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CHAPTER 1.0 INTRODUCTION AND PURPOSE

This design and construction manual is intended for use by any person, agency or organization involved in the development, design or construction of projects which will impact storm water runoff. Possible users of this manual include homeowners, builders, developers, design professionals, redevelopment authorities, and City staff.

1.1 Purpose

Compliance with this document is required to ensure the general health, safety, and welfare of the citizens of the City of Norfolk (City) and protect the quality of state waters from the potential harm of unmanaged stormwater runoff, including protection from a land disturbing activity causing unreasonable degradation of properties, water quality, stream channels and other natural resources, and, in accordance with *Code of Virginia*, § 62.1-44.15:27, to establish procedures whereby stormwater requirements related to water quality and quantity shall be administered and enforced~~. Stormwater runoff is flow overland from precipitation that accumulates in and flows through natural or man-made conveyance systems during rainfall events or from snowmelt.~~ Stormwater means precipitation that is discharged across the land surface or through conveyances to one or more waterways and that may include stormwater runoff, snow melt runoff, and surface runoff and drainage.

Development and redevelopment projects shall be conducted in accordance with the requirements of this manual and subsequent amendment made thereto. This manual will be amended to reflect changes in the *Code of Virginia* or Virginia Administrative Code affecting local implementation of the Virginia Stormwater Management Program. Any subsequent amendments to this design manual will be reviewed and approved by the Virginia Department of Environmental Quality prior to incorporation herein.

Upon the adoption of an amended manual, previous versions of the design manual will be null and void and development and redevelopment projects will be required to be conducted in accordance with the amended design and construction manual from its effective date unless another date is specified within the amendment.

The effective date of this design and construction manual is **July 1, 2014.**

1.2 Definitions

Notwithstanding other definitions to the contrary in the Norfolk City Code or Zoning Ordinance, as used in this design and construction manual, the following terms have the following definitions:

"*Administrator*" means the Director of the Department of City Planning or his designated agent.

"*Applicant*" means any person submitting an application for a permit or requesting issuance of a permit under this chapter.

"Agreement in lieu of a stormwater management plan" means a contract between the VSMP authority and the owner or permittee that specifies methods that shall be implemented to comply

with the requirements of a VSMP for the construction of a single-family residence; such contract may be executed by the VSMP authority in lieu of a stormwater management plan.

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

"*Chesapeake Bay Preservation Act land-disturbing activity*" means a land-disturbing activity including clearing, grading or excavation that results in a land disturbance equal or greater than 2,500 square feet and less than one acre in all areas of jurisdictions designated as subject to the regulations adopted pursuant to the Chesapeake Bay Preservation Act, *Code of Virginia*, § 62.1-44.15:67, et seq.

"*Common plan of development or sale*" means a contiguous area where separate and distinct construction activities may be taking place at different times on difference schedules.

"*Conservation management area or CMA"* means an area designated by Department of Public Works – Storm Water Management ~~Operations~~ Division to be conserved for the purpose of improved environmental quality. Vegetation in CMAs will be managed towards this goal and is not subject to ordinances for management of turf, landscaping or trees. CMAs may include, but are not limited to: tidal or non-tidal wetlands; forested or grass buffers around wetlands, streams, ditches, or stormwater ponds; managed meadows; and upland forest groves.

"*Construction record drawing"* means a design, working drawing or as built drawing submitted as the final record of documentation for a land disturbing activity.

"Control measure" means any best management practice or other method used to prevent or reduce the discharge of pollutants to surface waters.

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

"General permit" means the VSMP GENERAL PERMIT FOR DISCHARGES OF STORMWATER FROM CONSTRUCTION ACTIVITIES found at 9 VAC 25-880-70 authorizing a category of discharges under the CWA and the Act within a geographical area of the Commonwealth of Virginia.

"Land disturbance" or *"land-disturbing activity"* means a manmade change to the land surface that potentially changes its runoff characteristics including any clearing, grading, or excavation except that the term shall not include those exemptions specified in Section 2.1 of this Design Manual.

"*Land disturbing activity permit"* means an approval to conduct a land-disturbing activity issued by the Administrator for the initiation of a land-disturbing activity, and which may only be issued after evidence of general permit coverage has been provided by the Department, where applicable.

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

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

"Minor modification" means 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.

"*New Development"* means development where the predevelopment land cover condition is forested or mowed at a frequency of less than four times per year.

"Operator" means the owner or operator of any facility or activity subject to regulation under this Ordinance.

"Permit" or *"VSMP Authority Permit"* means a land disturbing activity permit.

"Permittee" means the person to whom the Permit is issued.

"Person" means 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.

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

"Predevelopment" means the conditions that exist at the time that plans for the land development of a tract of land are submitted to the VSMP authority. Where phased development or plan approval occurs (preliminary grading, demolition of existing structures, roads and utilities, etc.), the existing conditions at the time prior to the first item being submitted shall establish predevelopment conditions.

