

ORANGE COUNTY, VIRGINIA 2013 DRAFT STORMWATER MANAGEMENT ORDINANCE



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Chapter 27

STORMWATER MANAGEMENT

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ARTICLE 1. IN GENERAL

DIVISION 1. GENERAL PROVISIONS

Sec. 27-1. Statutory Authority.

This chapter is adopted pursuant to the authority conferred by the Virginia Stormwater Management Act [Article 2.3 (§62.1-44.2 et seq.) of Chapter 3.1 of Title 62.1 of the Code of Virginia]. Adoption of this Ordinance is part of an initiative to integrate Orange County stormwater management requirements with Orange County erosion and sediment control and floodplain management requirements into a unified stormwater program.

This ordinance is adopted pursuant to Article 2.3 (§ 62.1-44 et seq.) of Chapter 3.1 of Title 62.1 of the Code of Virginia.

Sec. 27-2. Purpose.

The purpose of this Ordinance is to ensure the general health, safety, and welfare of the citizens of Orange County and protect the quality and quantity of state waters from the potential harm of unmanaged stormwater, including protection from a land disturbing activity causing unreasonable degradation of properties, water quality, stream channels, and other natural resources, and to establish procedures whereby stormwater requirements related to water quality and quantity shall be administered and enforced. This chapter seeks to meet the preceding purpose through the following objectives:

- (a) Requirement that land development and land conversion activities maintain the after-development characteristics, as nearly as practicable, to the pre-development characteristics in order to reduce flooding, siltation, stream bank erosion, and property damage;
- (b) Establishment of 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 storm water runoff;
- (c) Establishment of minimum design criteria for measures to minimize non-point source pollution from stormwater runoff which would otherwise degrade water quality;
- (d) Protect groundwater resources with the use of low impact development (LID) techniques;
- (e) Establishment of provisions for the long-term responsibility for and maintenance of stormwater management control devices and other techniques specified to manage the quality and quantity of runoff; and
- (f) Establishment of certain administrative procedures for the submission, review, approval, and disapproval of stormwater pollution prevention plans, and the inspection of approved projects.

Sec. 27-3. Applicability.

(a) Except as provided for in §27-3(b) and Article II of this chapter, all land disturbing activity shall comply with the requirements of this chapter. Except as provided herein, no person may engage in any

land-disturbing activity until a VSMP authority permit has been issued by the Administrator in accordance with the provisions of this chapter.

(b) Notwithstanding any other provisions of this Ordinance, the following activities are exempt, unless otherwise required by federal law:

- (1) Permitted surface or deep mining operations and projects, or oil and gas operations and projects conducted under the provisions of Title 45.1 of the Code of Virginia;
- (2) Clearing of lands specifically for agricultural purposes including the management, tilling, planting, or harvesting of agricultural, horticultural, or forest crops, livestock feedlot operations, or as additionally set forth by the VSWCB in regulations, including engineering operations as follows: construction of terraces, terrace outlets, check dams, desilting basins, dikes, ponds, ditches, strip cropping, lister furrowing, contour cultivating, contour furrowing, land drainage, and land irrigation; however, this exception shall not apply to harvesting of forest crops unless the area on which harvesting occurs is reforested artificially or naturally in accordance with the provisions of the Code of Virginia § 10.1-1100 et seq., or is converted to bona fide agricultural or improved pasture use as described in subsection B of § 10.1-1163;
- (3) Single-family residences separately built and disturbing less than one acre including additions or modifications to existing single-family detached residential structures, and not part of a common development plan;
- (4) Land disturbing activities that disturb less than one acre of land area or activities that are part of a larger plan of development or sale that is one acre or greater of disturbance;
- (5) Linear development projects, provided that: (i) less than one acre of land will be disturbed per outfall or watershed; (ii) there will be insignificant increases in peak flow rates, and (iii) there is no existing or anticipated flooding or erosion problems downstream of the discharge point.
- (6) Discharges to a sanitary sewer or a combined sewer system;
- (7) Activities under a State or federal reclamation program to return an abandoned property to an agricultural or open land use;
- (8) Routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original construction of the project. The paving of an existing road with a compacted or impervious surface and reestablishment of existing associated ditches and shoulders shall be deemed routine maintenance if performed in accordance with this subsection; and
- (9) Conducting land-disturbing activities in response to a public emergency where the related work requires immediate authorization to avoid imminent endangerment to human health or the environment. In such situations, the Administrator shall be advised of the disturbance within seven days of commencing the land-disturbing activity and compliance with the administrative requirements of § 27-3(a) of this chapter is required within 30 days of commencing the land-disturbing activity.

(c) When a site development plan is submitted that qualifies as a redevelopment project as defined in §27-7 of this chapter, decisions on permitting and on-site stormwater requirements shall be governed by the stormwater sizing criteria found in the current Virginia Stormwater Management Handbook and Orange County adopted LID manuals. This criterion is dependent on the amount of impervious area created by the redevelopment and its impact on water quality. Final authorization of all redevelopment projects will be determined after review by the Administrator.

(d) The Administrator shall have final decision making authority on all aspects of the enforcement of this chapter. Throughout this chapter, the phrase “in consultation with the Soil and Water Conservation District and/or other agencies” shall not be construed to imply otherwise.

Sec. 27-4. 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.

Sec. 27-5. Severability.

If 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.

Sec. 27-6. Stormwater Management Handbook.

The Administrator will utilize the policy, criteria, and information including specifications and standards of the Virginia Stormwater Management Handbook, the Virginia Stormwater BMP Clearinghouse and the Orange County Stormwater Program Manual, for the proper implementation of the requirements of this chapter. The Handbook is a list of acceptable stormwater treatment practices, including the specific design criteria for each stormwater practice. Design and construction in accordance with updates to the Handbook, regarding improvements in technology, engineering, science, monitoring, and local maintenance, will be presumed to meet the minimum water quality performance standards required by this chapter.

DIVISION 2. DEFINITIONS

Sec. 27-7. Terms and Words Defined.

In addition to the definitions set forth in 9VAC25-870-10 of the Virginia Stormwater Management Regulations, which are expressly adopted and incorporated herein by reference, the following words and terms used in this chapter have the following meanings unless the context clearly indicates otherwise. Where definitions differ, those incorporated herein shall have precedence.

Administrator: The staff person or department responsible for administering program or his designated agent.

Agreement in lieu of a plan: A contract between the plan-approving authority and the landowner with minimum requirements necessary to meet the intent of a stormwater pollution prevention plan as defined in this Article.

Agricultural: The keeping of agricultural animals, livestock, grazing, and the tilling of the soil, the raising of crops, horticulture, forestry, and including the keeping and the processing of any products produced on the premises, such as milk, eggs, and the like; but excluding any industry or business such as fruit packing plants or similar uses where all products processed are not produced on said premise.

Applicant: Any person submitting an application for a permit or requesting issuance of a permit under this chapter.

As-Built Checklist: A guideline for preparing as-built drawings.

Best management practice (BMP): 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 from the impacts of land-disturbing activities. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Buffers: An area of land at or near a tributary streambank and/or wetland that has intrinsic water quality value due to the ecological and biological processes it performs or is otherwise sensitive to changes which may result in significant degradation to the quality of state waters.

Channel: A natural or artificial watercourse with a definite bed and banks that conducts continuously or periodically flowing water.

Common plan of development or sale: A contiguous area where separate and distinct construction activities may be taking place at different times on different schedules.

Control measure: Any best management practice or other method used to prevent or reduce the discharge of pollutants to surface waters.

Clean Water Act or CWA: The federal Clean Water Act (33 USC §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.

Department or DEQ: Means the Department of Environmental Quality.

Development: 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.

Drainage easement: A legal right granted by a landowner to a grantee allowing the use of private land for stormwater conveyance and/or treatment and the construction thereof.

Ephemeral stream: An ephemeral stream has flowing water only during, and for a short duration after, precipitation events in a typical year. Ephemeral stream beds are located above the water table year-

round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.

Erosion: Removal of soil particles by wind and/or water. Often the eroded debris (silt or sediment) becomes a pollutant via stormwater runoff. Erosion occurs naturally but can be intensified by human activities such as farming, development, road-building, and timber harvesting.

Environmental Site Design (ESD): Nonstructural techniques and better site planning to mimic natural hydrologic runoff characteristics and minimize the impact of land development on water resources.

Facility: A device that controls stormwater runoff and changes the characteristics of that runoff including, but not limited to, the quantity and quality, the period of release, and the velocity of flow.

Flooding: A volume of water that is too great to be confined within the banks or walls of a stream, water body, or conveyance system and that overflows onto adjacent lands, causing or threatening damage.

Floodplain: Land which would be inundated by flood waters in a storm event of a one-hundred (100) year return interval.

Forested condition: Mature, healthy forest land condition.

General permit: The VSMP GENERAL PERMIT FOR DISCHARGES OF STORMWATER FROM CONSTRUCTION ACTIVITIES found at 9VAC25-880-70 authorizing a category of discharges under the CWA and the Act within a geographical area of the Commonwealth of Virginia.

Geotechnical investigation: On site soil conditions inspected and reported by a trained professional.

Hotspot: An area where land use or activities generate highly contaminated runoff, with concentrations of pollutants in excess of those typically found in stormwater. Hotspots include but are not limited to industrial uses, gas stations, storage, handling and disposal facilities.

Hydrology: All bodies of water and their connectivity.

Infiltration: The process of percolating stormwater into the subsoil.

Integrated stormwater management practices or IMP: BMPs and techniques used to manage stormwater runoff at the source, including but not limited to any combination of Environment Site Design (ESD) techniques, Runoff Reduction (RR) practices and Pollutant Removal (PR) measures that are implemented on individual lots to prevent pollutant generation and mitigate increases in stormwater runoff.

Intermittent stream: A natural stream channel in which water flows for part of the year and which is depicted as a line of blue dashes and dots on the most recent United States Geological Survey 7.5 minute topographic quadrangle map.

Land cover: A vegetative condition of a parcel. Vegetative condition is associated with a specified curve number used to calculate runoff pollution.

Land disturbance activity: A man-made change to the land surface that potentially changes its runoff characteristics including clearing, grading, or excavation except that the term shall not include those exemptions specified in Section 27-3 of this Ordinance.

Land use conversion: The official changing of the permitted land use to a new permitted land use; the result of a rezoning.

Layout: A conceptual drawing sufficient to provide for the specified stormwater management facilities required at the time of approval.

Natural Resource Assessment: A description of the natural qualities and physical limitations of a site for the purposes of implementing low impact development. The assessment is to identify the physical boundaries and properties of soils, water bodies, vegetation and topography of the site.

Linear development project: A land development 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) the construction of tracks, right-of-ways, private roads, bridges, communication facilities, and other related structures of a railroad company, (iii) highway construction projects, (iv) driveways.

Lot: A tract, plot, portion of a subdivision, or other parcel of land intended as a unit for the purpose, whether immediate or future, of transfer of ownership or for development.

Low-impact development (LID): An approach to site design and stormwater management that seeks to maintain the pre-development hydrology of a site (e.g. infiltration and groundwater recharge; volume, rate, and frequency of stormwater discharges) through the use of environmental site design techniques and runoff reduction practices to create functionally equivalent hydrologic characteristics.

Low-impact development manuals: Orange County adopted manuals, as incorporated by reference in this chapter.

Minor modification: An amendment to an existing 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 permit modification or amendment does not substantially alter 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.

Non-tidal wetlands: Wetlands other than tidal wetlands that are inundated or saturated by surface or groundwater at a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions, as defined by the United States Environmental Protection Agency.

Operator: The owner or operator of any facility or activity subject to regulation under this ordinance.

Parcel: see lot.

Parking lot: An area not within a building where licensed and operable motor vehicles may be stored for the purpose of temporary, daily or overnight off-street parking.

Peak discharge: The maximum volumetric flow rate passing a particular location during a storm event.

Percent impervious: The impervious area within the site divided by the area of the site multiplied by 100.

Perennial streams: Streams which typically run year round and are depicted as a continuous blue line on the most recent United States Geological Survey 7.5 minute topographic quadrangle map (scale 1:24,000), except for streams within a development area or area of infill and redevelopment that have been piped or converted legally and intentionally into stormwater conveyance channels such that the stream does not resemble or maintain the characteristics of a natural stream channel, as determined by the program authority.

Permit or VSMP Authority Permit: An approval to conduct a land-disturbing activity issued by the Administrator for the initiation of a land-disturbing activity, in accordance with this chapter, and which may only be issued after evidence of general permit coverage has been provided by the Department, where applicable.

Permittee: The person to whom the Permit is issued.

Person: Any individual, corporation, partnership, association, state, municipality, commission, or political subdivision of a state, governmental body, including federal, state, or local entity as applicable, any interstate body or any other legal entity.

Point of discharge: The geographic point of analysis to which runoff from a particular area of land is conveyed.

Pollutant load: The amount of pollutants running off the land. In Virginia, pollutant load is based on the amount of phosphorus, but can refer to other pollutants as well such as nitrogen.

Pollutant Removal (PR): The change in the average concentration of a pollutant as runoff flows into and out of a control measure.

Post-development: 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: Conditions that exist at the time that plans for the land development of a tract of land are approved by the plan approving authority. Where phased development of plan approval occurs (preliminary grading, roads, utilities, etc.), the existing conditions at the time *prior to* the first time being approved or permitted shall establish pre-development conditions.

