data, as well as the boxed as-built data where applicable.
- D. Certification statement, signed by the permittee and a Professional Engineer or Professional Land Surveyor, registered in the Commonwealth of Virginia, indicating conformance with the approved Stormwater Management Plan.

If it is determined from the as-built documentation that the storm drainage systems and the stormwater management facilities have not been constructed in accordance with the approved Stormwater Management Plan, then corrective action will be taken to comply with the approved Plan or the permittee shall provide studies and information required by the County of Fauquier to demonstrate that the constructed systems will function equivalent to the approved Stormwater Management Plan. This includes meeting all flow,

velocity, and regulatory requirements and that the approved elevation-storage requirement is maintained.

Once the as-built documentation has been accepted by Fauquier County, the permittee shall schedule a final inspection of the project site prior to final acceptance of the project by the County and the return of performance bonds or securities. The permittee shall provide 48 hour notice of a final inspection to the County.

Where a project is constructed in phases, a final inspection shall be conducted of each completed phase as designated by the approved Stormwater Management Plan. The final inspection shall consist only of the phase being identified as complete.

### **211.3 Post-Construction Inspections and Maintenance**

The property owner or responsible party is responsible for the proper operation, inspection, maintenance, and repair of stormwater management facilities, after the completion of construction, in accordance with the applicable maintenance agreement. All inspection, maintenance, and repair activities shall be documented. See Section 210 for additional information concerning maintenance and repair of stormwater management facilities. Exhibit 211.2 shall be used as a Stormwater Management BMP Inspection Checklist after construction.

The responsible party shall inspect and maintain stormwater management facilities at the frequencies listed in the Maintenance Agreement.

In addition to the inspections performed by the responsible party, each stormwater management facility will be inspected periodically by the County.

In the event that the stormwater management facility has not been maintained and/or becomes a danger to public safety, public health, or the environment, Fauquier County shall notify the property owner, or responsible party, by registered or certified mail and issue a Notice of Violation. The Notice shall specify the measures needed to correct the situation and shall specify the time within which such measures must be completed. If the responsible party fails or refuses to meet the requirements of the maintenance agreement, the County, after reasonable notice, may apply a civil or criminal penalty and may correct a violation of the design standards or maintenance needs by performing all necessary work to place the facility in proper working condition, and recover the costs from the responsible party or property owner.

### **211.4 Records**

Parties responsible for the operation and maintenance of a stormwater management facility shall make records of the installation and of all inspections, maintenance and repairs, and shall retain the records for at least five (5) years. These records shall be made available to the County of Fauquier upon request. See Exhibit 211.3 for a blank Stormwater Management Facilities Inspection Report Form and Exhibit 211.4 for a blank Stormwater Management Facilities Maintenance/Repair Report Form.

Each year, before December 31st, the property owner or responsible party shall mail to the County copies of the documentation for all inspection and maintenance activities that occurred during that year. This information shall be mailed to:

Fauquier County Department of Community Development  
16 Courthouse Square, Suite 100  
Warrenton, Virginia 20186  
Attention: VESMP Administrator

### **211.5 Restoration of Lands**

Any violator may be required to restore land to its undisturbed condition in accordance with a notice of violation, stop work order, or permit requirements. In the event that restoration is not undertaken within the time specified in the notice, Fauquier County may take necessary corrective action, the cost of which shall be covered by the performance bond, or become a lien upon the property until paid, or both.

## **SECTION 212 Erosion and Sediment Control Planning and Design**

### **212.1. General**

Control measures shall be the minimum criteria standards and specifications as contained in Chapter 7 of the Virginia Stormwater Management Handbook (VSMH), current edition except as specifically modified in this Manual.

An Erosion and Sediment Control Checklist shall be completed and submitted with the initial submission of a site plan or subdivision plan containing an Erosion and Sediment Control Plan.

### **212.2 Single-Family Dwelling Unit Standards and Specifications**

An Agreement in Lieu of a Plan may be acceptable for land disturbance activities for a single-family detached residential dwelling where the dwelling is not part of a development project. The disturbed area must be less than one acre. All erosion and sediment control measures must be installed and maintained in accordance with the Virginia Stormwater Management Handbook. Single-family detached residential dwellings permitted as an Agreement in Lieu that disturb greater than one acre but less than 5 acres may apply for an Agreement in Lieu of a Stormwater Plan provided they submit a completed application, utilize a SWPPP, download permit coverage and pay the additional fees.