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

"*Regulations*" means the Virginia Stormwater Management Program (VSMP) Permit Regulations, 9 VAC 25-870-10, *et. seq.*, as amended.

"Single family" means a detached building containing only one dwelling unit surrounded by yards. Manufactured homes, mobile homes, travel trailers, housing mounted on self-propelled or drawn vehicles, tents, or other forms of temporary housing or portable housing are not included in this definition.

"Site" means the land or water area where any facility or activity is physically located or conducted, a parcel of land being developed, or a designated area of a parcel in which the land development project is located. Areas channelward of mean low water in tidal Virginia shall not be considered part of a site.

"State" means the Commonwealth of Virginia.

"State Board" means the Virginia State Water Control Board.

"State permit" means an approval to conduct a land-disturbing activity issued by the State Board in the form of a state stormwater individual permit or coverage issued under a state general permit or an approval issued by the State Board for stormwater discharges from an MS4. Under these state permits, the Commonwealth imposes and enforces requirements pursuant to the federal Clean Water Act and regulations, the Virginia Stormwater Management Act and the Regulations. "State Water Control Law" means Chapter 3.1 (§62.1-44.2 et seq.) of Title 62.1 of the Code of Virginia.

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

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

"Stormwater management plan" means a document(s) containing material for describing methods for complying with the requirements of Chapter 5 of this Design Manual.

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

"Subdivision" means the same as defined in Chapter 42.5 – Subdivision Ordinance of the Norfolk City Code.

"Total maximum daily load" or *"TMDL"* means 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"* means Article 2.3 (§62.1-44.15:24 et seq.) of Chapter 3.1 of Title 62.1 of the Code of Virginia.

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

"*Virginia Stormwater Management Program*" or "*VSMP*" means 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*" means 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.

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CHAPTER 2.0 STORMWATER MANAGEMENT PLAN PREPARATION

2.1 Stormwater Plan Review Process Overview

To protect the quality and quantity of state water from the potential harm of unmanaged stormwater runoff resulting from land-disturbing activities, the City requires all development and redevelopment which go through site plan review, as required in the Chapter 26, *Site Plan Review*, of the Zoning Ordinance of the City of Norfolk, and to comply with the applicable storm water technical criteria for regulated land-disturbing activities as determined in Section 2.3.1, below.

2.2 Exemptions

The following activities are exempt from City of Norfolk stormwater management technical criteria but may be subject to regulation under the City of Norfolk Municipal Separate Storm Sewer System permit where discharges from these activities enter the City storm sewer system:

1. 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;[1]
2. Single-family residences separately built and disturbing less than 2,500 square feet and not part of a larger common plan of development or sale, including additions or modifications to existing single-family detached residential structures;[2]
3. Land disturbing activities that disturb less than 2,500 square feet of land area except for land disturbing activities that are part of a larger common plan of development or sale that is 2,500 square feet or greater of disturbance;
4. Discharges to a sanitary sewer or combined sewer system;[3]
5. 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 VSMP authority shall be advised of the disturbance within seven days of commencing the land-disturbing activity and compliance with the administrative requirements of Section 2.3 is required within 30 days of commencing the land-disturbing activity.
6. Activities under a State or federal reclamation program to return an abandoned property to an agricultural or open land use;
7. Clearing of lands specifically for agricultural purposes and the management, tilling, planting or harvesting of agricultural, horticultural, or forest crops, livestock feedlot operations, or as additionally set forth by the Board 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 Chapter 11 (§ 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;

8. Permitted surface or deep mining operations and projects, or oil and gas operations and projects conducted under the provisions of Title 45:1;

[1] Routine maintenance does not include the wholesale replacement of an existing improvement.

[2] Single family residence construction usually results in more than 2,500 square feet of land disturbance and generally requires a land disturbance permit.

[3] Discharges to the sanitary sewer system must be in accordance with either Chapter 39.1 or Chapter 39.2 of the Code of the City of Norfolk.

9. Linear development projects are exempt from the stormwater management requirements of these Standards provided that:

- The project does not significantly alter the predevelopment runoff characteristics of the land surface after the completion of construction and final stabilization;
- The project is managed so that less than one (1) acre of land disturbance occurs on a daily basis;
- The disturbed land where work has been completed is adequately stabilized on a daily basis;
- The environment is protected from erosion and sedimentation damage associated with the land-disturbing activity;
- The owner and/or construction activity operator designs, installs, implements, and maintains pollution prevention measures to:
  - Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other wash waters;
  - Minimize the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste, and other materials present on-site to precipitation and to stormwater;
  - Minimize the discharge of pollutants from spills and leaks and implement chemical spill and leak prevention and response procedures;
  - Prohibit the discharge of wastewater from the washout of concrete;
  - Prohibit the discharge of wastewater from the washout and cleanout of stucco, paint, form release oils, curing compounds, and other construction materials; and,
  - Prohibit the discharge of fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance.
- The owner and/or construction activity operator provides reasonable assurance to the City of Norfolk that all of the above conditions will be satisfied by incorporating these conditions into an erosion and sediment control plan developed for the project.