Recharge: The replenishment of underground water reserves.

Redevelopment project: A land disturbing activity on previously developed land, where the development is adaptively reused, rehabilitated, restored, renovated, and/or expanded.

Regulations: The Virginia Stormwater Management Program (VSMP) Permit Regulations, 9VAC25-870-10, *et seq*, as amended.

Runoff Reduction (RR): The total annual runoff volume reduced through canopy interception, soil infiltration, evaporation, transpiration, rainfall harvesting, engineered infiltration, or extended infiltration to maintain the pre development runoff volume.

Sediment deposition: The process of water creating a sediment deposit, through the laying down of granular material that has been eroded and transported from another geographical location.

Site: 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.

State: The Commonwealth of Virginia.

State Board: The Virginia Water Control Board.

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

State waters: All water, on the surface and under the ground, wholly or partially within or bordering the Commonwealth or within its jurisdiction, including wetlands.

Stormwater: 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 drainage system: An engineered man-made or natural system that transports stormwater through an area, site, and/or drainage area.

Stormwater (management) impoundment structures: See facility.

Stormwater management design manuals: Orange County list of approved guidance manuals; including but not limited to the Virginia Stormwater Management Handbook and Orange County Stormwater Program Manual.

Stormwater management concept plan: A document containing preliminary material and narrative for describing how existing runoff characteristics will be affected by a land development project, and methods for complying with the requirements of this ordinance.

Stormwater management design plan: A document containing narrative information and computational analysis for describing how existing runoff characteristics will be affected by a land development project, and methods for complying with the requirements of this ordinance.

Stormwater Pollution Prevention Plan or SWPPP: A document that is prepared in accordance with good engineering practices and that identifies potential sources of pollution 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, an approved erosion and sediment control plan, an approved stormwater management plan, and a pollution prevention plan.

Stormwater runoff: Water originating from rainfall and other precipitation that ultimately flows into drainage facilities, rivers, streams, springs, seeps, ponds, lakes, and wetlands as well as shallow groundwater.

Stream impact: The effect of land use change on the local aquatic system.

Structure: See facility.

Surface water: Water other than groundwater, such as lakes, rivers, or streams.

Total maximum daily load or TMDL: The sum of the individual wasteload allocations for point sources, load allocations 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.

Virginia Stormwater Management Act or Act: Virginia Stormwater Management Act, Article 2.3 (§62.1-44.2 et seq.) of Chapter 3.1 of Title 62.1 of the Code of Virginia.

Virginia Stormwater BMP Clearinghouse website: 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 Stormwater Management Permit: A statement of the various methods employed by a locality to manage the runoff from land development projects and may include such items as local ordinances, policies and guidelines, technical materials, inspection, enforcement, and evaluation.

Virginia Stormwater Management Program (VSMP): A program approved by the VSWCB after September 13, 2011, that has been established by a locality to manage the quality and quantity of runoff resulting from land-disturbing activities and shall include such items as local ordinances, rules, permit requirements, annual standards and specifications, policies and guidelines, technical materials, and requirements for plan review, inspection, enforcement, where authorized in this Article, and evaluation consistent with the requirements of this Article and associated regulations.

Virginia Stormwater Management Program authority or VSMP authority: An authority approved by the Board after September 13, 2011, to operate a Virginia Stormwater Management Program or, until such approval is given, the Department. An authority may include a locality; state entity, including the Department; federal entity; or, for linear projects subject to annual standards and specifications in accordance with subsection B of § 62.1-44.15:31, electric, natural gas, and telephone utility companies, interstate and intrastate natural gas pipeline companies, railroad companies, or authorities created pursuant to § 15.2-5102.

Virginia Stormwater Management Program (VSMP) Permit Regulations: Chapter 3.1 (9VAC25-870) of the Virginia Administrative Code.

Water quality volume (WQV) or Treatment Volume (Tv): The volume of water being stored for treatment in a stormwater management facility or integrated stormwater management practice.

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

Wetlands: Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

Zoning Administrator: The Orange County Zoning Administrator or his designee.

ARTICLE II. EXCEPTIONS

Sec. 27-8. Generally.

Except as provided herein, no person may engage in any land disturbing activity until a permit has been issued in accordance with the provisions of this chapter. Exceptions to the provisions of this chapter may be granted by the Administrator upon receipt of request for such exception in writing from the applicant or property owner. The request shall include descriptions, drawings, calculations, and other information that is necessary to evaluate the waiver of stormwater management requirements. Exceptions to the technical criteria in Article IV of this chapter may be granted as follows:

- (a) An exception may be granted provided that:
 - (1) Exceptions to the criteria are the minimum necessary to afford relief;
 - (2) Economic hardship alone is not sufficient reason to grant an exception;
 - (3) Reasonable and appropriate conditions shall be imposed as necessary upon an exception granted so the intent of the chapter is preserved.
 - (4) Granting the exception will not confer any special privileges that are denied in other similar circumstances.
 - (5) Exception requests shall not be based upon conditions or circumstances that are self-imposed or self-created.
 - (6) It can be demonstrated that the proposed development is not likely to impair attainment of the objectives of this chapter.
- (b) Exceptions to the requirement that the land disturbing activity obtain a required VSMP authority permit shall not be given by the Administrator, nor shall the Administrator approve the use of a BMP not found on the Virginia Stormwater BMP Clearinghouse web site, or any other commonly accepted BMP meeting industry standards.
- (c) Exceptions to the requirement for phosphorous reduction shall not be allowed unless off-site options otherwise permitted pursuant to 9VAC25-870-69 have been considered and found unavailable.
- (d) Nothing in this section shall preclude an operator from adhering to a more stringent standard at their discretion.
- (e) A record of all exceptions granted shall be maintained by the Administrator in accordance with 9VAC25-870-126.

Sec. 27-9. Low Impact Development Exceptions.

An exception to implementation of Low Impact Development may be granted provided that an exception request in accordance with Section 27-8 is provided. Such requests shall provide the following:

(a) A stormwater management concept plan which utilizes LID techniques in accordance with design manuals to the maximum extent possible. The exception request shall be supported by a natural resource checklist, environmental site design checklist and an LID performance worksheet (See Worksheet 1 in Appendix);

(b) The stormwater management plan shall address requirements for water quality and quantity in accordance with Article IV; and

(c) At least one of the following conditions must be met:

- (1) Minimum on-site requirements cannot be met due to the natural physical characteristics of the site; or
- (2) Site conditions are such that compliance with Low Impact Design will conflict with existing state or Orange County ordinances, regulations or policy.

ARTICLE III. STORMWATER MANAGEMENT PROGRAM PERMIT PROCEDURES AND REQUIREMENTS

No application for land disturbance will be approved unless it includes a stormwater management design plan as required by this chapter, detailing how runoff and associated water quality impacts resulting from the activity will be controlled or managed. A stormwater management plan shall consist of a concept plan, to ensure adequate planning for the management of runoff, and a design plan.

DIVISION 1. GENERAL STORMWATER REQUIREMENTS

Sec. 27-10. General Stormwater Program Requirements.

(a) Pursuant to § 62.1-44.15:27 of the Code of Virginia, Orange County hereby establishes a stormwater program for land disturbing activities and adopts the applicable regulations, references, guidelines, standards and specifications promulgated by the VSWCB to protect property, state waters, stream channels, and other natural resources from the potential harm of unmanaged stormwater, and to establish procedures whereby stormwater requirements related to water quality and quantity shall be administered and enforced, including, but not limited to the Regulations, the Virginia Stormwater Management Handbook, and the Virginia Stormwater BMP Clearinghouse website. The County of Orange hereby designates the Zoning Administrator or his designee as the Administrator of the Orange County Stormwater Program.

(b) No permit shall be issued by the Administrator, until the following items have been submitted to and approved by the Administrator as prescribed herein:

- (1) A permit application that includes a general permit registration statement;
- (2) An erosion and sediment control plan, in accordance with the Orange County Erosion and Sediment Control Ordinance, Chapter 26 of the Orange County Code;

- (3) A stormwater management plan meets the requirements of Division 3 of this chapter;
 - (4) At the discretion of the Administrator, A pollution prevention plan, in accordance with Division 2 of this chapter.
- (b) No permit shall be issued until evidence of general permit coverage is obtained.
- (c) No permit shall be issued until the fees required to be paid pursuant to Article VIII.
- (d) No VSMP authority permit shall be issued unless and until the permit application and attendant materials and supporting documentation demonstrate that all land clearing, construction, disturbance, land development, and drainage will be done according to the approved permit.
- (e) No grading, building or other permit involving land disturbance shall be issued for a property unless a stormwater permit has been issued by the Administrator.

DIVISION 2. STORMWATER POLLUTION PREVENTION PLANS

Sec. 27-11. Stormwater Pollution Prevention Plans (SWPPP).

- (a) The Stormwater Pollution Prevention Plan (SWPPP) required by the general permit, must comply with the requirements set forth in Sec. 27-12 and 9VAC25-870-54, and the terms of the general permit.
- (b) The SWPPP shall be amended whenever there is a change in design, construction, operation, or maintenance that has a significant effect on the discharge of pollutants to state waters which is not addressed by the existing SWPPP.
- (c) The SWPPP must be maintained at a central location on-site. If an on-site location is unavailable, notice of the SWPPP's location must be posted near the main entrance at the construction site. Operators shall make the SWPPP available for public review in accordance with Section II of the general permit, either electronically or in hard copy.

Sec. 27-12. Pollution Prevention Plan (PPP) Contents.

- (a) A Pollution Prevention Plan, required by 9VAC25-870-54, must detail the design, installation, implementation, and maintenance of effective pollution prevention measures to minimize the discharge of pollutants. At a minimum, such measures must be designed, installed, implemented, and maintained to:
 - (1) Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other wash waters. Wash waters must be treated in a sediment basin or alternative control that provides equivalent or better treatment prior to discharge;
 - (2) Minimize the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste, and other materials present on the site to precipitation and to stormwater; and
 - (3) Minimize the discharge of pollutants from spills and leaks and implement chemical spill and leak prevention and response procedures.

(b) The pollution prevention plan shall include effective best management practices to prohibit the following discharges:

- (1) Wastewater from washout of concrete, unless managed by an appropriate control;
- (2) Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, and other construction materials;
- (3) Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance; and
- (4) Soaps or solvents used in vehicle and equipment washing.

(c) Discharges from dewatering activities, including discharges from dewatering of trenches and excavations, are prohibited unless managed by appropriate controls.

DIVISION 3. STORMWATER MANAGEMENT DESIGN PLANS

Sec. 27-13. Stormwater Management Concept Plans.

(a) All preliminary plans of major subdivision shall provide a stormwater management concept plan describing, in general, how stormwater runoff through and from the development will be conveyed and controlled. Special use permit and rezoning applications shall provide a stormwater management concept plan when determined by the Administrator to be appropriate.

(b) The stormwater management concept plan must be approved prior to submission of a stormwater management design plan (as part of the construction plans or final plan) for the entire development, or portions thereof.

(c) Concept plans shall include any exception requests as outlined in Article II.

(d) The Administrator shall check the design plan for consistency with the concept plan as needed and may require a revised stormwater management concept plan if substantial changes in the site development proposal have been made.

(e) The stormwater management concept plan shall utilize, to the maximum extent practicable, low-impact development (LID) site planning in accordance with the low-impact development design manuals.

(f) At a minimum, the stormwater management concept plan will include:

- (1) A drainage map with accompanying Natural Resource Assessment that identifies the existing conditions of the site and the surrounding areas. This description should include a discussion of existing drainage features, forest conservation, stream buffers, wetland, floodplain, recharge, habitat, steep slopes, soil conditions, and other natural area protections that apply on the site.
- (2) A layout showing the location of existing and proposed improvements including both structural and nonstructural best management practices. The layout will also clearly show post

development drainage patterns, proposed land use tabulation of the percentage of surface area to be adapted to various uses, and proposed drainage easements;

- (3) Hydrologic computations using the low impact development design manuals indicating the LID watershed storage volume or Treatment Volume, and/or the runoff reduction spreadsheet to show water quality compliance;
- (4) Low impact development site planning, to the maximum extent practicable, in accordance with the low impact development design manuals with a written summary explaining how LID has been utilized and whether on-site or offsite control measures are used to comply with remaining stormwater requirements;
- (5) Additional information may be required, as deemed necessary by the Administrator to evaluate the concept plan.

Sec. 27-14. Stormwater Management Design Plans.

(a) Except as provided for in Article II, Exceptions, no grading or building permit shall be issued for land development without approval of a stormwater management design plan that demonstrates compliance with Article IV, General Criteria and a VSMP permit issued by the Administrator.

(b) The applicant shall demonstrate that the project meets the criteria set forth in this chapter through submission of a stormwater management design plan. Failure of the applicant to demonstrate that the project meets these criteria, as determined by the Administrator shall be reason to deny approval of the plan.

(c) A stormwater management design plan containing all appropriate information described in Sec. 27-15 shall be submitted to the Administrator in conjunction with the construction plans, final plan, or site plan.

(d) Where the land-disturbing activity results from the construction of a single family residence, inclusive of the driveway accessing the site, an agreement in lieu of a plan may be substituted for a stormwater management design plan.

Sec. 27-15. Stormwater Management Design Plan Contents.