When the proposed development is located adjacent to environmentally sensitive areas, the VESMP Administrator shall require more stringent erosion and perimeter control measures. In addition, the VESMP Administrator may also require additional storage volume to be provided for sediment traps and basins.

### **212.3 Two-Layer Perimeter Erosion Control Measures**

- A. To protect adjacent properties and to limit erosion and to control sediments, two layered erosion control measures shall be installed under the following conditions:
  1. Slopes of fifteen (15%) percent or greater with soils showing severe erodibility as per the Fauquier County Soil Survey.
  2. Wetlands.

3. Expected detrimental impact on adjacent properties, waterways or water courses.
- B. Except for single-family dwelling units two-layered erosion control measures shall consist of diversion dikes with adequate outlet structures, and silt fence. The measures shall be placed approximately parallel to each other and not closer than ten (10) feet. One layer shall be placed within the limits of disturbance identified on the approved plans. Both layers shall remain in place and functional until all disturbed areas that will contribute towards these measures are properly stabilized.

## **SECTION 213    Exceptions**

Exceptions to the requirements contained in this Chapter shall be pursuant to the standards and procedures outlined in Section 104.D of this Manual.

## Exhibit 201.1

<b>ROUGHNESS COEFFICIENT “n” FOR MANNING EQUATION – SHEET FLOW</b>	
<b>Surface Description</b>	<b>N Value</b>
Smooth Surfaces (Concrete, Asphalt, Gravel, or Bare Soil)	0.011
Fallow (no residue)	0.05
Cultivated Soil: Residue Cover < 20%	0.06
Cultivated Soil: Residue Cover > 20%	0.07
Grass: Short Grass Prairie	0.15
Grass: Dense Grasses	0.24
Grass: Bermuda Grasses	0.41
Range (Natural)	0.13
Woods: Light Underbrush	0.40
Woods: Dense Underbrush	0.80

## Exhibit 201.2

<b>RATIONAL METHOD – RUNOFF COEFFICIENTS</b>	
<b>Description of Area</b>	<b>Runoff Coefficients</b>
Business: Industrial and Commercial	0.80-0.90
Apartments and Townhomes	0.65-0.75
Schools	0.50-0.60
Residential - Lots 10,000 sf	0.40-0.50
- Lots 12,000 sf	0.40-0.45
- Lots 17,000 sf	0.35-0.45
- Lots $\geq \frac{1}{2}$ acre	0.30-0.40
Parks, Cemeteries, and Unimproved Areas	0.20-0.35
Paved and Roof Areas	0.90
Cultivated Areas	0.50-0.70
Pasture	0.35-0.45
Lawns	0.25-0.35
Forest	0.20-0.30
Steep Grass (2:1) *	0.40-0.70
Shoulder and Ditch Areas *	0.35-0.50

Comments:

4. The lowest range of runoff coefficients may be used for flat areas (areas where the majority of the grades and slopes are 2% and less).
5. The average range of runoff coefficients should be used for intermediate areas (areas where the majority of the grades and slopes are from 2% to 5%).
6. The highest range of runoff coefficients shall be used for steep areas (areas where the majority of the grades are greater than 5%), for cluster areas, and for development in clay soil areas.
7. Lower runoff coefficients should be used for permanent or established conditions (post-construction), i.e. sizing stormwater management basins.
8. Higher runoff coefficients should be used to design roadside ditch linings (construction). The design considers the ditch lining as not yet established.