2.3 Determining Which Stormwater Technical Criteria Apply to a Project

Regulated land disturbance activities must either comply with the technical criteria contained in Part II B or Part II C of the Virginia Stormwater Management Regulations based on whether the site qualifies as either a grandfathered site or a site having received initial coverage under the General permit prior to July 1, 2014. The applicant must determine which stormwater technical criteria apply to their site, and, if proposing to develop or redevelop a site based on grandfathering provisions or based on the date of initial General permit coverage, submit proof of the applicability of grandfathering or General permit coverage to the City at the time of site plan submission.

Approved Stormwater Management Plans and Executed Agreements in Lieu of a Stormwater Management Plan shall be good for a period of five (5) years from the date of either plan approval or the executed agreement, as applicable.

2.3.1 Single Family Home Construction

Single family home construction permit requirements are driven by the amount of land disturbance, whether the construction is part of a larger development or not and whether or not the home site is located in a Resource Protection Area (RPA) or Resource Management Area (RMA). The following tables describe the permitting required for single family home construction depending upon whether the construction is stand alone or part of a larger development (subdivision).

Single family home construction sites must provide appropriate drainage to avoid creating a nuisance to neighboring properties. Failure to avoid the creation of a nuisance will result in the issuance of a Notice of Violation. No Certificate of Occupancy will be granted until such problems are addressed to the satisfaction of the Department of Public Works, Storm Water Management Division. On-site drainage must be conveyed from the property to the City's right of way or to an existing drainage system capable of conveying the anticipated volume of storm water runoff, or the lot must provide a public drainage easement to convey storm water runoff to the City right of way or an existing storm water conveyance system (10 foot minimum along a property line to the City right of way or public storm water conveyance system). Any increase in the rate (cfs) or volume (CF) of stormwater discharge as a result of an increase in impervious area shall be addressed on site by means of a BMP and shall be conveyed to the City drainage system without impacting adjacent lots or downstream City drainage systems.

2.3.1.1 Grading and Drainage Requirements for Single-Family Dwellings

Development of new, single-family dwellings (SFD) within the City of Norfolk geographic boundary typically result in increased impervious area (dwelling, driveway, etc), which results in increased site runoff (rate and volume). Site development shall not obstruct or negatively impact drainage on adjacent properties. The *Stormwater Grading and Drainage Requirements for Single-Family Dwellings* has been developed to reduce the probability of property damage associated with increased flooding from new development.

A site grading plan must be submitted for review prior to land disturbance when the Developer/Builder intends to substantially affect the direction, rate or volume of surface runoff from the site, including revised grades of a SFD site from existing conditions. In accordance with Section 42-20.2 and/or 42-20.3 of the City Code of Ordinances and Section 2.3.2 of the *Norfolk Design and Construction Manual* adopted by Ordinance in Section 41.2, the Developer/Builder is required to obtain a Fill Permit. If the Developer/Builder obtains an approved site plan from the Department of Planning that incorporates, at a minimum, the items outlined in the *Stormwater Grading and Drainage Requirements for Single-Family Dwellings*, the Fill Permit may be waived by the Director of Public Works.

2.3.1.2 Storm Water Grading & Drainage Requirements

1. Topographic Survey, prepared and certified as complete and accurate by a Professional Engineer (PE) or Certified Land Surveyor (PLS).
   a. Drawn to scale.
   b. All existing site features, including any areas to be filled or regraded (topographic contours and/or spot elevations).

c. Adjacent property elevations to include sufficient information including spot elevations and obstructions to flow such as fences and trees on the five (5) adjoining parcels to assess the impacts of stormwater from the site on these parcels and to ensure there are no upstream or downstream effects.

2. Site Plan.
   a. Location, elevation, extent and type of proposed grading (topographic contours and/or spot elevations). Obstructing or increasing drainage to adjacent properties is prohibited.
   b. Site must demonstrate how new site grades will tie-in to existing grade on adjacent property(-ies).
   c. Location of any natural or man-made drainage system(s) which could be affected by grading modifications including any known easements, public or private.
   d. Provide detailed excavation spoil disposal plan. Disposal may include removal from the site or reuse on-site for regrading purposes. Provide a cut/fill analysis.
   e. Provide flow arrows to indicate site runoff.
      i. Runoff (including rain barrel overflow) must be directed to City right-of-way, an approved City-maintained drainage system, natural waterway or directly to waters of the United States.
      ii. Builder/Developer is encouraged to utilize low-impact design and maintain drainage on-site (e.g. Infiltration, Bioretention), so long as appropriate means are in place to ensure proper infiltration of runoff.
3. Developer/Builder must install gutters and downspouts to collect and convey roof runoff to City right-of-way. If gutters and downspout leaders are permitted to be omitted from the SFD site, the plan must reflect splash areas associated with the sheet flow from the SFD.
   a. Roof drainage plan must adequately ensure estimated quantity of roof runoff to a specific area on-site is adequately addressed (e.g. infiltration trenches, swales, and/or retaining walls).
   b. There must be a defined justification to allow the exemption.
4. All improvements and tie-ins to the City right-of-way are subject to inspection by the Department of Public Works, Environmental Storm Water Management, Department of Transit, Right of Way and Department of City Planning
5. Inspections must be completed on the grading aspect of the site prior to issuance of an occupancy permit.
   a. Provide an As-Built, prepared and certified as complete and accurate by a Professional Engineer (PE) or Certified Land Surveyor (PLS).
      i. Drawn to scale.
      ii. All newly constructed site features, including any areas filled or regraded (topographic contours and/or spot elevations), location, size, depth, and invert elevations of any stormwater control features.
      iii. Adjacent property elevations.
   b. Final occupancy permits will not be issued until the as-builts are reviewed by the Planning Department or Public Works staff to verify site conditions match the approved site plan.