The stormwater management design plan shall contain maps, charts, graphs, tables, photographs, narrative descriptions, explanations, and citations to supporting references as appropriate to communicate the information required by this chapter, the stormwater management design manuals, and the low-impact development design manuals. At a minimum, the stormwater management design plan shall contain the following:

(a) *General.*

- (1) A map or maps of the site that depicts the topography of the site and includes:
 - i. All contributing drainage areas;

- ii. Existing streams, ponds, culverts, ditches, wetlands, other water bodies, and floodplains;
 - iii. Soil types, geologic formations if karst features are present in the area, forest cover, and other vegetative areas;
 - iv. Current land use including existing structures, roads, and locations of known utilities and easements;
 - v. Sufficient information on adjoining parcels to assess the impacts of stormwater from the site on these parcels;
 - vi. The limits of clearing and grading, and the proposed drainage patterns on the site;
 - vii. Proposed buildings, roads, parking areas, utilities, and stormwater management facilities; and
 - viii. Proposed land use with tabulation of the percentage of surface area to be adapted to various uses, including but not limited to planned locations of utilities, roads, and easements.
- (2) A narrative that includes a description of current site conditions and final site conditions; including documentation and calculations verifying compliance with the water quality and quantity requirements of Article IV of this chapter.
 - (3) A general description of the proposed stormwater management facilities and the mechanism through which the facilities will be operated and maintained after construction is complete.
 - (4) Information on the type and location of stormwater discharges; information on the features to which stormwater is being discharged including surface waters or karst features if present, and the predevelopment and post development drainage areas.
 - (5) A Natural Resource Assessment, LID Site Design Checklist, and an LID Performance Worksheet . (See Worksheet #1 in Appendix)
 - (6) Identification of on-site and off-site easements required.
 - (7) Contact information including the name, address, and telephone number of the owner and the tax reference number and parcel number of the property or properties affected.
 - (8) Project schedule, including sequence of construction
 - (9) Elements of the stormwater management plans that include activities regulated under Chapter 4 (§54.1-400 et seq.) of Title 54.1 of the Code of Virginia shall be appropriately sealed and signed by a professional registered in the Commonwealth of Virginia pursuant to Article 1 (§ 54.1-400 et seq.) of Chapter 4 of Title 54.1 of the Code of Virginia.
 - (10) If an operator intends to meet the water quality and/or quantity requirements set forth in 9VAC25-870-63 or 9VAC25-870-66 through the use of off-site compliance options, where applicable, then a letter of availability from the off-site provider must be included. Approved off-site options must achieve the necessary nutrient reductions prior to the commencement of the applicant's land-disturbing activity except as otherwise allowed by § 62.1-44.15:35 of the Code of Virginia.

(b) *Stormwater management facilities and Integrated Stormwater Management Practices.*

- (1) Stormwater management facilities identified on a map, including details, plan, profile, cross sections, and other pertinent data necessary for review as identified in the stormwater management design manuals and information on the proposed stormwater management facilities, including:
 - i. the type of facilities;
 - ii. location, including geographic coordinates;
 - iii. acres treated; and
 - iv. the surface waters or karst features into which the facility will discharge.
- (2) Comprehensive hydrologic and hydraulic design calculations, including all assumptions and criteria, for the pre-development and post-development conditions for the design storms specified in this chapter or the stormwater management design manuals.
- (3) If infiltration facilities are proposed, the location of existing and proposed wells and septic system drain fields shall be shown along with an analysis that supports the location of the infiltration facility in the soil type identified.
- (4) A geotechnical report with recommendations and earthwork specifications in accordance with requirements in the stormwater management design manuals. The geotechnical engineer shall certify on a specifications sheet in the design plan that the geotechnical recommendations have been incorporated into the design of stormwater management facilities.
- (5) A plan describing the woody and herbaceous vegetative stabilization and management techniques to be used within and adjacent to the stormwater management facility in accordance with standards in the stormwater management design manuals.
- (6) Identification of all on-site and off-site, temporary and permanent easements needed for construction, inspection, and maintenance of stormwater management facilities in accordance with specifications in the stormwater management design manuals.
- (7) A maintenance plan identifying the parts or components of the stormwater management facility that need to be maintained to ensure continued proper functioning of the facility.

(c) *Stormwater drainage systems.*

- (1) Hydrologic and hydraulic design calculations, including calculations for off-site drainage systems.
- (2) Design specifications in accordance with the stormwater management design manuals.
- (3) Identification of all easements needed for construction, inspection and maintenance of drainage systems in accordance with specifications in the stormwater management design manuals.
- (4) All existing and proposed drainage systems, natural or manmade, shall be analyzed according to the Virginia Erosion and Sediment Control Regulations Minimum Standard 19.

Sec. 27-16. Stormwater Management Design Plan Approval.

The Administrator shall construction management plans and shall approve or disapprove such plans according to the following:

(a) A maximum of fifteen (15) calendar days from the receipt of an application will be allowed for preliminary review of the application to determine if the application is complete. Following this period, the application will be accepted for review, which will begin the sixty-day review period, or it will be rejected for incompleteness. If rejected, the applicant will be informed in writing of the information necessary to complete the application.

(b) The sixty-day (60) review period begins on the day the complete stormwater management design plan is accepted for review. During the sixty-day review period, the Zoning Administrator, or his designee, shall either approve or disapprove the plan and communicate the decision to the applicant in writing. Approval or denial shall be based on the plan's compliance with this chapter and the stormwater management design manuals. In cases where modifications are required to approve the plan, the County shall have an additional forty-five (45) days to review the revised plan from the initial and any subsequent resubmission dates. If the plan is approved, one copy bearing certification of such approval shall be returned to the applicant. If the plan is rejected, the applicant shall be notified in writing of the reasons. A copy of the approved plan shall be kept on the project site.

(c) All plans, profiles, and specifications shall be distributed to the appropriate County departments and/or State agencies for review and recommendation.

Sec. 27-17. Conditions of Approval.

(a) The applicant shall comply with all applicable requirements of the approved stormwater management plan and shall certify that all land clearing, construction, land development and drainage will be done according to the approved plan.

(b) The County shall have the right of entry, after giving notice to the owner, occupier or operator of the land development project, to conduct periodic inspections of the project;

(c) The Operator shall conduct monitoring and submit inspection reports as the Administrator may require, to ensure compliance with the approved stormwater management plan and to determine whether the plan provides effective stormwater management;

(d) No transfer, assignment, or sale of the rights granted by virtue of an approved stormwater management plan shall be made unless a written notice of transfer is filed with the County and the transferee certifies agreement to comply with all obligations and conditions of the approved plan.

(e) The applicant shall comply with all applicable requirements of the approved plan and shall be responsible for implementing the approved plan.

(f) Approved stormwater plans may be modified as follows:

- (1) Modifications to an approved stormwater management plan shall be allowed only after review and written approval by the Administrator. The Administrator shall have sixty (60) calendar days to respond in writing either approving or disapproving such request.

- (2) The Administrator may require that an approved stormwater management plan be amended, within a time prescribed by the Administrator, to address any deficiencies noted during inspection.

(g) The stormwater management design plan's approval expires one (1) year from the date of approval unless a final plat is recorded or unless work has actually begun on the site. If the stormwater management design plan expires, the applicant shall file with the Orange County Planning Department for re-approval of the stormwater management design plan.

ARTICLE IV. GENERAL CRITERIA

DIVISION 1. GENERAL PERFORMANCE CRITERIA

Sec. 27–18. General Performance Criteria.

(a) In accordance with Administrator's authority, this Article establishes the minimum technical criteria that shall be employed to protect the quality and quantity of state waters from the potential harm of unmanaged stormwater runoff resulting from land-disturbing activities.

(b) Low impact development site planning shall be used to control stormwater runoff at the source and more closely approximate predevelopment runoff conditions. The design criteria, hydrologic analysis and computational procedures for low impact development techniques shall be those identified in LID design manuals acceptable to the County.

(c) Stormwater management plans developed consistent with the requirements of Low Impact Development pursuant to Sec. 27-22 shall satisfy the Water Quality and Channel Protection performance criteria of this article.

(d) Unless exempted under Sec. 27-3 as an approved maintenance activity, existing stormwater management facilities that must be modified or replaced as part of a site plan shall meet the criteria of this Article.

(e) Proposed residential, commercial, or industrial subdivisions shall apply these stormwater management criteria to the land disturbance as a whole. Individual lots in new subdivisions shall not be considered separate land-disturbing activities, but rather the entire subdivision shall be considered a single land development project.

(f) Unless exempt pursuant to Sec. 27-3 of this chapter, linear development projects shall control post development stormwater runoff in accordance with a site-specific stormwater management plan or a comprehensive watershed stormwater management plan developed in accordance with this Article.

(g) In accordance with § 62.1-44.15:28 of the Code of Virginia, stormwater harvesting is encouraged for the purposes of landscape irrigation systems, fire protection systems, flushing water closets and urinals, and other water handling systems to the extent such systems are consistent with federal, state, and local regulations.

Sec. 27–19. Grandfathering.

Until June 30, 2019, any land-disturbing activity for which a currently valid proffered or conditional zoning plan, preliminary or final subdivision plat, preliminary or final site plan or zoning with a plan of development, or any document determined by the locality as being equivalent thereto, was approved by a locality prior to July 1, 2012, and for which no coverage under the general permit has been issued prior to July 1, 2014, shall be considered grandfathered by the stormwater program administrative authority and shall not be subject to the technical criteria of this Article, but shall be subject to the technical criteria of Part II C of the Regulations for those areas that were included in the approval, provided that the stormwater program administrative authority finds that such proffered or conditional zoning plan, preliminary or final subdivision plat, preliminary or final site plan or zoning with a plan of development, or any document determined by the locality as being equivalent thereto, (i) provides for a layout and (ii) the resulting land-disturbing activity will be compliant with the requirements of Part II C. In the event that the locality-approved document is subsequently modified or amended in a manner such that there is no increase over the previously approved plat or plan in the amount of phosphorus leaving each point of discharge of the land-disturbing activity through stormwater runoff, and such that there is no increase over the previously approved plat or plan in the volume or rate of runoff, the grandfathering shall continue as before.

(a) Until June 30, 2019, for local, state, and federal projects for which there has been an obligation of local, state, or federal funding, in whole or in part, prior to July 1, 2012, or for which the department has approved a stormwater management plan prior to July 1, 2012, such projects shall be considered grandfathered by Orange County and shall not be subject to the technical requirements of this Article, but shall be subject to the technical requirements of Part II C of the Regulations.

(b) For land-disturbing activities grandfathered under this subsection, construction must be completed by June 30, 2019, or portions of the project not under construction shall become subject to the technical requirements this Article.

In cases where governmental bonding or public debt financing has been issued for a project prior to July 1, 2012, such project shall be subject to the technical requirements of Part II C of the Regulations, as adopted by this section.

Nothing in this section shall preclude an operator from constructing to a more stringent standard at their discretion.

DIVISION 2. LOW-IMPACT DEVELOPMENT

Sec. 27–20. Low Impact Development Criteria.

Low-impact development site design is intended to maximize conservation of open space, minimize impervious area, and manage the increase in runoff volume through the use of environmental site design techniques, runoff reduction practices and pollutant removal facilities while complying with the requirements for stormwater management set forth by the State and this chapter.

(a) Compliance with the water quality requirements of Section 27-24 of this chapter may be achieved by applying the following low impact development criteria:

(1) Volume Control: The post-development runoff volume associated with the 1-year storm event shall be no greater than the 1-year runoff volume from the contributing drainage area in forested condition.

(2) Peak Flow Rate Control: The post-development peak runoff rate associated with the 1-year storm event shall be no greater than the 1-year peak runoff rate from the contributing drainage area in forested condition.

(3) Where site conditions prevent the control of runoff volume, peak flow rate shall be addressed utilizing a hybrid design approach in accordance with the LID Design Manuals. The stormwater management facilities and the integrated stormwater management practices shall have a storage volume computed using the hybrid approach such that the 1-year storm event is released at the same rate as the contributing drainage area in forested condition.

(b) In no case shall the watershed storage control volume computed in subsection (a), above, be less than the water quality volume or treatment volume.

(c) The LID criteria of subsection (a) shall be applied to the limits of disturbance for each land development project.

(d) Storm drainage easements shall be recorded to identify the locations of integrated management practices on lots or parcels. The property owner shall not remove or structurally alter integrated management practices without prior written approval from the Administrator.

(e) Annual groundwater recharge rates shall be maintained by promoting infiltration through the use of low impact development design. At a minimum, annual recharge from the post development site shall mimic the annual recharge from pre-development site conditions.

DIVISION 3. WATER QUALITY

Sec. 27–21. General Water Quality.

(a) All stormwater runoff generated from land development and land use conversion activities shall not discharge untreated stormwater runoff directly into a jurisdictional wetland or local water body without adequate treatment. Where such discharges are proposed, the impact of the proposal on wetland functions shall be addressed using a method acceptable to the Administrator, in consultation with the Culpeper Soil and Water Conservation District and/or other agencies. In no case shall the impact on functions be any less than allowed by the United States Army Corp of Engineers or the Virginia Department of Environmental Quality.

(b) Stormwater discharges to critical areas with sensitive resources may be subject to additional criteria, or may need to utilize or restrict certain stormwater management practices at the discretion of Orange County. Prior to design, applicants are required to consult with the Administrator, in consultation with the Culpeper Soil and Water Conservation District and/or other agencies, to determine if they are subject to additional stormwater design requirements. Water supply protection areas, if established, shall be subject to additional criteria.