## Exhibit 202.1

### ROUGHNESS COEFFICIENT “n” FOR MANNING EQUATION - CHANNELS

Type of Channel and Description	Minimum	Normal	Maximum
<b>LINED CHANNELS (Selected linings)</b>			
<b>a. Concrete</b>			
1. Trowel finish	0.011	0.013	0.015
2. Float finish	0.013	0.015	0.016
3. Gunite, good section	0.016	0.019	0.023
<b>b. Asphalt</b>			
1. Smooth	0.013	0.013	---
2. Rough	0.016	0.016	---
<b>EXCAVATED OR DREDGED</b>			
<b>a. Earth, straight and uniform</b>			
1. Clean, recently completed	0.016	0.018	0.020
2. Clean, after weathering	0.018	0.022	0.025
3. Gravel, uniform section, clean	0.022	0.025	0.030
<b>b. Earth, winding and sluggish</b>			
1. No vegetation	0.023	0.025	0.030
2. Grass, some weeds	0.025	0.030	0.035
3. Dense weeds or aquatic plants in deep channels	0.030	0.035	0.040
4. Earth bottom and rubble sides	0.025	0.030	0.035
5. Stony bottom and weedy sides	0.025	0.035	0.045
6. Cobble bottom and clean sides	0.030	0.040	0.050
<b>c. Dragline excavated or dredged</b>			
1. No vegetation	0.025	0.028	0.033
2. Light brush on banks	0.035	0.050	0.060
<b>d. Rock cuts</b>			
1. Smooth and uniform	0.025	0.035	0.040
2. Jagged and irregular	0.035	0.040	0.050
<b>e. Channels not maintained, weeds and brush uncut</b>			
1. Dense weeds, high as flow depth	0.050	0.080	0.120
2. Clean bottom, brush on sides	0.040	0.050	0.080
3. Same, highest stage of flow	0.045	0.070	0.110
4. Dense brush, high stage	0.080	0.100	0.140

## Exhibit 202.2

### ROUGHNESS COEFFICIENT “n” FOR MANNING EQUATION – NATURAL STREAMS

Type of Channel and Description	Minimum	Normal	Maximum
<b>NATURAL STREAMS</b>			
1. Minor streams (top width at flood stage <100 ft)			
a. Streams on Plain			
1. Clean, straight, full stage, no rifts or deep pools	0.025	0.030	0.033
2. Same as above, more stones and weeds	0.030	0.035	0.040
3. Clean, winding, some pools/shoals	0.033	0.040	0.045
4. Same as above, but some weeds and stones	0.035	0.045	0.050
5. Same as above, lower stages, more ineffective slopes and sections	0.040	0.048	0.055
6. Same as 4, but more stones	0.045	0.050	0.060
7. Sluggish reaches, weedy, deep pools	0.050	0.070	0.080
8. Very reedy reaches, deep pools or floodways with heavy stand of timber and underbrush	0.075	0.100	0.150
b. Mountain Streams (no vegetation in channel, banks usually steep, trees and brush along banks submerged at high stages)			
1. Bottom: gravels, cobbles, few boulders	0.030	0.040	0.050
2. Bottom: cobbles with large boulders	0.040	0.050	0.070
2. Floodplains			
a. Pasture, no brush			
1. Short grass	0.025	0.030	0.035
2. High grass	0.030	0.035	0.050
b. Cultivated area			
1. No crop	0.020	0.030	0.040
2. Mature row crops	0.025	0.035	0.045
3. Mature field crops	0.030	0.040	0.050
c. Brush			
1. Scattered brush, heavy weeds	0.035	0.050	0.070
2. Light brush and trees, in winter	0.035	0.050	0.060
3. Light brush and trees, in summer	0.040	0.060	0.080
4. Medium to dense brush, in winter	0.045	0.070	0.110
5. Medium to dense brush, in summer	0.070	0.100	0.160
d. Trees			
1. Dense willows, summer, straight	0.110	0.150	0.200
2. Cleared land with tree stumps, no sprouts	0.030	0.040	0.050
3. Same as above, but with heavy sprout growth	0.050	0.060	0.080
4. Heavy stand of timber, a few down trees, little undergrowth, flood stage below branches	0.080	0.100	0.120
5. Same as above, but with flood stage reaching branches	0.100	0.120	0.160
3. Major Streams (top width at flood stage >100 ft)			
a. Regular section with no boulders or brush			
	0.025	---	0.060
b. Irregular and rough section			
	0.035	---	0.100
(The n value is less than that for minor streams of the same description, because banks offer less effective resistance.)			