Table 2.1: Stand-Alone Single Family Home Permitting

Single family construction,	Erosion and Sediment Control Approval Required?	Stormwater Management Plan Approval or Executed Agreement in Lieu of a Stormwater Management Plan Required?	Construction General Permit Required?
Less than 2,500 square feet	Yes	No	No
2,500 square feet ≤ disturbance ≤ 43,559 square feet	Yes (agreement in lieu)	~~No~~ Yes (see notes below)	No
Disturbance ≥ 1 acre	Yes	Yes	Yes (Permit by Rule for up to 5 acres of disturbance)

An Agreement in Lieu of a Stormwwater Management Plan may only be used under the following conditions:

- the site and construction have been designed to meet the Resiliency Quotient (RQ) requirements of either a 200-gallon rain barrel or infiltration or tree canopy;
- the conditions specified in Section 5.12.5.A(2) of the Zoning Ordinance are met and are included as enforceable provisions in the Agreement; and,
- a map as specified in Section 2.4.1 of the Standards shall be provided as part of the Agreement.

Table 2.2: Single Family Home Permitting Within a Common Plan of Development greater than 1 acre.

Single Family Construction, PART of Larger Development Plan	Erosion and Sediment Control Approval Required?	Stormwater Management Plan Approval or Executed Agreement in Lieu of a Stormwater Management Plan Required?	Construction General Permit Required?
2,500 square feet ≤ disturbance ≤ 43,559 square feet	Yes (agreement in lieu)	Yes (Plan from larger development may qualify)	Yes (Permit by Rule)

Disturbance ≥ 1 acre	Yes	Yes (Plan from larger development may qualify)	Yes (Permit by Rule for up to 5 acres of disturbance)

An agreement in lieu of a stormwater plan may be used for those single family home sites within larger common plans of development where the stormwater management plan for the larger development does not account fully for the pollutant loading or runoff from the single family home site. An agreement in lieu of a stormwater management plan may also be used to satisfy stormwater quality requirements from standalone single family home construction instead of a full stormwater management plan as described in Section 2.4.1. All Single Family site plans requiring review in accordance with these Standards shall be approved in writing by the Department of Public Works, Storm Water Management Division.

2.3.2 Fill Permit Required

Before any filling is done by any person in any area in the City which could affect the direction, rate or volume of surface flow from one property onto another or onto a public right of way, a fill plan shall be filed with the Director of Public Works, or his designee. This fill plan can be incorporated into site plans for a site and must contain, at a minimum, the following items:

1. A survey drawn to scale, certified as complete and accurate by a professional engineer, landscape architect or a certified land surveyor, which clearly delineates:
   a. The existing topography of the area proposed to be filled or graded shown by contour lines;
   b. The location, elevation, extent, and type of proposed fill or grading shown by contour lines and total fill and disturbed area calculations; and,
   c. The location of natural drainage areas which would or could be obstructed by the fill.
2. Appropriate erosion and sedimentation control procedures as required by Chapter 15 of the City Code.
3. A description of the purpose and necessity of the filling or grading.
4. Any additional information or data the Director of Public Works or his designee requests to complete their review of the fill plan.

~~Filling of portions of property which do not affect the direction, rate or volume of surface flow from one property onto or into another shall not require a fill permit at the discretion of the Director of Public Works or his designee~~. If the builder/developer obtains an approved Site Plan from the Department of Planning that incorporates, as a minimum, the items outlined in Section 2.3.1.1, the Fill Permit may be waived by the Director of Public works or his designee. The issuance of a fill permit does not convey property rights in either real or personal property, or exclusive privileges, nor does it authorize injury to private property or invasion of personal property rights, nor infringement of any other federal, state or local law or regulation.