(c) Stormwater discharges from land uses or activities with higher potential pollutant loadings, known as “hotspots”, may require the use of specific structural BMPs and pollution prevention practices.

Sec. 27–22. Water Quality Criteria.

A BMP will be located, designed and maintained to achieve the target pollutant load as specified in this section.

(a) In order to protect the quality of state waters and to control the discharge of stormwater pollutants from regulated activities, the following minimum design criteria and statewide standards for stormwater management shall be applied to the site.

- (1) New development. The total phosphorus load of new development projects shall not exceed 0.41 pounds per acre per year.
- (2) Redevelopment projects.
 - i. For land-disturbing activities that result in no net increase in impervious cover from the predevelopment condition, the total phosphorus load shall be reduced at least 20% below the predevelopment total phosphorus load.
 - ii. For land-disturbing activities that result in a net increase in impervious cover over the predevelopment condition, the design criteria for new development shall be applied to the increased impervious area. The criteria of 27-22(a)(2)(i) above, shall be applied to the remainder of the site.

(b) Compliance with the water quality design criteria set out in subdivision (a) above shall be determined by utilizing the Virginia Runoff Reduction Method or another equivalent methodology that is approved by the Virginia Water Control Board (Board).

(c) The BMPs found on the Virginia Stormwater BMP Clearinghouse Website are approved for use as necessary to effectively reduce the phosphorus load and runoff volume in accordance with the Virginia Runoff Reduction Method. Design specifications and the pollutant removal efficiencies for all approved BMPs are found on the Virginia Stormwater BMP Clearinghouse Website. The BMPs listed in the County approved LID manuals may also be utilized.

(d) BMPs differing from those listed in subsection (c) of this section shall be reviewed and approved by the Administrator.

(e) The Administrator may establish limitations on the use of specific BMPs following submission of the proposed limitation.

(f) The Administrator shall have the discretion to allow for application of the design criteria to each drainage area of the site. However, where a site drains to more than one sixth order hydrologic unit code (HUC), the pollutant load reduction requirements shall be applied independently within each HUC unless reductions are achieved in accordance with a comprehensive watershed stormwater management plan in accordance with §27-29.

(g) Off-site alternatives where allowed in accordance with §27-29(b) may be utilized to meet the design criteria of subsection (a).

Sec. 27–23. General Water Quantity Criteria.

In order to protect Orange County waters from the potential harms of unmanaged quantities of stormwater runoff (sediment deposition, erosion, and damage due to changes in runoff rate of flow and hydrologic characteristics, including but not limited to, changes in volume, velocity, frequency, duration, and peak flow rate of stormwater runoff), channel protection and flood protection shall be addressed in accordance with the minimum standards set out in this Division, which are established pursuant to the requirements of subdivision 7 of § 62.1-44.15:28 of the Code of Virginia.

(a) Maintain post-development runoff rate of flow and runoff characteristics that replicate as nearly as practicable, the existing predevelopment runoff characteristics and site hydrology,

(b) Properties and receiving waterways downstream of any land development project shall be protected from erosion and damage due to increases in volume, velocity and frequency of peak flow rate of stormwater runoff in accordance with the Virginia Erosion and Sediment Control Law and/or Orange County Code Chapter 26 Erosion and Sediment Control.

(c) Determination of flooding and channel erosion impacts to receiving streams due to land-disturbing activities shall be measured at each point of discharge from the land disturbance and such determination shall include any runoff from the balance of the watershed which also contributes to that point of discharge

(d) For purposes of computing predevelopment runoff, all pervious lands in the site shall be assumed prior to development to be in good condition (if the lands are pastures, lawns, or parks), with good cover (if the lands are woods), or with conservation treatment (if the lands are cultivated); regardless of conditions existing at the time of computation. Predevelopment runoff calculations utilizing other land cover values may be utilized provided that it is satisfactorily demonstrated that actual site conditions warrant such considerations.

(e) Increased volumes of sheet flow resulting from pervious or disconnected impervious areas, or from physical spreading of concentrated flow through level spreaders, must be identified and evaluated for potential impacts on down-gradient properties or resources. Increased volumes of sheet flow that will cause or contribute to erosion, sedimentation, or flooding of down gradient properties or resources shall be diverted to a stormwater management facility or a stormwater conveyance system that conveys the runoff without causing down-gradient erosion, sedimentation, or flooding. If all runoff from the site is sheet flow and the conditions of this subsection are met, no further water quantity controls are required.

(f) The Administrator may determine that some watersheds or receiving stream systems require enhanced criteria in order to address the increased frequency of bankfull flow conditions brought on by land development projects.

Sec. 27–24. Flood Protection Criteria.

(a) Concentrated stormwater flow from new development shall be released into an adequate stormwater conveyance system and shall release a post development peak flow rate for the 10-year 24-hour storm event that is less than the predevelopment peak flow rate from the 10-year 24-hour storm event. In the event of existing localized flooding, more stringent criteria developed as per §27 – 23 (f) shall apply.

(b) Concentrated stormwater flow from a redevelopment project shall be released into an adequate stormwater conveyance system and shall meet one of the following criteria as demonstrated by use of acceptable hydrologic and hydraulic methodologies:

- (1) The 10-year post development peak rate of runoff from the development site shall not exceed the 10-year pre-development peak rate for the 24-hour storm event.
- (2) Concentrated stormwater flow to stormwater conveyance systems that currently experience localized flooding during the 10-year 24-hour storm event. The point of discharge either:
 - i. Confines the post development peak flow rate from the 10-year 24-hour storm event within the stormwater conveyance system to avoid localized flooding. Detention of stormwater or downstream improvements may be incorporated into the approved land-disturbing activity to meet this criterion, at the discretion of the Administrator; or
 - ii. Releases a post development peak flow rate for the 10-year 24-hour storm event that is 20 percent less than the predevelopment peak flow rate from the 10-year 24-hour storm event. Downstream stormwater conveyance systems do not require any additional analysis to show compliance with flood protection criteria if this option is utilized.

(c) Limits of analysis. Unless subdivision (b) (2) ii of this subsection is utilized to comply with the flood protection criteria, stormwater conveyance systems shall be analyzed for compliance with flood protection criteria to a point where:

- (1) The site's contributing drainage area is less than or equal to 1.0% of the total watershed area draining to a point of analysis in the downstream stormwater conveyance system;
- (2) Based on peak flow rate, the site's peak flow rate from the 10-year 24-hour storm event is less than or equal to 1.0% of the existing peak flow rate from the 10-year 24-hour storm event prior to the implementation of any stormwater quantity control measures; or
- (3) The stormwater conveyance system enters a mapped floodplain or other flood-prone area, adopted by ordinance, of any locality.

Sec. 27-25. Channel Protection Criteria.

Concentrated stormwater flow shall be released into a stormwater conveyance system and shall meet the criteria in subdivision (a), (b), or (c) of this subsection, where applicable, from the point of discharge to a point at the limits of analysis in subdivision (d) of this subsection.

(a) Manmade stormwater conveyance systems. When stormwater from a development is discharged to a manmade stormwater conveyance system, following the land-disturbing activity, either:

- (1) The manmade stormwater conveyance system shall convey the post development peak flow rate from the 2-year 24-hour storm event without causing erosion of the system. Detention of stormwater or downstream improvements may be incorporated into the

approved land-disturbing activity to meet this criterion, at the discretion of the stormwater program administrative authority; or

- (2) The peak discharge requirements for concentrated stormwater flow to natural stormwater conveyance systems in subdivision (c) of this subsection shall be met.

(b) Restored stormwater conveyance systems. When stormwater from a development is discharged to a restored stormwater conveyance system that has been restored using natural design concepts, following the land-disturbing activity, either:

- (1) The development shall be consistent, in combination with other stormwater runoff, with the design parameters of the restored stormwater conveyance system that is functioning in accordance with the design objectives; or
- (2) The peak discharge requirements for concentrated stormwater flow to natural stormwater conveyance systems in subdivision (c) of this subsection shall be met.

(c) Natural stormwater conveyance systems. When stormwater from a development is discharged to a natural stormwater conveyance system, the maximum peak flow rate from the 1-year 24-hour storm following the land-disturbing activity shall be calculated in accordance with the methodology established in either state regulation 9VAC25-870-66 or in the Orange County Stormwater Program Manual.

(d) Limits of analysis. Unless subdivision (c) of this subsection is utilized to show compliance with the channel protection criteria, stormwater conveyance systems shall be analyzed for compliance with channel protection criteria to a point where either:

- (1) Based on land area, the site's contributing drainage area is less than or equal to 1.0% of the total watershed area; or
- (2) Based on peak flow rate, the site's peak flow rate from the 1-year 24-hour storm is less than or equal to 1.0% of the existing peak flow rate from the 1-year 24-hour storm prior to the implementation of any stormwater quantity control measures.

DIVISION 5. DESIGN STORM HYDROLOGY

Sec. 27–26. Design Storm and Hydrologic Methods.

(a) Unless otherwise specified, the prescribed design storms are the 1-year, 2-year, and 10-year 24-hour storms using the site-specific rainfall precipitation frequency data recommended by the U.S. National Oceanic and Atmospheric Administration (NOAA) Atlas 14. Partial duration time series shall be used for the precipitation data.

(b) Unless otherwise specified, all hydrologic analyses shall be based on the existing watershed characteristics and how the ultimate development condition of the subject project will be addressed.

(c) Predevelopment and post development runoff characteristics and site hydrology shall be verified by site inspections, topographic surveys, available soil mapping or studies, and calculations consistent with good engineering practices. Guidance provided in the Virginia Stormwater Management Handbook.

(d) The U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) synthetic 24-hour rainfall distribution and models, including, but not limited to TR-55 and TR-20; hydrologic and hydraulic methods developed by the U.S. Army Corps of Engineers; or other standard hydrologic and hydraulic methods, shall be used to conduct the analyses described in this part.

(e) The Rational Method and Modified Rational Method may be used for designing stormwater conveyance systems such as culverts, inlets, and pipes receiving in accordance with the Orange County Design Manuals.

DIVISION 6. STORMWATER MANGEMENT FACILITIES

Sec. 27–27. Stormwater Management Impoundment Structures or Facilities.

(a) Construction of stormwater management impoundment structures or facilities within wetlands and perennial streams will be avoided to the maximum extent practicable.

(b) Construction of stormwater management impoundment structures or facilities within a Federal Emergency Management Agency (FEMA) designated 100-year floodplain will be avoided to the maximum extent practicable. When this is demonstrated to be unavoidable, all stormwater management facility construction will be in compliance with all applicable requirements under the National Flood Insurance Program, 44 CFR Part 59 and Chapter 34 of the County of Orange Code of Ordinances.

(c) Stormwater management impoundment structures that are not covered by the Impounding Structure Regulations (4VAC50-20) will be engineered for structural integrity for the 100-year storm event. In no case will the design standard be less than the 100-year storm event for any stormwater management impoundment structure.

Sec. 27–28. Stormwater Drainage Easements.

(a) Within any land development project, stormwater drainage easements must be provided for all improved stormwater conveyance systems. Stormwater drainage easements must be provided for existing or improved swales, channels and pipes draining runoff across two (2) or more lots;

(b) Stormwater drainage easements must be extended to upstream property lines to permit future development to have reasonable access for connections to on-site drainage ways or stormwater conveyance systems;

(c) Stormwater drainage easements must be provided for all stormwater management facilities located within any land development project;

Sec. 27-29. Comprehensive Watershed Stormwater Management Plans.

(a) The Administrator may develop comprehensive watershed stormwater management plans to be approved by DCR that meet the water quality objectives, quantity objectives, or both of this chapter:

- (1) Such plans shall ensure that offsite reductions equal to or greater than those that would be required on each contributing site are achieved within the same HUC or within another locally designated watershed. Pertaining to water quantity objectives, the plan may

provide for implementation of a combination of channel improvement, stormwater detention, or other measures that are satisfactory to the local stormwater management program to prevent downstream erosion and flooding.

- (2) If the land use assumptions upon which the plan was based change or if any other amendments are deemed necessary by the local stormwater management program, such program shall provide plan amendments to DCR for review and approval.
- (3) During the plan's implementation, the local stormwater management program shall document nutrient reductions accredited to the BMPs specified in the plan.
- (4) State and federal agencies may develop comprehensive stormwater management plans, and may participate in locality-developed comprehensive stormwater management plans where practicable and permitted by the local stormwater management program

(b) Offsite compliance options that the Administrator may allow an operator to use to meet required phosphorus nutrient reductions include the following:

- (1) Off-site controls utilized in accordance with a comprehensive watershed stormwater management plan adopted pursuant to subsection (a) for the local watershed within which a project is located;
- (2) A locality pollutant loading pro rata share program established pursuant to § 15.2-2243 of the Code of Virginia or similar local funding mechanism;
- (3) The nonpoint nutrient offset program established pursuant to §62.1-44.15:35 of the Code of Virginia;
- (4) Any other off-site options approved by an applicable state agency or state board; and
- (5) When an operator has additional properties available within the same HUC or upstream HUC that the land-disturbing activity directly discharges to or within the same watershed as determined by the stormwater program administrative authority, off-site stormwater management facilities on those properties may be utilized to meet the required phosphorus nutrient reductions from the land-disturbing activity.