## Exhibit 202.3

### PERMISSIBLE VELOCITIES FOR ERODIBLE LININGS

Soil type or lining (earth; no vegetation)	Maximum permissible velocities (ft/sec) for		
	Clear water	Water carrying fine silts	Water carrying sand and gravel
Fine sand (non colloidal)	1.5	2.5	1.5
Sandy loam (non colloidal)	1.7	2.5	2.0
Silt loam (non colloidal)	2.0	3.0	2.0
Ordinary firm loam	2.5	3.5	2.2
Volcanic ash	2.5	3.5	2.7
Fine gravel	2.5	5.0	3.7
Stiff clay (very colloidal)	3.7	5.0	3.0
Graded, loam to cobbles (non colloidal)	3.7	5.0	5.0
Graded, silt to cobbles (colloidal)	4.0	5.5	5.0
Alluvial silts (non colloidal)	2.0	3.5	2.0
Alluvial silts (colloidal)	3.7	5.0	3.0
Coarse gravel (non colloidal)	4.0	6.0	6.5
Cobbles and shingles	5.0	5.5	6.5
Shales and hard pans	6.0	6.0	5.0

## Exhibit 202.4

### Permissible Velocities for Grass-Lined Channels

Channel Slope	Lining	Velocity* (ft./sec.)
0 – 5%	Bermudagrass	6
	Reed canarygrass Tall fescue Kentucky bluegrass	5
	Grass-legume mixture	4
	Red fescue Redtop Sericea lespedeza Annual lespedeza Small grains Temporary vegetation	2.5
	Bermudagrass	5
5 – 10%	Reed canarygrass Tall fescue Kentucky bluegrass	4
	Grass-legume mixture	3
	Bermudagrass	4
	Reed canarygrass Tall fescue Kentucky bluegrass	3
Greater than 10%	* For highly erodible soils, decrease permissible velocities by 25%	

Source: Soil and Water Conservation Engineering, Schwab, et. al. and American Society of Civil Engineers.

## Exhibit 203.1

### RECOMMENDED MANNING EQUATION “n” VALUES

Type of Conduit	Wall Description	Manning's n
Concrete Pipe	Smooth walls	0.010 - 0.013
Concrete Boxes	Smooth walls	0.012 - 0.015
Corrugated Metal Pipes and Boxes, Annular or Helical Pipe	2 2/3 by 1/2 inch corrugations	0.022 - 0.027
	6 by 1 inch corrugations	0.022 - 0.025
	5 by 1 inch corrugations	0.025 - 0.026
	3 by 1 inch corrugations	0.027 - 0.028
	6 by 2 inch structural plate	0.033 - 0.035
	9 by 2 1/2 inch structural plate	0.033 - 0.037
Corrugated Metal Pipe	2 2/3 by 1/2 inch corrugations	0.012 - 0.024
Spiral Rib Metal (Steel or Alum.)	Smooth walls	0.012-0.013
PVC	Smooth interior	0.010 - 0.012
Polyethylene (PE or HDPE)	Smooth interior	0.011 - 0.013
Corrugated PE or HDPE	Corrugated interior	0.022 - 0.026

- Note 1: The values indicated in this table are recommended Manning's “n” design values. Actual field values may vary depending on the effects of abrasion, corrosion, deflection, and joint conditions. Concrete pipe with poor joints and deteriorated walls may have “n” values of 0.014 to 0.018. Corrugated metal with joint and wall problems may also have higher “n” values, and in addition, may experience shape changes which could adversely affect the general hydraulic characteristics of the culvert.
- Note 2: For further information concerning Manning n values for selected conduits consult Hydraulic Design of Highway Culverts, Federal Highway Administration, HDS No. 5, page 163.

## Exhibit 210.1

### STORMWATER MANAGEMENT/BMP FACILITIES MAINTENANCE AGREEMENT

THIS AGREEMENT, made and entered into this \_\_\_ day of \_\_\_\_\_, 20\_\_, between hereinafter called (Insert Full Name of Owner) the “Landowner”, and the Board of Supervisors of Fauquier County, Virginia, hereinafter called the “County”. WITNESSETH, that

WHEREAS, the Landowner is the owner of certain real property described as: recorded by deed in (Fauquier County Tax Map/Parcel Identification Number) the land records of Fauquier County, Virginia, Deed Book Page, hereinafter called the "Property".