2.3.3 Chesapeake Bay Land Disturbing Activities

After July 1, 2014, commercial, industrial, institutional and multi-family projects disturbing between 2,500 square feet and 43,559 square feet, which are not part of a larger common plan of development or sale, do not require coverage under a general permit and are not required to prepare a stormwater pollution prevention plan. These sites still require coverage under a land disturbing permit issued by the City of

Norfolk and are also subject to the stormwater management technical criteria and stormwater management plan criteria of Chapter 42.1 of the Code of the City of Norfolk and this Design Manual.

The original or subsequent owners of commercial, industrial or institutional lots within larger common plans of development may utilize the stormwater management plan approved for the common plan of development to satisfy the requirement for the preparation of a stormwater management plan for their individual lot or parcel provided the development is conducted in conformance with the previously approved stormwater management plan and the water quality and quantity control features designed and installed to treat runoff from the lot are installed and functioning in accordance with their approved design.

All development equaling or exceeding one acre (43,560 square feet) of land disturbance must obtain coverage under the general permit and provide proof of general permit coverage to the City of Norfolk prior to the issuance of a land disturbance permit.

2.3.4 Construction Laydown Areas

Construction laydown area permit requirements are driven by the amount of land disturbance and whether or not the laydown area is contiguous to the project site. For laydown areas contiguous to other land-disturbing activities, the process for permitting is the same as for the remainder of the site. Land areas less than 1 acre in size do not require coverage under a construction general permit (CGP), are not required to prepare a stormwater pollution prevention plan, require coverage under a land disturbing permit issued by the City of Norfolk, and are required to submit a Stormwater Management Plan meeting the requirements of Section 2.4.1.

When the construction laydown area is not contiguous to the site, and the laydown area is not covered under a CGP, the contractor shall submit the site plan for the laydown area through the normal review process. Areas less than 1 acre in size require coverage under a land disturbing permit issued by the City of Norfolk, and are required to submit a Stormwater Management Plan meeting the requirements of Section 2.4.1. In lieu of a Stormwater Management Plan, the contractor may enter into an executed Agreement with the condition that all green spaces of the laydown area must be returned to their original condition or better.

2.3.4 Grandfathering

Any project meeting the grandfathering criteria is not subject to the technical criteria of Part II B of the Virginia Stormwater Management Regulations (9 VAC 25-870-62 through 9 VAC 25-870-92), but is subject to the technical criteria of Part II C of the Virginia Stormwater Management Regulations (9 VAC 25-870-93 through 9 VAC 25-870-98) for those areas that were included in the approval. Nothing in this section precludes an owner from constructing their project to a more stringent standard at their discretion.

The following projects are considered vested (grandfathered) to the stormwater regulations as outlined above:

1. 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 City as being equivalent thereto, was approved by the City's site plan review process prior to July 1, 2012 and that provides a layout as defined herein and will comply with the Part II C technical criteria of the Virginia

Stormwater Management Regulations, and has not been subsequently modified or amended in a manner resulting in an increase in the amount of phosphorus leaving each point of discharge, and such that there is no increase in the volume or rate of runoff, and has not received coverage under the VSMP Construction General Permit prior to July 1, 2014 and has not commenced land disturbing activities prior to July 1, 2014.

2. Local, state, and federal projects for which there has been an obligation of funding, in whole or in part, prior to July 1, 2012, or for which the Commonwealth has approved a stormwater management plan prior to July 1, 2012, shall be considered grandfathered and shall not be subject to the technical requirements of Part II B of the Virginia Stormwater Management Regulations, but shall be subject to the technical requirements of Part II C of the Virginia Stormwater Management Regulations for those areas that were included in the approval provided such project has not received coverage under the VSMP Construction General Permit prior to July 1, 2014 and has not commenced land disturbing activities prior to July 1, 2014.

3. Notwithstanding anything to the contrary, 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 criteria of Part II C in perpetuity.

4. For those sites that are authorized to design utilizing Part II C of the Virginia Stormwater Management Regulations, the default watershed impervious value (**I watershed)** to be used for performance based water quality calculations is 16%.

~~4.~~5. New submissions no longer meet grandfathering requirements.

2.3.5 On-Going Land Disturbing Activities and Sites that Continue General Permit Coverage

Land-disturbing activities without current site plan approval and which do not qualify for grandfathering in accordance with Section 2.3.4 that obtain general permit coverage prior to July 1, 2014 but do not commence land disturbing activities prior to July 1, 2014 may be designed to Part II C of the Virginia Stormwater Management Regulations provided they:

1. Maintain permit coverage continuously (submit for coverage under the 2014 General permit prior to June 30, 2014) for the 2014-2019 General permit;
2. Submit to the City for review a stormwater management plan and erosion and sediment control plan within 60 days of receipt of coverage under the 2014 General permit, and;
3. Receive plan approval from the City within 120 calendar days from initial submittal.

Land disturbing activities that commence lawful land disturbance prior to July 1, 2014 shall be conducted in accordance with the technical criteria of Part II C of the Virginia Stormwater Management Regulations (9 VAC 25-870-93 through 9 VAC 25-870-98) until June 30, 2024. After such time, portions of the project not under construction shall become subject to any new technical criteria adopted by the City of Norfolk.