(c) Notwithstanding subsection (b) of this section, and pursuant to §62.1-44.15:35 of the Code of Virginia, operators shall be allowed to utilize off-site options identified in subsection (b) of this section under any of the following conditions:

- (1) Less than five acres of land will be disturbed;
- (2) The post-construction phosphorus control requirement is less than 10 pounds per year; or
- (3) At least 75% of the required phosphorus nutrient reductions are achieved on-site. If at least 75% of the required phosphorus nutrient reductions cannot be met on-site, and the operator can demonstrate to the satisfaction of the stormwater program administrative authority that (i) alternative site designs have been considered that may accommodate on-site best management practices, (ii) on-site best management practices have been

considered in alternative site designs to the maximum extent practicable, (iii) appropriate on-site best management practices will be implemented, and (iv) full compliance with postdevelopment nonpoint nutrient runoff compliance requirements cannot practicably be met on-site, then the required phosphorus nutrient reductions may be achieved, in whole or in part, through the use of off-site compliance options.

- (d) Notwithstanding subsections (b) and (c) of this section, off-site options shall not be allowed:
- (1) Unless the selected off-site option achieves the necessary nutrient reductions prior to the commencement of the operator's land-disturbing activity. In the case of a phased project, the operator may acquire or achieve off-site nutrient reductions prior to the commencement of each phase of land-disturbing activity in an amount sufficient for each phase.
 - (2) In contravention of local water quality-based limitations at the point of discharge that are (i) consistent with the determinations made pursuant to subsection (b) of § 9VAC25-870-69 of the Code of Virginia, (ii) contained in a municipal separate storm sewer system (MS4) program plan approved by DEQ, or (iii) as otherwise may be established or approved by the board.

DIVISION 7. STREAM BUFFERS

Sec. 27–30. General Stream Buffer Criteria.

For all development subject to this chapter, stream buffers shall be retained if present and established where they do not exist on any lands containing streams, and/or wetlands contiguous to these streams. Please see Stream Buffer Policy Standards (Item 2) in the Appendix for guidance and specific requirements.

- (a) The stream buffer shall be no less than one hundred (100) feet on each side of the Rapidan River, no less than fifty (50) feet on each side of perennial streams, and no less than twenty-five (25) feet on each side of intermittent streams, or contiguous non-tidal wetland.
- (b) Buffers shall be measured horizontally from the edge of the contiguous non-tidal wetland, or top of the stream bank if no wetlands exist.
- (c) Indigenous vegetation shall be preserved to the maximum extent practicable. The target vegetative cover in the stream buffer shall be indigenous forest with ground cover, shrub and tree canopy layers.
- (d) Establishment and modification of vegetative cover and the mitigation of encroachments shall be in accordance with the latest edition of the Virginia Riparian Buffer Modification and Mitigation Guidance Manual.
- (e) Each stream buffer shall be maintained and incorporated into the design of the land development to the fullest extent possible.
- (f) Where the buffer has been incorporated into the stormwater management plan as a BMP, the buffer shall be planted with trees and shrubs in accordance with the County's Design Manual and

protected in perpetuity under a deed restriction or conservation easement that conforms to an approved maintenance plan recorded with a maintenance agreement. Runoff reduction and pollutant removal efficiency may be credited in accordance with the specifications on the Virginia Stormwater BMP Clearinghouse.

(g) Except for activities addressed in Section 27-31 of this chapter, no indigenous vegetation within a stream buffer shall be disturbed or removed. Incidental loss of vegetation during construction shall be replaced in accordance with the Virginia Riparian Buffer Modification and Mitigation Guidance Manual.

Sec. 27–31. Stream Buffer Encroachments.

If otherwise authorized by the applicable regulations of zoning ordinances, the following activities shall be allowed in a stream buffer, provided that the requirements of § 27-30 are satisfied:

(a) If otherwise authorized by the applicable regulations of the zoning ordinances, the following activities shall be allowed in a stream buffer, provided that the requirements of § 27-30 are satisfied:

- (1) A building or structure which existed on the date of adoption of this chapter may continue at such location. However, replacement, expansion or enlargement of such structures may not encroach upon the stream buffer more than the encroachment of the existing structures.
- (2) The construction, installation, and maintenance by public agencies of water and sewer lines, including water and sewer lines constructed by private interests for dedication to public agencies, or sewage disposal systems on existing lots of record, provided that the Administrator determines the riparian buffer would prohibit the practical development of such facilities or systems.
- (3) Development which will consist of a lake, pond, or ecological/wetland restoration project.
- (4) Development which will consist of the construction and maintenance of a driveway or roadway, provided reasonable access to the lot is prohibited by the riparian buffer, as determined by the Administrator
- (5) Development on a lot which was of record prior to the date of adoption of this chapter, if the stream buffer would result in the loss of a building site, and there are no other available building sites outside the stream buffer on the lot, as determined by the Administrator.
- (6) Water-dependent facilities; water wells, passive recreation access, such as pedestrian trails and bicycle paths; historic preservation; archaeological activities; provided that all applicable federal, state and local permits are obtained and in accordance with the County's Design Manuals.

(b) The following types of development are permitted provided that the requirements of 27-30 are satisfied and an exception is requested pursuant to 27-8:

- (1) Stormwater management facilities and temporary erosion and sediment control measures.
- (2) Crossings by roads, driveways and private utilities.

(c) Exception requests for activities authorized under subsection (b) shall demonstrate the following in writing:

- i. To the extent practical, as determined by the Administrator, the location of such encroachment shall be outside of the stream buffer;
- ii. No more land shall be disturbed than is necessary to provide for construction and maintenance;
- iii. There are no reasonable alternatives as determined by an Environmental Impact Assessment;
- iv. The proposed layout will minimize encroachment into the stream buffer;
- v. Water quality impacts have been minimized by equivalent treatment in the form of stormwater treatment and mitigation measures;
- vi. Indigenous vegetation will be preserved to the maximum extent practicable;
- vii. Proposed land disturbance (limits of construction) will be minimized;
- viii. The project complies with erosion and sediment control requirements;
- ix. Effective mitigation measures, including additional vegetative plantings, are proposed to mitigate the potential water quality impacts of the proposed encroachment; and
- x. Contain all other information requested by the Administrator.

ARTICLE V. PERFORMANCE BOND / CONSTRUCTION INSPECTION

Stormwater management construction inspection shall utilize the final approved plans prepared in accordance with Article III: Stormwater Management Program Procedures and Requirements. In addition, the inspection shall comply with the latest version of the Erosion and Sediment Control Regulations, promulgated pursuant to Section 4 (10.1-566), Chapter 5 of Title 10.1 of the Code of Virginia.

Sec. 27-32. Performance Bonds.

Prior to the issuance of any permits, the Administrator shall require the owner to submit a reasonable performance bond in conformance with the most current Orange County Performance Guaranty Policy to ensure that action can be taken by the Administrator, at the applicant's expense, should the applicant fail, after proper notice and within the time specified, to initiate or maintain those measures identified in the approved stormwater management design plan. The performance bond shall be provided from a date prior to the issuance of any permit until after the requirements of the approved stormwater management plan have been completed including as-built plans as outlined in § 27-34, as determined by the Administrator.

If the Orange County takes such action upon such failure by the Applicant, Orange County may collect from the Applicant for the difference should the amount of the reasonable cost of such action exceed the amount of the security held, if any. Within 60 days of the completion of the requirements of the permit conditions, such bond, cash escrow, letter of credit or other legal arrangement, or the unexpended or unobligated portion thereof, shall be refunded to the Applicant or terminated.

Sec. 27-33. Inspections.

A final inspection, of all aspects outlined in the As-Built checklist, by the Administrator or his designee is required before the release of any performance securities can occur.

(a) The Administrator or any duly authorized agent of the Administrator shall periodically inspect the land-disturbing activity during construction for:

- (1) Compliance with the approved erosion and sediment control plan;
- (2) Compliance with the approved stormwater management plan;
- (3) Development, updating, and implementation of a pollution prevention plan; and
- (4) Development and implementation of any additional control measures necessary to address an approved TMDL.

(c) The Administrator may, at reasonable times and under reasonable circumstances, enter any establishment or upon any property, public or private, for the purpose of obtaining information or conducting surveys or investigations necessary in the enforcement of the provisions of this chapter.

(d) In accordance with a performance bond with surety, cash escrow, letter of credit, any combination thereof, or such other legal arrangement or instrument, the Administrator may also enter any establishment or upon any property, public or private, for the purpose of initiating or maintaining appropriate actions which are required by the permit conditions associated with a land-disturbing activity when a permittee, after proper notice, has failed to take acceptable action within the time specified.

(c) Pursuant to §62.1-44.15:50 of the Code of Virginia, the Administrator may require every permit applicant or permittee to furnish when requested such application materials, plans, specifications, and other pertinent information as may be necessary to determine the effect of his discharge on the quality of state waters, or such other information as may be necessary to accomplish the purposes of this chapter.

(d) A preconstruction conference between the Administrator, the applicant, and the person(s) performing the work shall be required.

(e) Inspections during construction activity will be in accordance with Virginia Erosion and Sediment Control Regulation VAC50-30-60B or, if approved, with an alternative inspection program.

(f) County inspections shall verify that the contractor and on-site inspector are documenting the construction inspections in order to adequately substantiate the as-built certification per § 27-34.

(g) Upon completion, the applicant is responsible for certifying that the completed project is in accordance with the approved plans and specifications and shall provide regular inspections sufficient to adequately document compliance as outlined in the Design Manual.

Sec. 27-34. As-built Plans.

Three (3) sets of certified as-built plans and one electronic copy on storage media acceptable to the County, meeting the specifications documented in the stormwater management design manuals, shall be submitted to the Administrator upon completion of the project. Each as-built plan shall have a certification statement by a professional licensed in Virginia to perform such work and provide photographic evidence that proper construction practices have been followed. The Administrator shall require the submission of a construction record drawing for permanent stormwater management facilities. The Administrator may elect not to require construction record drawings for stormwater management facilities for which recorded maintenance agreements are not required pursuant to Article VI of this chapter.

As-built information should be documented and submitted in three forms:

- (1) A copy of the applicant’s inspection log book: A copy of the inspection log book should be kept at the project site. The log should document all aspects of the construction of the facility (with copies of applicable test results) to insure compliance with the approved plan. Any significant inconsistencies should immediately be reported to the engineer for evaluation and possible modification.
- (2) A red-line revision of the approved stormwater management plan sheets: Red-line revision plans should be submitted upon completion of the facility. The plans should indicate any changes to the approved plan. Items that differ from the original approved plans and computations should be shown in red on both the plans and computations as follows:
 - i. A red check mark must be made beside design values where they agree with actual constructed values.
 - ii. For changed values “line out” the design value and enter the actual value in red.
 - iii. Elevations to the nearest 0.1' are sufficient.
 - iv. A stage-storage summary table comparing the design values and the as-built values should be provided for facilities with storage volume.
- (3) A certification statement from a qualified individual regarding the conformance of the as-built to the approved plan: The project owner should have those persons responsible for the inspection and implementation of the plan submit written certification that the stormwater management facility(s) and conveyance system have been built in accordance to the approved plan, as amended, since this will cover underground facilities as well.

ARTICLE VI. POST CONSTRUCTION MAINTAINENCE, INSPECTION, AND REPAIR OF STORMWATER FACILITIES

Sec. 27-35. Maintenance of Stormwater Facilities.

(a) Responsibility for the operation and maintenance of the stormwater management facilities and storm drainage system shall remain with the property owner or an owner’s association. All maintenance activities shall be in accordance with standard maintenance practices for stormwater management facilities and the stormwater management design manual.

(b) Maintenance agreement and maintenance plan shall be submitted to the Administrator for review and approval prior to the approval of the stormwater management plan.

(c) The Administrator shall require the provision of long-term responsibility for and maintenance of stormwater management facilities specified in the stormwater management plan to manage the quality and quantity of runoff. Such requirements shall be set forth in a maintenance agreement recorded with the Clerk of the Circuit Court of Orange County as required by the stormwater program administrative authority and shall at a minimum:

- (1) Designate for the land development the owner, governmental agency, or other legally established entity which shall be permanently responsible for maintenance of the stormwater management facility(s) required by the plan;

- (2) Pass the responsibility for such maintenance to successors in title;
- (3) Provide an inspections plan for ensuring the facility is performing as designed;
- (4) Provide a maintenance plan that describes the routine maintenance responsibilities;
- (5) Allow for right-of-entry by Orange County for inspection purposes, and for conveyance of easements to the County upon County request;
- (6) Be enforceable by all appropriate governmental parties; and
- (7) Set forth a schedule of reporting annual maintenance logs to the County.

(d) At the discretion of the Administrator, maintenance agreements need not be required for stormwater integrated management practices designed to treat stormwater runoff primarily from an individual residential lot on which they are located.

Sec. 27-36. Inspections of Stormwater Facilities.

(a) To ensure proper performance of the stormwater facility, the property owner or owner's association is responsible for inspecting and performing all necessary maintenance and repairs to the stormwater management facility in accordance with the approved maintenance plan and the stormwater management design manuals as specified in the stormwater management facilities maintenance agreement. The responsible party shall keep written records of inspections and maintenance/repairs and make them available to the county upon request.

(b) The Administrator, in consultation with the Orange Soil and Water Conservation District and/or other agencies, shall be allowed, after giving notice to the owner, occupier, or operator of the land development, to conduct any inspection required by this chapter. The notice may be either verbal or in writing. Notice shall not be required if Orange County or its agents have entered into a right of entry agreement or if the owner has granted to the County an easement for purposes of inspection and maintenance.