WHEREAS, the Landowner is proceeding to build on and develop the property; and

WHEREAS, the Site Plan/Subdivision Plan known as (Name of Plan/Development), hereinafter called the "Plan", which is expressly made a part hereof, as approved or to be approved by the County, provides for treatment of stormwater within the confines of the property; and

WHEREAS, the County and the Landowner, its successors and assigns, including any homeowners association, agree that the health, safety, and welfare of the residents of Fauquier County, Virginia, require that on-site stormwater management/BMP facilities be constructed and maintained on the Property; and

WHEREAS, the County requires that on-site stormwater management/BMP facilities as shown on the Plan be constructed and adequately maintained by the Landowner, its successors and assigns, including any homeowners association.

NOW, THEREFORE, in consideration of the foregoing premises, the mutual covenants contained herein, and the following terms and conditions, the parties hereto agree as follows:

1. The on-site stormwater management/BMP facilities shall be constructed by the Landowner, its successors and assigns, in accordance with the plans and specifications identified in the Plan.
2. The Landowner, its successors and assigns, including any homeowners association, shall adequately maintain the stormwater management/BMP facilities. This includes all pipes and channels built to convey stormwater to the facility, as well as all structures, improvements, and vegetation provided to control the quantity and quality of the stormwater. Adequate maintenance is herein defined as good working condition so that these facilities are performing their design functions.
3. The Landowner, its successors and assigns, shall periodically inspect the stormwater management BMP facilities. The purpose of the inspection is to assure safe and

proper functioning of the facilities. The inspection shall cover the entire facilities, berms, outlet structure, pond areas, access roads, etc. Deficiencies shall be noted in the inspection report.

4. The Landowner, its successors and assigns, shall document all inspections, maintenance activities and repairs that are performed on the stormwater management BMP facilities. Documents shall be maintained for a minimum period of five (5) years and they shall be made available for review by, or copies shall be provided to, the County upon request.

5. The Landowner, its successors and assigns, hereby grant permission to the County, its authorized agents and employees, to enter upon the Property and to inspect the stormwater management/BMP facilities periodically and whenever the County deems necessary. The purpose of inspection is to verify that proper maintenance is occurring and/or to follow-up on reported deficiencies and/or to respond to citizen complaints. The County shall provide the Landowner, its successors and assigns, copies of the inspection findings and a directive to commence with the maintenance or repairs if necessary.

6. In the event the Landowner, its successors and assigns, fails to maintain the stormwater management/BMP facilities in good working condition acceptable to the County, the County may enter upon the Property and take whatever steps necessary to correct deficiencies identified in the inspection report and to charge the costs of such repairs to the Landowner, its successors and assigns. This provision shall not be construed to allow the County to erect any structure of permanent nature on the land of the Landowner outside of the easement for the stormwater management/BMP facilities. It is expressly understood and agreed that the County is under no obligation to routinely maintain or repair said facilities, and in no event shall this Agreement be construed to impose any such obligation on the County.

7. The Landowner, its successors and assigns, will perform the work necessary to comply with the attached maintenance schedule, including sediment removal, and as otherwise required to keep these facilities in good working order as appropriate.

8. In the event the County pursuant to this Agreement, performs work of any nature, or expends any funds in performance of said work for labor, use of equipment, supplies, materials, and the like, the Landowner, its successors and assigns, shall reimburse the County upon demand, within thirty (30) days of receipt thereof for all actual costs incurred by the County hereunder.

9. This Agreement imposes no liability of any kind whatsoever on the County and the Landowner agrees to hold the County harmless from any liability in the event the stormwater management/BMP facilities fail to operate properly.

10. This Agreement shall be recorded among the land records of Fauquier County, Virginia, and shall constitute a covenant running with the land, and shall be binding on the Landowner, its administrators, executors, assigns, heirs and any other successors in interests, including any homeowners association.