The grandfathering clause applies specifically to land-disturbing activities and does not apply to regional or watershed storm water management plans or storm water master plans. Regional and watershed storm

water management plans and storm water master plans will need to be reviewed and modified in order to ensure compliance with Part II B of the Virginia Stormwater Management Regulations.

2.3.6 New Development and Redevelopment Projects Lacking a General Permit and Grandfathering

For non-grandfathered new development and redevelopment sites, and for sites that have not obtained a Virginia Stormwater Management Program General Permit for Construction Activities prior to June 30, 2014, the stormwater management plan shall apply the technical criteria contained in Part II B of the Virginia Stormwater Management Regulations (9 VAC 25-870-62 through 9 VAC 25-870-92).

2.4 Development of the Stormwater Management Plan

As a part of the site plan review process, a stormwater management plan must be developed and submitted to the City of Norfolk for review for all land disturbance exceeding 2,500 square feet. The Department of City Planning is responsible for site plan review and for distributing site plans to additional departments for review. The Department of Public Works Storm Water Management ~~Operations~~ Division reviews stormwater management for water quantity and quality calculations and stormwater management facility design. Where stormwater runoff is comingled with other sources of surface or subsurface water runoff from a site, the stormwater management plan must consider the combined flow in its totality regardless of source. Stormwater management plans are not considered submitted for review until any required plan review fees are paid to the City of Norfolk by the applicant.

2.4.1 Stormwater Management Plan Contents

The required elements of the stormwater management plan are the same, regardless of whether the stormwater runoff must meet the technical criteria of either Part II B or Part II C of the Virginia Stormwater Management Regulations. For a stormwater management plan to be considered complete, it must contain the following elements:

1. Information on the type of and location of stormwater discharges, information on the features to which stormwater is being discharged including surface waters if present, and predevelopment and post-development drainage areas;

2. 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;

3. A narrative that includes a description of pre-development~~current~~ site conditions and ~~final~~ post-development site conditions;

4. 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.~~ Any existing BMP proposed to be removed and/or replaced during the site development or redevelopment process shall be specifically identified and approval of such removal and/or replacement shall require the written approval of both Public Works Storm Water Division and the City Attorney.

5. Under the provisions of Ch. 41.1-4 (pollution of the stormwater system); https://www.norfolk.gov/DocumentCenter/View/3026/Environmental-Codes?bidId=, in an effort

to minimize the infiltration and/or runoff potential of petroleum-based materials, provide oil/water separators for contributory drainage areas serving vehicle fueling canopies, underground storage tank fill areas, and solid waste dumpster enclosures. Coordinate with the Building Official's office for proper placement of the OWS on-site so that fuel- and/or pollutant-laden runoff is processed through the OWS to the maximum extent practicable prior to tie-in to the stormwater system."

~~5.~~6. Information on *each* of the proposed on-site stormwater management facilities, including:

a. the type of facility;

b. its location, including geographic coordinates;

c. the square feet and acreage treated;

d. the surface waters into which each facility will discharge. For interconnected stormwater management features, the ultimate receiving water for each series of interconnected features should be reported; ~~and,~~

e. documentation and calculations verifying compliance with the applicable water quality and quantity requirements for all areas within the limit of disturbance (LOD) inclusive of work within the right-of-way (ROW), including a summary of pre- and post-development land cover totals for forest/open space, managed turf, and impervious surface area;~~.~~

f. the elevation of the seasonally high groundwater table (GWT) at each BMP. If the GWT intersects the BMP section, provide impermeable liner and buoyancy calculations;

g. water quantity/quality storage required and provided (in cubic feet);

h. a sequence of when each BMP will be installed in the construction project; and,

~~e.~~i. the following elevations for each BMP shall be provided: (i) water quality (1-inch) storm event; (ii) 1-, 2-, and 10-year 24-hour storm events (NOAA Atlas 14); and (iii) the seasonal high groundwater table (GWT).

~~6.~~7. Hydrologic and hydraulic computations, runoff characteristics including site specific determination of the depth to seasonal high groundwater and infiltration rate;

~~7.~~8. A map or maps of the site that depict the topography of the site and that include:

a. All contributing drainage areas;

b. Existing streams, ponds, culverts, ditches, wetlands, other water bodies, Chesapeake Bay Preservation Area features and any associated buffers, and floodplains;

c. Soil types, ~~geologic formations if karst features are present in the area,~~ forest cover, and other vegetative areas;

d. Current land use including existing structures, roads, and locations of known utilities and easements;

e. Sufficient information including spot elevations and obstructions to flow such as fences and trees on the five (5) adjoining parcels to assess the impacts of stormwater from the site on these parcels and to ensure there are no upstream or downstream effects;~~Sufficient information on adjoining parcels to assess the impacts of stormwater from the site on these parcels~~;

f. The limits of clearing and grading, and the proposed drainage patterns on the site;

g. Proposed buildings, roads, parking areas, utilities, and stormwater management facilities; and

h. 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;