(c) Post-construction inspections of stormwater maintenance facilities shall be conducted pursuant to the Locality's adopted inspection program, and shall occur, at minimum, during the first year of operation and at least once every three (3) years.

ARTICLE VII. ENFORCEMENT AND PENALTIES

Sec. 27-37. General Procedures.

Upon determination by the Administrator, that the owner has failed to comply with the approved stormwater management plan, or that there is a failure to comply with the VSMP authority permit conditions or there is an unauthorized discharge, the following procedures shall apply:

(a) The Administrator shall serve upon the owner a written notice to comply. The notice shall be served by registered or certified mail to the address specified in the permit application or by delivery at the site of the development activities to the agent or employee supervising such activities. The notice

shall specify the measures needed to comply with the plan and shall specify the time within such measures shall be completed.

(b) If the owner fails to take the corrective measures stated in the notice to comply within the time specified in the notice any grading, building or other permit for activities involving the land development may be revoked and the owner shall be deemed to be in violation of this chapter.

(c) If the Administrator determines, upon completion of a maintenance inspection, that maintenance or repair of the measures is neglected, or that any stormwater management facility is a danger to public health or safety, the County may perform the work necessary to assure that such measures or facilities are not a danger to public health or safety, and shall be entitled to recover the costs of such work from the owner.

Sec. 27-38. Violations.

Any development activity that is commenced or is conducted contrary to this chapter or the approved plans and permit may be subject to the enforcement actions outlined in this article and the Virginia Stormwater Management Law.

Sec. 27-39. Stop Work Orders.

Persons receiving a stop work order will be required to halt all construction activities. This stop work order will be in effect until the Administrator confirms that the development activity is in compliance and the violation has been satisfactorily addressed. Upon failure to comply within the time specified, the permit may be revoked and the penalties in §27-40 enforced.

Sec. 27-40. Civil and Criminal Penalties.

Any person violating or failing, neglecting, or refusing to obey any rule, regulation, ordinance, order, or any permit condition issued by the Administrator or any provisions of this chapter may be compelled in a proceeding instituted in any appropriate court by the Locality to obey same and to comply therewith by injunction, mandamus or other appropriate remedy. In addition, the Administrator may pursue the following actions:

(a) Apply to the circuit court to enjoin a violation or a threatened violation of the provisions of this chapter without the necessity of showing that an adequate remedy at law does exist.

(b) Without limiting the remedies which may be obtained in this article, may bring a civil action against any person for violation of this ordinance or any condition of a permit. A civil penalty shall not exceed \$32,500 for each violation within the discretion of the court. Each day of violation of each requirement shall constitute a separate offense.

- (1) Violations for which a penalty may be imposed under this subsection shall include but not be limited to the following: i) no permit registration, ii) no SWPPP, iii) incomplete SWPPP; iv) SWPPP not available for review; v.) no approved erosion and sediment control plan; vi) failure to install stormwater BMPs or erosion and sediment controls; vii) stormwater BMPs or erosion and sediment controls improperly installed or maintained; viii) operational deficiencies; ix) failure to conduct required inspections; x) incomplete, improper, or missed inspections; xi) discharges not in compliance with the requirements of Section 9VAC25-880-70 of the general permit.

- (2) The Locality may issue a summons for collection of the civil penalty and the action may be prosecuted in the appropriate court.
- (3) In imposing a civil penalty pursuant to this subsection, the court may consider the degree of harm caused by the violation and also the economic benefit to the violator from noncompliance.
- (4) Any civil penalties assessed by a court as a result of a summons issued by the Locality shall be paid into the treasury of the Locality to be used for the purpose of minimizing, preventing, managing, or mitigating pollution of the waters of the locality and abating environmental pollution therein in such manner as the court may, by order, direct.

(c) The Administrator, may provide and issue an order against any person who has violated or failed, neglected or refused to obey this chapter or any conditions of a permit, for the payment of civil charges for violations in specific sums, not to exceed the limit specified in §27-40(b).

(d) Notwithstanding any other civil or equitable remedy provided by this section, any person who willfully or negligently violates any provision of this chapter, any order of the Locality or DEQ, any condition of a permit, or any order of a court shall be guilty of a misdemeanor punishable by confinement in jail for not more than 12 months and a fine of not less than \$2,500 nor more than \$32,500, either or both.

Sec. 27-41. Restoration of Lands.

Any violator may be required to restore land to its undisturbed condition or in accordance with a Notice of Violation, Stop Work Order, or Permit requirements. In the event that restoration is not undertaken within a reasonable time after notice, the Administrator may take necessary corrective action, the cost of which shall be covered by the performance bond, and/or become a lien upon the property until paid.

Sec. 27-42. Holds on Certificates of Occupancy.

Certificates of occupancy shall not be granted until corrections to all stormwater practices have been made in accordance with the approved plans, Notice of Violation, Stop Work Order, or Permit requirements, and accepted by the Administrator, in consultation with the Culpeper Soil and Water Conservation District and/or other agencies.

ARTICLE VIII. FEES

Sec. 27-43. Fees.

Fees shall be paid to the County in accordance with the Orange County Fee Schedule to defray the cost of plan review, program administration, and necessary inspections.

(a) Fees for coverage under the general permit shall be imposed in accordance with Table 1. When a site or sites has been purchased for development within a previously permitted common plan of development or sale, the applicant shall be subject to fees in accordance with the disturbed acreage of their site or sites according to Table 1.

Table 1: Fees for permit issuance

Fee type	Total fee to be paid by Applicant (includes both VSMP authority and Department portions where applicable)	Department portion of “total fee to be paid by Applicant” (based on 28% of total fee paid*)
Chesapeake Bay Preservation Act Land-Disturbing Activity (not subject to General Permit coverage; sites within designated areas of Chesapeake Bay Act localities with land-disturbance acreage equal to or greater than 2,500 square feet and less than 1 acre)	\$290	\$0
General / Stormwater Management - Small Construction Activity/Land Clearing (Areas within common plans of development or sale with land disturbance acreage less than 1 acre.)	\$290	\$81
General / Stormwater Management - Small Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 1 acre and less than 5 Acres)	\$2,700	\$756
General / Stormwater Management – Large Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 5 acres and less than 10 acres)	\$3,400	\$952
General / Stormwater Management – Large Construction Activity/Land Clearing [Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 10 acres and less than 50 acres]	\$4,500	\$1,260
General / Stormwater Management – Large Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 50 acres and less than 100 acres)	\$6,100	\$1,708
General / Stormwater Management – Large Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 100 acres)	\$9,600	\$2,688

* If the project is completely administered by the Department such as may be the case for a state or federal project or projects covered by individual permits, the entire applicant fee shall be paid to the Department.

(b) Fees for the modification or transfer of registration statements from the general permit issued by Orange County shall be imposed in accordance with Table 2. If the permit modifications result in changes to stormwater management plans that require additional review by Orange County, such reviews shall be subject to the fees set out in Table 2. The fee assessed shall be based on the total disturbed acreage of the site. In addition to the general permit modification fee, modifications resulting in an increase in total disturbed acreage shall pay the difference in the initial permit fee paid and the permit fee that would have applied for the total disturbed acreage in Table 1.

Table 2: Fees for the modification or transfer of registration statements for the General Permit for Discharges of Stormwater from Construction Activities

Type of Permit	Fee Amount
General / Stormwater Management – Small Construction Activity/Land Clearing (Areas within common plans of development or sale with land disturbance acreage less than 1 acre)	\$20
General / Stormwater Management – Small Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 1 and less than 5 acres)	\$200
General / Stormwater Management – Large Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 5 acres and less than 10 acres)	\$250
General / Stormwater Management – Large Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 10 acres and less than 50 acres)	\$300
General / Stormwater Management – Large Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 50 acres and less than 100 acres)	\$450
General / Stormwater Management – Large Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 100 acres)	\$700

(d) Permit maintenance fees (9VAC25-870-830): The following annual permit maintenance shall be imposed in accordance with Table 3, including fees imposed on expired permits that have been administratively continued. With respect to the general permit, these fees shall apply until the permit coverage is terminated.

Table 3: Permit Maintenance Fees

Type of Permit	Fee Amount
Chesapeake Bay Preservation Act Land-Disturbing Activity (not subject to General Permit coverage; sites within designated areas of Chesapeake Bay Act localities with land-disturbance acreage equal to or greater than 2,500 square feet and less than 1 acre)	\$50
General / Stormwater Management – Small Construction Activity/Land Clearing (Areas within common plans of development or sale with land disturbance acreage less than 1 acre)	\$50
General / Stormwater Management – Small Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land disturbance equal to or greater than 1 acre and less than 5 acres)	\$400
General / Stormwater Management – Large Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 5 acres and less than 10 acres)	\$500
General / Stormwater Management – Large Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 10 acres and less than 50 acres)	\$650
General / Stormwater Management – Large Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 50 acres and less than 100 acres)	\$900
General / Stormwater Management – Large Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater 100 acres)	\$1,400

General permit coverage maintenance fees shall be paid annually to Orange County, by the anniversary date of general permit coverage. No permit will be reissued or automatically continued without payment of the required fee. General permit coverage maintenance fees shall be applied until a Notice of Termination is effective.

(d) The fees set forth in Sections (a)-(c), above shall apply to:

- (1) All persons seeking coverage under the general permit.
- (2) All permittees who request modifications to or transfers of their existing registration statement for coverage under a general permit.
- (3) Persons whose coverage under the general permit has been revoked shall reapply for an Individual Permit for Discharges of Stormwater From Construction Activities.
- (4) Permit and permit coverage maintenance fees outlined under Section (c) may apply to each general permit holder.

(e) No permit application fees will be assessed to:

- (1) Permittees who request minor modifications to permits as defined in Section 1- 3 of this chapter. Permit modifications at the request of the permittee resulting in changes to stormwater management plans that require additional review by the Administrator shall not be exempt pursuant to this section.
- (2) Permittees whose permits are modified or amended at the initiative of the Department, excluding errors in the registration statement identified by the Administrator or errors related to the acreage of the site.

(e) All incomplete payments will be deemed as non-payments, and the applicant shall be notified of any incomplete payments. Interest may be charged for late payments at the underpayment rate set forth in §58.1-15 of the Code of Virginia and is calculated on a monthly basis at the applicable periodic rate. A 10% late payment fee shall be charged to any delinquent (over 90 days past due) account. Orange County shall be entitled to all remedies available under the Code of Virginia in collecting any past due amount.

Article IX – Hearings and Appeal

Sec. 27-44. Hearings

- (a) Any permit applicant or permittee, or person subject to Ordinance requirements, aggrieved by any action of Orange County taken without a formal hearing, or by inaction of Orange County may demand in writing a formal hearing by the Orange County board of supervisors provided a petition requesting such hearing is filed with the Administrator within 30 days after notice of such action is given by the Administrator.
- (b) The hearings held under this Section shall be conducted by the board of supervisors at a regular or special meeting of the board of supervisors, or by at least one member of the board of supervisors designated by said board to conduct such hearings on behalf of the board at any other time and place authorized by the board.
- (c) A verbatim record of the proceedings of such hearings shall be taken and filed with the board of supervisors. Depositions may be taken and read as in actions at law.
- (d) The board of supervisors or its designated member, as the case may be, shall have power to issue subpoenas and subpoenas duces tecum, and at the request of any party shall issue such subpoenas. The failure of a witness without legal excuse to appear or to testify or to produce documents shall be acted upon by the local governing body, or its designated member, whose action may include the procurement of an order of enforcement from the circuit court. Witnesses who are subpoenaed shall receive the same fees and reimbursement for mileage as in civil actions.

Sec. 27-45. Appeals

Any permit applicant or permittee, or person subject to Ordinance requirements, aggrieved by any action of the Orange County Board of Supervisors or its designee pursuant to §27-44 of this Ordinance, may file an appeal with the Orange County Circuit Court within thirty (30) days of the final decision rendered by the Board of Supervisors (or its designee).

WORKSHEET 1: Natural Resource Assessment, LID Site Design Checklist, and LID Computations Worksheet

ii. Natural Resource Assessment

Provide a Qualitative Narrative describing the existing conditions of selected natural resources. Include any quantification that may support this assessment.

Components of the Resource Assessment Narrative:

1. Stream Channels: describe the current conditions including size estimates of width and depth, current stability of channel banks and bed, entrenchment, bed materials, and bank vegetation cover conditions,
2. Wetlands: describe locations, size, type and relationship to other hydrologic features,
3. Current drainage features of the site interior (i.e. slopes, watershed size, etc.),
4. Ponds: describe existing condition of the embankment, riser, and outfall area,
5. Buffers: describe type and condition of vegetation along perennial and intermittent streams within required buffer width,
6. Significant Soils: provide soil survey and soil reports from <http://websoilsurvey.nrcs.usda.gov>. Include extent of each soil type, typical depth to bedrock, typical depth to water table, and any know limitations (slopes, infiltration rates, linear extensibility, etc.)

Provide a Natural Resource Assessment Map:

- Identifies waterbodies, floodplains, riparian buffers, wetlands, woodlands, natural drainage ways, steep slopes, and other sensitive natural features.
- Do not count any area twice, for example an area that is both a floodplain and wetland may only be considered once.