BMP Type: \_\_\_\_\_

<b>Required Action</b>	<b>Maintenance Objective</b>	<b>Frequency of Action</b>
Inspections		
Vegetation Management		
Slope, Embankment, and Outlet Stabilization		
Debris and Litter Control		
Mechanical Components		
Insect Control		
Access Road and Area Maintenance		
Sediment and Pollutant Removal		
Component Repair and Replacement		
Other		



### Best Management Practices (BMPs)

Best Management Practice	Constructed as Approved?	Discrepancies and Corrections	Completion Date
	Y <input type="checkbox"/> N <input type="checkbox"/>		
	Y <input type="checkbox"/> N <input type="checkbox"/>		
	Y <input type="checkbox"/> N <input type="checkbox"/>		
	Y <input type="checkbox"/> N <input type="checkbox"/>		
	Y <input type="checkbox"/> N <input type="checkbox"/>		
	Y <input type="checkbox"/> N <input type="checkbox"/>		
	Y <input type="checkbox"/> N <input type="checkbox"/>		

### Stormwater Collection and Transport (Culverts, Storm Drains, and Inlets)

Item	Constructed as Approved?	Discrepancies and Corrections	Completion Date
	Y <input type="checkbox"/> N <input type="checkbox"/>		
	Y <input type="checkbox"/> N <input type="checkbox"/>		
	Y <input type="checkbox"/> N <input type="checkbox"/>		
	Y <input type="checkbox"/> N <input type="checkbox"/>		
	Y <input type="checkbox"/> N <input type="checkbox"/>		
	Y <input type="checkbox"/> N <input type="checkbox"/>		
	Y <input type="checkbox"/> N <input type="checkbox"/>		
	Y <input type="checkbox"/> N <input type="checkbox"/>		
Discharge Outfall from Development	Adequate channel: Y <input type="checkbox"/> N <input type="checkbox"/>		

**Signature of Inspector** \_\_\_\_\_

## Exhibit 211.2

### STORMWATER MANAGEMENT/BMP INSPECTION CHECKLIST

Inspector Name: \_\_\_\_\_ Inspection Date: \_\_\_\_\_

Site Address or Location: \_\_\_\_\_

Watershed: \_\_\_\_\_ Tax Map or Parcel ID No: \_\_\_\_\_

Type of Stormwater BMP or Structure

- |  |   |
|--|---|
| <input type="checkbox"/> Culvert<br><input type="checkbox"/> Inlet and Storm Drain<br><input type="checkbox"/> Open Channel (Vegetated/Geotextile)<br><input type="checkbox"/> Open Channel (Concrete) | <input type="checkbox"/> Pond (Permanent Pool)<br><input type="checkbox"/> Pond (Dry Pool)<br><input type="checkbox"/> Bioretention Basin<br><input type="checkbox"/> Oil/Water Separator |
|--|---|

Other(Describe) \_\_\_\_\_

Item Inspected	Checked		Maintenance	Observations and Remarks
	Yes	No		
<b>Open Channel and BMP Embankments</b>				
Does the structure show signs of settling, cracking, bulging, or other structural deterioration?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do embankments, spillways, side slopes, or inlet/outlet structures show signs of erosion?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is there evidence of animal burrows?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is there woody vegetation growth that may interfere with the flow or operation of the facility?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do vegetated areas need mowing or is there a buildup of clipping that could clog the facility?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are there bare areas which need seeding or sodding?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is there standing water in inappropriate areas?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is there an accumulation of sediment, debris, or trash?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is there evidence of improper use of buffer areas, or construction or fill at channels or embankments which restrict flow or interfere with the proper operation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is there evidence of oil or other pollutant spills?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Item Inspected	Checked		Maintenance		Observations and Remarks
	Yes	No			
<b>Culverts and Storm Drains</b>					
Is the culvert or storm drain filled more than 25% with debris, sediment, or trash?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is there evidence of structural failure of the culvert pipe?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is there evidence of erosion at the inlet and outlet of the culvert or at the storm drain inlet?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are there signs of settling, cracking, or misalignment of culverts, storm drain pipe, or concrete inlets?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>Stormwater Ponds (see also Embankments)</b>					
Is the emergency spillway clear of obstructions, debris, and vegetation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is the outlet structure and pipe clean of debris and sediment, free of damage, and in working order?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is there an accumulation of debris, litter or trash?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(For dry detention ponds) Is there standing water in the pond?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(For wet ponds) Is their excessive algae growth or other vegetation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is there evidence of oil or other pollutants in the pond?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is there erosion at the discharge point?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do any safety devices, fences, gates, or locks need repair?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>Other BMPs (Infiltration, Sand Filters, and Manufactured Structures)</b>					
Is there sediment, debris, litter, oil, or trash that needs to be cleared for aesthetic or functional reasons?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is there standing water where there should not be standing water?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is there structural damage to concrete structures?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are there signs of erosion at entrance or exit?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are valves, sluice gates, and other mechanical devices operational?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

## Exhibit 211.3

### **STORMWATER MANAGEMENT BMP FACILITIES INSPECTION REPORT FORM**

Inspection Requirements: See the Stormwater Management BMP Facilities Maintenance Schedule for landowner's responsibilities for frequency of inspection and other requirements. This information is a part of the Maintenance Agreement that is recorded in the land records with the deed.