9. If an operator intends to meet the water quality requirements established by ~~either~~ Part II B ~~or Part II C~~ of the Virginia Stormwater Management Regulations through the use of off-site compliance options, where applicable, then a letter of availability from the off-site provider must be included; ~~and~~ If eligible, credit offsets can be purchased at an approved bank as outlined in Virginia DEQ Guidance Memo 21-2007. Documentation will be provided of 1.) the impairment status of first assessed stream or reservoir downstream of the site discharge and 2.) the closet approved bank based on proximity hierarchy criteria in the guidance memo;

~~8.~~10. A tabulation of practices to be employed on the site to meet "Component 2: Stormwater Management" requirements of the Resiliency Quotient (RQ) of Section 5.12 of the Zoning Ordinance shall be provided. The tabulation will provide a summary of the RQ points attributable to each practice and whether the practice has quantifiable water quality and water quantity (runoff reduction) benefits using industry acceptable methodology. Supporting calculations shall be provided for each quantifiable practice being proposed.

2.4.2 Certification Requirements for Plan Preparation

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.

2.4.3 Maintenance Plan Requirements

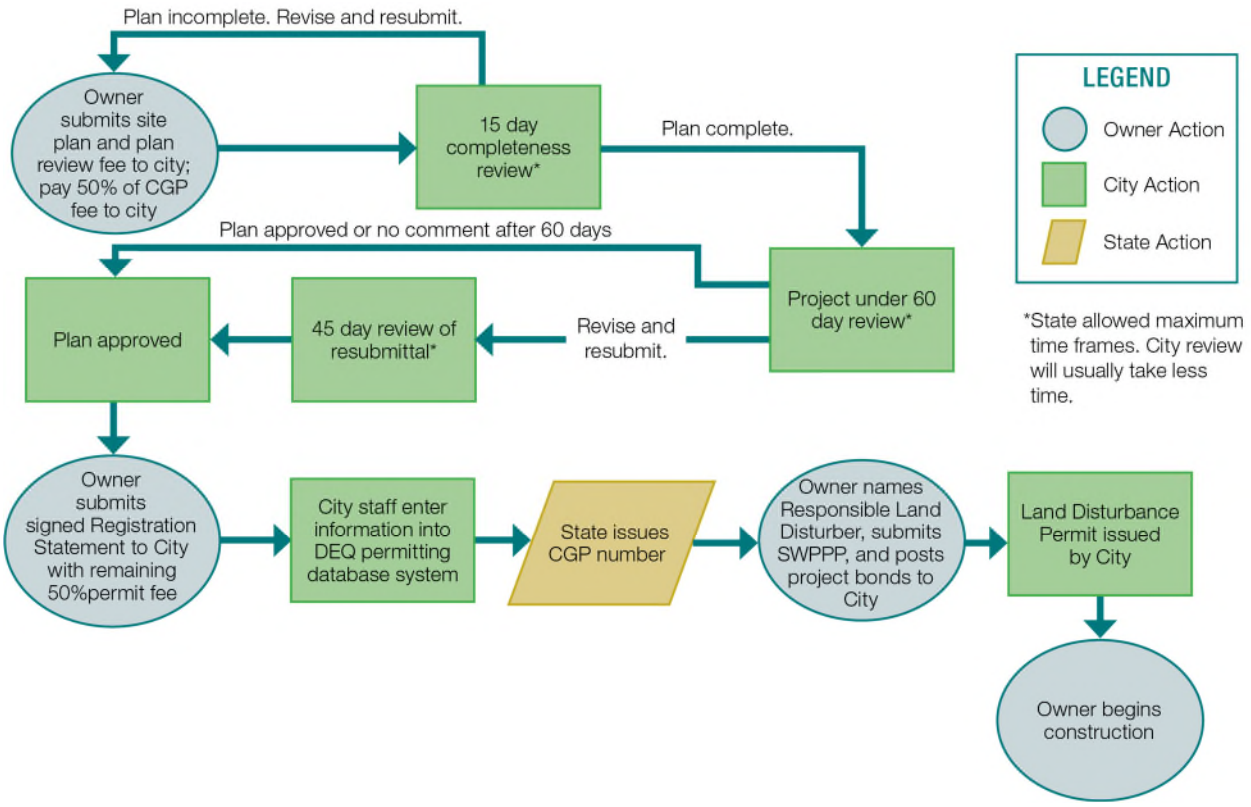
Prior to land disturbance permit issuance, the applicant must prepare and submit for formal review and approval a BMP Maintenance Manual as described in 7.2.1 and an executed Declaration of Covenants for the proposed permanent stormwater management facilities on the project site.