Sensitive Resource	Mapped (Yes or N/A)	Total Area (acres)	Protected/Undisturbed (Acres)
Waterbodies			
Floodplains			
Wetlands			
Riparian Buffer			
Woodlands			
Steep slopes (>15%)			
Other:			
Total Areas (acres)			

ii. **Environmental Site Design Checklist**

Prior to developing any structural stormwater practices on a site, significant reductions in stormwater quantity and quality impacts can be made through Environmental Site Design. Below is a checklist of site design and planning practices that can be used to minimize stormwater impacts. Please check the practices that you are applying to your development, and note the extent to which each selected practices was implemented.

Site Design Standard Technique 1: Conserve Natural Features

Minimize direct stormwater impacts to streams, wetlands and other natural features to the maximum extent practicable. This can be accomplished by siting stormwater facilities outside of streams and wetlands, maintaining natural drainages, and preserving riparian buffers.

Achieved	Percent of Site Area	Practice
		Stormwater facilities located outside of streams, wetlands and buffers
		Riparian Buffer Width maintained along the entire stream. (25 feet for intermittent streams, 50 feet for perennial streams and 100 feet for Hazel, Thornton, Rappahannock and Rapidan River)
		Maximize contiguous areas to avoid habitat fragmentation
		Legally protect areas by permanent conservation easement prescribing allowable uses and activities and preventing future development
		Integrated Stormwater Management Practices (IMPs) placed at the source of runoff in lieu of centralized SWMFs.
		Open Space accepts and treats stormwater runoff from the development site per the BMP Clearinghouse Specifications. Runoff Reduction Volume:
		Open Space adjacent to a wetland, mature forest or otherwise enhances the riparian buffer.

Site Design Standard Technique 2: Minimize Land Disturbance

Preserve the natural cover on as much of the site as possible, especially for areas located on hydrologic soil groups (HSG) A and B. Natural vegetation helps maintain and preserve predevelopment hydrology on a site, thereby reducing the reliance on large-scale stormwater ponds. Natural cover on highly permeable soils increases filtration and infiltration.

Achieved	Percent of Site Area	Practice
		Utilize clustered development designs that preserve a significant portion of the site in a natural state.
		Utilize “fingerprint” clearing, limit the clearing and grading of forests and native vegetation to the minimum area needed for the construction of the lots, necessary access, and fire protection.
		The plan includes detail on construction methods and sequencing to minimize compaction of natural and future stormwater areas.
		Prevent compaction of key soils, protect steep slopes (>15%) and maintain drainage features.
		Minimize total site area cleared and graded at any one time

Site Design Standard Technique 3: Reduce Impervious Cover

Minimize the overall impervious cover. Roadways, sidewalks, driveways and parking areas are the greatest sources of site imperviousness. Impervious areas alter runoff and recharge values and site hydrology. For LID sites, managing the imperviousness contributed by road and parking area pavement is an important component of the site planning and design process. There are several methods that can be used to achieve a reduction in the total runoff volume from impervious surfaces.

Achieved	Percent of Site Area	Practice
		Utilize the minimum required width for streets and roads.
		Utilize street layouts that reduce the number of homes per unit length
		Minimize cul-de-sac diameters, use doughnut cul-de-sacs, or use alternative turnarounds
		Minimize excess parking space construction, utilize structured or shared parking
		Reduce home setbacks and frontages
		Where permitted, minimize sidewalk construction by utilizing sidewalks on one side only, utilizing “skinny” sidewalks, or substituting sidewalks with pervious trails through common area.
		Substitute pervious surfaces for impervious wherever possible in accordance with the BMP Clearinghouse Specifications. Runoff Reduction Volume:

Site Design Standard Technique 4: Disconnection

“Disconnect” impervious areas. “Disconnecting” means having impervious cover drain to pervious cover (i.e. downspouts draining to the yard, not the driveway). This decreases both the runoff volume and Time of Concentration. Disconnected parking lots, for example, can provide sheet flow into bioretention areas or engineered infiltration swales.

Achieved	Percent of Site Area	Practice
		Utilize disconnection techniques in accordance with the BMP Clearinghouse Specifications. Runoff Reduction Volume:
		Utilized Gravel Diaphragm per the BMP Clearinghouse Specification 2 to maintain parking lot sheet flow into a pervious area
		Utilized Level Spreaders per the BMP Clearinghouse Specification 2 to disperse concentrated runoff into sheet flow entering a pervious area
		Utilized Curb Cuts that disperses flow with a reduced Froude number of at most 1/3Fr.

Site Design Standard Technique 5: Vegetated Stormwater Conveyance Systems

Increase the Time of Concentration. Replicating the pre-development Time of Concentration is a key aspect in maintaining pre-development flow regime, and minimizing downstream impacts.

Achieved	Percent of Site Area	Practice
		Maintain predevelopment flow paths by increasing flow length, dispersing and redirecting flows. Increased Tc:
		Where permitted, avoid the use of curb and gutter. Utilize Grass Channels per the BMP Clearinghouse Specification 3. Runoff Reduction Volume:
		Utilize permanent Check Dams to detain and prolong the Time of Concentration. Increased Tc:
		Flatten grades for stormwater conveyance to the minimum sufficient to allow positive drainage. Increased Tc:
		Utilize Dry Swales with engineered soils per the BMP Clearinghouse Specifications. Runoff Reduction Volume:

Site Design Standard Technique 6: Soil Restoration Techniques

Utilize soil restoration/enhancement techniques to improve soil properties. Amend soils that are compacted or poorly drained to improve infiltration and vegetation establishment.

Achieved	Percent of Site Area	Practice
		Minimize compaction of the landscape. In areas where soils will become compacted due to construction equipment, specify disking and soil amendments as per BMP Clearinghouse Specification 4. Curve Number Adjustment:
		Delineate soils on site for the preservation of infiltration capacity. Mark these areas in the field and restrict heavy equipment access.
		Require compacted soils in areas receiving sheet flow runoff will be “disked” and amended with compost as per BMP Clearinghouse Specification 4. Curve Number Adjustment:
		Utilized engineered soils for SWMFs and IMPs located on unsuitable native soils

Site Design Standard Technique 7: Creation of Transition Zones

Create transition zones to buffer managed turf from existing vegetated areas. Reduce hydrologic impacts by creating added surface roughness as well as providing for additional filtering and volume storage.

Achieved	Percent of Site Area	Practice
		Maximize overland sheet flow with use of gravel diaphragm, vegetated filter strips, level spreaders and other dispersion techniques. Increased Tc:
		Reconnect vegetated areas by planting buffers or filter strips and reforestation Runoff Reduction Volume:
		Clearly delineate the transition zone and provide a management plan for long-term maintenance.

iii. LID Performance Worksheet

Definitions

Detention – The collection of runoff in a ponding area, depression, or storage chamber followed by its gradual release through an outlet into a receiving water body. Detention reduces peak runoff rate to its pre-development peak rate, but is not an effective way to reduce the runoff volume.

Retention – The collection of runoff in a ponding area or receptacle where it is kept until it soaks into the ground through infiltration. Retention reduces the volume of runoff from a site and can also be effective in reducing the peak runoff rate if the retention volume is sufficiently large.

Connected Impervious Surface - Hard surfaces such as rooftops, pavement/concrete and compacted gravel that is directly conveyed within a pipe or channel.

Disconnected Impervious Surface – Where hard surfaces such as rooftops, pavement/concrete and compacted gravel disperses stormwater into pervious areas in accordance with BMP Clearinghouse Specifications.

Curve Number (CN) Adjustment – The modification of the post development CN by reducing impervious areas, disconnecting impervious runoff and preserving open space. Consequently, this will lessen the amount of storage that would otherwise be required to maintain the predevelopment runoff volume.

Time of Concentration (T_c) – The time for runoff to travel from the hydraulically most distant point in a catchment to the watershed outlet or study point.

Instructions

Before beginning the LID Performance Worksheet, first evaluate your site design using the Natural Resource Assessment (1.1.1) and Environmental Site Design Checklist (1.1.2). The use of environmental site design techniques is a critical component in ensuring that the pre-development hydrology on a site can be maintained.

The following worksheet follows the process detailed in *LID Hydrologic Analysis* (see references).

Protected and Undisturbed areas should be excluded from the storage volume calculations. Ideally, each subarea shall compute storage volumes separately. Retention volume may be provided in one subarea to compensate for an uncontrolled subarea. The uncontrolled subarea must discharge stormwater as sheet flow into an undisturbed area of vegetation that is uniform and mature enough to inhibit erosion.

Note: Development projects that are unable to provide sufficient runoff reduction practices to maintain the predevelopment runoff volume should revisit the application of the environmental site design techniques to the site. The thorough use of ESD techniques will reduce post-development curve numbers, and can result in decreased stormwater detention and retention volume requirements.

Computing Pre and Post-Development Composite Curve Numbers for LID Approach

$$CN_C = \frac{CN_1A_1 + CN_2A_2 \dots + CN_jA_j}{A_1 + A_2 \dots + A_j}$$

CN_C=Composite Curve Number

A_j=Area of each Land Cover

CN_j=Curve Number for each Land Cover

- a. Forested Runoff Curve Number. The predevelopment condition is required to be woods in good condition (LID Hydrological Analysis, pg. 37). Calculate the composite curve number for the site, using woods in good condition.

HSG	CN (woods good condition)	Area _j	% of Site	Area _j X CN _{j,pre}
A	30			
B	55			
C	70			
D	77			
	SUM			

$$CN_{C,woods} = \frac{\sum (CN_{j,woods} * A_j)}{\sum A_j}$$

- b. For comparison purposes, calculate a composite curve number for the *developed site*, using the **conventional TR-55 approach**.

Land Cover and Soil	CN	Area	% of Site	Area x CN
Protected/Undisturbed				

Disturbed Area = Total Site Area – Undisturbed Area

Composite CN of Disturbed Area:

Land Cover and Soil	CN	Area	% of Disturbed Area	Area x CN
<i>Connected – impervious</i>	98			
<i>disconnected - impervious</i>	98			
	Sum			

$$CN_{C,post} = \underline{\hspace{2cm}}$$

- c. Calculate a composite **custom LID curve number**. This approach factors in the use of higher permeability soils for infiltration and the use of “disconnection”.

$$CN_{LID} = CN_p + \left(\frac{P_{imp}}{100} \right) \times (98 - CN_p) \times (1 - 0.5R)$$

where:

R = ratio of disconnected impervious area to total impervious area;

CN_{LID} = LID curve number;

CN_p = composite pervious CN post development pervious surface only;

P_{imp} = percent of impervious site area.

Calculate CN_p : Use the composite CN of the pervious surfaces only from table in step “b.” above

Calculate R

R = *Disconnected Impervious / Total Impervious Area*

$$R = \underline{\hspace{2cm}}$$

$$CN_{C,post} = \underline{\hspace{2cm}} \text{ (from step “b.” above)}$$

$$CN_{LID} = \underline{\hspace{2cm}}$$

$$\text{Reduction in CN achieved with site design} = \underline{\hspace{2cm}} (CN_{C,post} - CN_{LID})$$

- d. Calculate the **pre-development** Time of Concentration (T_c) using TR-55 for each discrete drainage area discharging from the site. Utilize the environmental site design techniques described in section 11.1.2, such as flattening grades, lengthening flow paths, etc to maintain the T_c as much as possible. Then, calculate the **post-development** Time of Concentration (T_{cLID}) for the same drainages.

	<i>Drainage A</i>	<i>Drainage B</i>	<i>Drainage C</i>	<i>Drainage D</i>	<i>Drainage E</i>	<i>Drainage F</i>
T_{cpre}						
T_{cLID}						

NOTE: For the LID approach to function effectively, the $T_{c_{LID}}$ must be greater than or equal to $T_{c_{PRE}}$. If not, STOP here and incorporate additional practices to the maximum extent practical to maintain T_c . See LID Manuals for details.

e. Calculate the 1-year peak flow rate under a forested condition and with LID.

SCS Runoff Curve Number Method (TR-55 Graphical Peak Discharge):

$q_{1\text{-year forest}} =$ _____ cfs

$q_{1\text{-year LID}} =$ _____ cfs

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Step 1: Determine the Retention Volume Required to Maintain Pre-development Runoff Volume

- a. The **Design Rainfall** for your site will be the 1-year, 24 hour storm. This is the assumed rainfall at which runoff would have initiated on the site, if it were vegetated with “woods in good condition”.

Culpeper County 1-Year, 24 hour Rainfall (NOAA Atlas 14) = 2.75 inches

- b. Calculate watershed storage to **Maintain Predevelopment Runoff Volume using Retention Storage.**

Forested $CN_{C,woods}$ = _____
 Post Development CN_{LID} = _____
 Forested Runoff Depth, Q_{woods} = _____ inch
 LID Runoff Depth, Q_{LID} = _____ inch

Watershed Storage = $Q_{LID} - Q_{woods}$ = _____ inch

$$VR = \left(\frac{WatershedStorage}{12} \right) \times DA \times \left(\frac{43560}{Acres} \right) = \text{_____ } ft^3$$

VR = Volume of Retention Storage

$Watershed Storage$ = Volume of Runoff Storage Required (inches)

DA = Disturbed Drainage Area (Acres)

Step 2: Determine Storage Volume for Water Quality Protection

- a. The Predevelopment Retention Storage Volume (Step 1.b) should meet or exceed the current **Water Quality Standard**, which is the Treatment Volume, T_v of the total site area as determined by RRM.