Inspection Purpose: To assure safe and proper functioning of the stormwater management BMP facilities and associated structures, by providing regular observations of their conditions and operation.

Retention of Records: All inspection/maintenance/repair documentation shall be retained by the landowner for a minimum of five (5) years.

Submission of Records: At the end of each year, by December 31<sup>st</sup>, mail all BMP inspection and maintenance documentation to:

Fauquier County Department of Community Development  
16 Courthouse Square  
Warrenton, Virginia 20186  
Attention: VESMP Administrator

NAME OF BUSINESS OR LANDOWNER:

\_\_\_\_\_

ADDRESS:

\_\_\_\_\_

INSPECTION DATE:

\_\_\_\_\_

PERFORMED BY:

\_\_\_\_\_

#### Facility Management Checklist

The following items should be checked for each BMP:

1. Facility construction meets the requirements of the Fauquier Design Standards Manual, where applicable, and is adequate for the intended function.
2. The facility has been maintained properly according to the requirements of the Recorded Maintenance Agreement, BMP Maintenance Schedule, and the Fauquier County Design Standards Manual.
3. The facility is functioning adequately.
4. There have been no changes to the site conditions or area that would require modification and/or replacement of the existing facilities.
5. Access to the facility is adequate and maintained.

**STORMWATER MANAGEMENT BMP FACILITIES INSPECTION REPORT FORM**

**REFER TO THE RECORDED MAINTENANCE AGREEMENT BMP MAINTENANCE SCHEDULE FOR EACH BMP TYPE – COMPLETE SEPARATE FORM FOR EACH STORMWATER MANAGEMENT BMP FACILITY**

Facility Type: \_\_\_\_\_

Facility Location \_\_\_\_\_

Authorization

Yes No

Does the facility comply adequately with all pertinent regulations and requirements?

Requirements to Meet Compliance

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Additional Observations/Comments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

# Exhibit 211.4

## STORMWATER MANAGEMENT/BMP FACILITIES MAINTENANCE/REPAIR REPORT FORM

Maintenance Requirements: Refer to the site's Stormwater Management BMP Facilities Maintenance Schedule for landowner's responsibilities for frequency of maintenance and other requirements. This Maintenance Schedule is a guideline of minimum maintenance requirements. Additional maintenance shall be performed as necessary for the proper functioning of Stormwater Management BMP facilities. This information is a part of the Maintenance Agreement that is recorded in the land records with the deed

Maintenance Purpose: To enable the proper long-term functioning of the stormwater management BMP facilities to protect water quality and prevent downstream flooding.

Retention of Records: All inspection/maintenance/repair documentation shall be retained for a minimum of five (5) years.

Submission of Records: At the end of each year, by December 31<sup>st</sup>, mail all BMP inspection and maintenance documentation to:

Fauquier County Department of Community Development  
16 Courthouse Square, Suite 100  
Warrenton, Virginia 20186  
Attention: VESMP Program Administrator

NAME OF BUSINESS OR LANDOWNER: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

MAINTENANCE/REPAIR DATE: \_\_\_\_\_

PERFORMED BY: \_\_\_\_\_

GENERAL COMMENTS: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**STORMWATER MANAGEMENT/BMP FACILITIES INSPECTION REPORT FORM**

REFER TO THE RECORDED MAINTENANCE AGREEMENT BMP MAINTENANCE SCHEDULE FOR EACH BMP TYPE – COMPLETE SEPARATE FORM FOR EACH STORMWATER MANAGEMENT BMP FACILITY

Facility Type: \_\_\_\_\_

Facility Location \_\_\_\_\_

Routine Maintenance Performed:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Repairs Performed:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Remarks (Are additional maintenance/repairs needed?):

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_