Volume of Retention Storage = _____ cu. ft. (From Step 1.b)
Treatment Volume, $T_v = (1/12) * R_v * DA =$ _____ cu. ft. (Virginia Runoff Reduction Spreadsheet)

Enter Higher
 → → → →
 Value

Required Retention Storage Volume _____ cu. ft.

- b. **Estimate the BMP surface area required** to retain the Retention Storage Volume (Step 2.a). $VR / \text{depth of storage} = \text{BMP Surface Area}$

Estimated BMP Surface Area = _____ Square Feet

Provided BMP Surface Area = _____ Square Feet

Step 3: Determine the Storage Volume for Maintaining Peak Runoff Rate Using 100% Retention
Using the Charts starting on page 141 of this document (2 inch and 3 inch Type II 24 hour storms), determine the **storage volume** required to **maintain peak Runoff Rate using 100% RETENTION storage.**

Pre-Development $CN_{C,pre}$ = _____

Post-Development CN_{LID} = _____

Watershed Storage = _____ inch

$$VR_{100} = \left(\frac{\text{Watershed Storage}}{12} \right) \times (DA \times 43560) = \text{_____ } ft^3$$

VR_{100} = Retention Volume for Peak Flow Control (cubic feet)

Watershed Storage = Volume of Runoff Storage (inches)

DA = Disturbed Drainage Areas (Acres)

Step 4: Evaluate Need for Additional Detention Storage
Compare the volumes required for volume control and peak rate control:

$$VR_{100} = \text{_____ } ft^3 \quad \text{vs.} \quad VR = \text{_____ } ft^3$$

(Step 3) (Step 2a)

If $VR > VR_{100}$ then:

Design IMPs or SWMFs that provides runoff reduction equivalent to the VR storage volume.

No additional detention is required to control peak flow rate.

If $VR < VR_{100}$ then a HYBRID DESIGN IS REQUIRED:

Follow Steps 5, and 6 to calculate additional detention storage volume required to meet peak flow rate. If additional detention storage within a runoff reduction practice is not practicable for the site, extended detention and wet ponds can be used to detain the additional volume.

OR if providing Runoff Reduction storage of the VR is unachievable due to site constraints then an Exception Request is required for Partial LID. *Follow Steps 5, and 7 to calculate additional detention required to meet peak runoff rate.*

Step 5: Determine the Storage Volume for Maintaining Peak Runoff Rate using 100% Detention

Using TR-55 storage volume for detention basins method determine storage volume required to **maintain peak runoff rate using 100% DETENTION storage.**

$$\text{LID Runoff Depth, } Q_{LID} = \text{ ______ inch}$$

$$q_{1\text{-year forest}} = \text{ ______ cfs}$$

$$q_{1\text{-year LID}} = \text{ ______ cfs}$$

Watershed Storage =

$$\left(0.682 - 1.43 \left(\frac{q_{forest}}{q_{LID}} \right) + 1.64 \left(\frac{q_{forest}}{q_{LID}} \right)^2 - 0.804 \left(\frac{q_{forest}}{q_{LID}} \right)^3 \right) \times Q_{LID} = \text{ ______ inch}$$

$$V_{D100} = \left(\frac{\text{Watershed Storage}}{12} \right) \times (DA \times 43560) = \text{ ______ } ft^3$$

V_{D100} = Detention Volume for Peak Flow Control (cubic feet)

Watershed Storage = Volume of Runoff Storage (inches)

DA = Disturbed Drainage Area (acre)

Step 6: Hybrid Design for Full LID Design

$$\text{Retention Storage Provided (Step 2a)} = VR = \text{ ______ } ft^3$$

$$X = \frac{50}{V_{R100} - V_{D100}} \left[-V_{D100} + \left(V_{D100}^2 + 4(V_{R100} - V_{D100}) \times VR \right)^{0.5} \right]$$

X = Area ratio of retention storage to total storage

$$\text{Detention Storage, H} = VR \times \left(\frac{100}{X} \right) - VR = \text{ ______ } ft^3$$

With a Hybrid Design, IMPs and SWMFs must be provided that can meet the Additional Detention Storage (calculated above) **AND** Retention Storage (VR) from Step 2a.

Step 7: Hybrid Design for Partial LID Design

$$\text{Retention Storage Provided} = VR' = \text{ ______ } ft^3$$

VR' = Available Retention storage volume (cubic feet) (determined by the designer by analyzing the site constraints)

Partial LID Design: $\frac{VR'}{VR} \times 100 > 50\%$

$$X' = \frac{50}{V_{R100} - V_{D100}} \left[-V_{D100} + \left(V_{D100}^2 + 4(V_{R100} - V_{D100}) \times VR' \right)^{0.5} \right]$$

X' = Ratio of available Retention storage to Total storage

$$H' = VR' \times \left(\frac{100}{X'} \right) - VR' = \text{---} \text{ ft}^3$$

H' = Detention Storage Volume required to maintain peak flow.

Summary of Quantitative LID Results

Yes / No - Site design and impervious cover reduction practices were used to the maximum extent practicable to minimize runoff volume.

Yes / No - The design results in a post-development Tc equal to the pre-development Tc.

Yes / No - The entire **Retention Storage Volume** will be retained and infiltrated.

Yes / No / NA - If the entire **Retention Storage Volume** is not retained and infiltrated, the plans show that every practicable effort was made to implement runoff volume reduction efforts, and all potential green space areas were made hydrologically functional for retention.

Yes / No/NA- Detention practices were used to store the additional volume required to maintain the predevelopment peak flow rate as determined by Hybrid Design.

Yes / No/NA- Detention Practices discharge the detention storage volume as overland sheet flow at a non-erosive rate. If no, concentrated flows must discharge the 1-year peak flow rate at or below the 1-year predevelopment flow rate in forested condition.

References

1. **Low Impact Development National Manual. *Low-Impact Development Design Strategies An Integrated Design Approach.*** EPA 841-B-00-003. Available on the web at <http://water.epa.gov/polwaste/green/upload/lidnatl.pdf>
2. **Low Impact Development National Hydrology Manual. *Low-Impact Development Hydrologic Analysis.*** EPA 841-B-00-002. Available on the web at http://water.epa.gov/polwaste/green/upload/lid_hydr.pdf

NOTE: The appendices to the hydrology document include a series of charts which are required to calculate LID storage volumes. They are not currently available in the downloadable version, but selected charts from that series are attached to the end of this document.

Worksheet 2: Stream Buffer Policy Standards

Purpose:

A Stream Buffer is an area of land managed to provide a vegetative filter to protect the water quality of state waters from land disturbing activities. The purpose of the stream buffer is to retard runoff, prevent erosion, filter pollutants from runoff, moderate stream temperature, and provide for the ecological integrity of the stream corridors and networks. Stream buffers have been recognized as a cornerstone for long term protection of the Chesapeake Bay watershed and forests are the natural cover for most streams in this region.

Criteria:

- Width shall be measured horizontally from edge of contiguous wetland or the top of stream bank if no wetlands exist;
- Slopes less than 5 %;
- Maximum overland sheet flow length of 150 feet;
- Maximum overland sheet flow velocity of 1.5 feet per second;
- Functional Buffer has density and diversity of cover:
 - Indigenous vegetation shall be preserved to the maximum extent possible. The target vegetative cover in the stream buffer shall be indigenous forest with ground cover, shrub, and tree canopy layers.
 - Canopy Tree is a tree of over 35 feet high.
 - Sub Canopy is an immature canopy tree.
 - Understory tree is a tree between 12-35 feet high.
 - Large Shrub is over 10 feet high.
 - Small shrub is less than 10 feet.
 - Woody groundcover is considered to be a woody spreading shrub that remains close to the ground, to 18” high. Vines may not be considered “woody groundcover” for the purpose of vegetation replacement.

Overall Target Planting Density

Land Use	Trophic Layers		
	Canopy (25%)	Sub-Canopy/ Understory (25%)	Shrubs/Sapling (50%)
Conserved Open Space	94 stems per acre	83 stems per acre	200 stems per acre
Stream Buffer	100 stems per acre	110 stems per acre	270 stems per acre

Source: Modified from DCR – Division of Natural Heritage (2002) Unpublished data on stand structure and stocking.

Management:

If the Stream Buffer is used as a BMP, the long-term maintenance of the buffer shall be in accordance with a recorded Operation and Maintenance agreement or deed restriction. At a minimum the following management activities should be preformed:

- Dead, diseased or dying trees and noxious weeds may be removed to improve the health and vitality of the buffer.
- Thinning of trees to improve the health and vitality of the buffer is allowed pursuant to some horticultural practice.
- Fallen trees that are blocking the stream channel or trees with undermined root systems in imminent danger of falling may be removed where stream bank erosion is a potential problem.
- Do not deposit or allow to accumulate any trash , refuse or debris in the buffer.
- Control invasive species, grasses and vines. Measures include mulch, geotextiles, mechanical removal, chemical applications, tree shelters or other means as necessary until plantings are established.
- Ground cover between plantings needs to be protected from erosion.
- Use of native plants requires no fertilization.
- Signs or fencing may be necessary to prevent mowing.
- Replacement plantings should be established in one year.
- Restoration and Afforestation plantings should be established in 2 to 5 years.

Replacement:

For incidental loss of vegetation during construction, trees are to be replaced in accordance with the following table. For stream buffers used as a BMP and covered under a maintenance agreement, the following table should be used for replacement of dead, diseased or dying trees.

Vegetation Replacement Rates:

Vegetation Removed	Preferred Replacement Vegetation	Acceptable Alternative Vegetation
1 tree or sapling ½” – 2 ½” caliper	1 tree @ equal caliper or greater	OR 2 large shrubs @ 3’ - 4’ OR 10 small shrubs or woody groundcover @ 15” - 18”
1 tree > 2 ½” caliper	1 tree @ 1 ½” – 2” caliper, or 1 evergreen tree @ 6’ min. ht., per every 4” caliper of tree removed	OR 75 % trees @ 1 ½” – 2” caliper and 25 % large shrubs @ 3’ – 4’ per every 4” caliper of tree removed. OR 10 small shrubs or woody groundcover @ 15” – 18” per 4” caliper of tree removed
1 large shrub	1 large shrub @ 3’ – 4’	OR 5 small shrubs or woody groundcover @ 15” – 18”

Restoration/Afforestation:

Restoration or afforestation of vegetation must address all trophic layers. Restoration occurs when large amounts of vegetation are removed or disturbed during construction. Afforestation occurs when the stream buffer is used as a BMP and does not have adequate vegetative cover.

Restoration /Afforestation Rates

Maintenance Plan	Preferred Vegetation	Acceptable Alternative Vegetation
2-year Agreement	<p>For every 400 square-foot unit (20' x 20') or fraction thereof plant:</p> <p>One (1) canopy tree @ 1 ½" – 2" caliper or large evergreen @ 6'</p> <p>Two (2) understory tree @ ¾" – 1 ½" or evergreen @ 4'</p> <p>Three (3) small shrubs or woody groundcover @ 15" – 18"</p>	OR one (1) understory tree and two (2) large shrubs @ 3' – 4'
5-year Agreement	<p>Bare Root seedlings or whips at 1,210 per acre, approximately 6' x 6' on center</p> <p>(minimum survival required after two growing seasons: 600 plants)</p>	<p>OR Container grown seedling tubes at 700 per acre approximately 8' x 8' on center</p> <p>(minimum survival required after two growing seasons: 490 plants)</p>

*Natural Regeneration may be an appropriate method of reforestation or afforestation for areas over 1 acre if performed in accordance with a Forest Stewardship plan prepared by a trained forestry professional.

Encroachments:

Permanent Stormwater Management Facilities, Temporary Erosion Control Measures, Private Roads and Private Utilities:

- To the extent practicable, the location of temporary and permanent control measures shall be outside of the stream buffer.
- There are no reasonable alternatives as determined by a Natural Resource Assessment and Environmental Site Design Checklist.
- No more land shall be disturbed than is necessary to provide for construction and maintenance.
- The overall layout will minimize additional permanent encroachments into the stream buffer.
- Erosion Control measures are based on controlling soil loss predicted using the RUSLE approach.
- Water quality impacts have been minimized by equivalent treatment in the form of stormwater treatment or mitigation measures.

Equivalent treatment will be considered in the form of stream buffer enlargement; use of disconnection and dispersion techniques; runoff reduction practices; or enhanced vegetative plantings.

Passive Recreation: trails, boardwalks and paths for non-motorized activities

- Restrictions: Avoid 25-feet seaward of the buffer, short paths for access only; avoid soft/waterlogged soils; follow contours, out-slope tread and avoid critical slopes; minimize stream crossings at stable slopes and minimal width.
- Design: intensity of use determines the tread (paved, mulch, natural); limit vertical clearing; size according to intended use

Type of Trail	Vertical Clearance	Trail Width	Horizontal Clearance	Preferred Surface
Hiking/Walking	8 feet	2 feet single lane 4 feet double lane	2 feet	Natural/Mulch/Gravel
Biking	8 feet	4 feet single lane 8 feet double lane	1 ft. trees/rocks 3 ft. limbs/brush	Natural/Gravel/ Paved
Equestrian	10 feet	5 feet	1 ft. trees/rocks 3 ft. limbs/brush	Natural/Mulch/Gravel

Source: The Virginia Greenways and Trails Toolbox (2000).

Document Source: Riparian Buffer Modification and Mitigation Guidance Manual. DCR CBLA. Reprinted 2006.

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