CHAPTER 3.0 STORMWATER MANAGEMENT AND EROSION AND SEDIMENT CONTROL PLAN REVIEW PROCESS

3.1 Stormwater Approval Process

Stormwater runoff is regulated by federal, state and local laws and regulations. The purpose of these regulations is to limit the amount of pollutants that are discharged into the waterways around the City of Norfolk with stormwater. A key aspect of the program for reducing pollution in stormwater runoff is the treatment of stormwater runoff both during and after construction within urban areas like Norfolk. Runoff from construction activities and from the completed projects is controlled through design practices contained in the project plans. These plans are reviewed by the Department of Planning, Bureau of Environmental Services for erosion and sediment control compliance and by the Department of Public Works, Storm Water Management ~~Operations~~ Division for stormwater quality and runoff reduction compliance. Figure 3.1 depicts the stormwater plan review and approval process.

Figure 3.1: Stormwater Plan Approval Process



The City of Norfolk will enter project information into the state developed e-Permitting system on behalf of the owner / applicant and will notify the Commonwealth via the e-Permitting system when the stormwater plan and erosion and sediment control plans are approved.

3.2 Stormwater Management Plan Completeness Review

Upon receipt of a stormwater management plan and one half of the fee specified based on project disturbed area in Appendix 7 of this Design Standards Manual, the plan will be reviewed for completeness.

Incomplete fee payments are deemed non-payments. The applicant will be notified within fifteen (15) days of receipt as to whether the plan is complete and if incomplete, what items are required to be submitted for the plan to be considered complete.

3.3 Stormwater Management and Erosion and Sediment Control Plan Technical Review

Upon receipt of a complete stormwater management plan, the plan will be reviewed for compliance with the technical criteria of Part II B or Part II C of the Regulations, Chapter 42.1 of the code of the City of Norfolk and this design manual. The erosion and sediment control plan will be reviewed for compliance with the Virginia Erosion and Sediment Control Law and Regulations and Chapter 15.1 of the code of the City of Norfolk by the Department of City Planning – Bureau of Environmental Services.

3.4 Stormwater Management and Erosion and Sediment Control Plan Approval or Disapproval

The results of the technical review will be communicated to the applicant and the plan will be deemed approved or not approved. For plans where the applicant was notified that the plan was complete within 15 days from submittal, the City will have up to sixty (60) additional days to perform the stormwater management plan technical review. For plans reviewed by the City where no written notification of plan completeness was provided to the applicant, the City will perform the technical review within sixty (60) days of the date of initial stormwater management plan submittal to the City. For plans deemed not approved, the applicant must revise and resubmit the stormwater management plan and/or erosion and sediment control plan for technical review to the Department City Planning-Bureau of Environmental Services. Revised plans will be reviewed and approval or disapproval with written comments will be provided to the applicant within forty-five (45) days of resubmittal.

3.5 Plan Modification

The approved stormwater management plan or erosion and sediment control plan may only be modified by the applicant after the submittal of the proposed modification to the Department of City Planning and the proposed stormwater management plan modification reviewed by the Department of Public Works, Storm Water Management~~Operations~~ Division staff and the proposed erosion and sediment control plan modifications reviewed by the Department of City Planning – Bureau of Environmental Services.

CHAPTER 4.0 EROSION AND SEDIMENT CONTROL PLAN REQUIREMENTS

All projects having land disturbance of 2,500 square feet or more, excluding single family residences disturbing between 2,500 square feet and one acre, are required to submit and obtain approval of an erosion and sediment control plan prior to land disturbance. This requirement is more stringent than the state law of 10,000 square feet for land disturbance. Single family residences are handled by having the owner/developer sign an agreement in lieu of an erosion and sediment control plan.

4.1 Standard Erosion and Sediment Control Plan

All erosion and sediment control plans must comply with Title 62.1, Chapter 3.1, Article 2.4 of the Code of Virginia, including the applicable regulations. Generally, all erosion and sediment control plans must include a map or maps depicting proposed structural and non-structural measures and associated details, limits of disturbance (LOD) of all on-site and off-site work, City of Norfolk Standard Erosion and Sediment Control Notes, an erosion and sediment control narrative, temporary and permanent vegetative stabilization specifications, calculation of the total site area and proposed amount of land disturbance, Virginia Stormwater Management Program General Permit for Stormwater Discharges from Construction Activities note (if required), and preconstruction conference note.

The plans are reviewed by a Virginia DEQ certified erosion and sediment control plan reviewer who utilizes the Virginia Department of Environmental Quality plan review checklist and the plan is either approved or disapproved within 60 days of plan submittal. For plans disapproved, the reason(s) for plan disapproval are communicated to the applicant in writing. Prior to the issuance of a land disturbance permit, the owner or applicant must name a Responsible Land Disturber (RLD) who will assume the responsibility of site compliance with the Erosion and Sediment Control ordinance.

4.2 Agreement In-Lieu of a Plan

For land disturbance of greater than 2,500 square feet but less than one acre on a single-family residential lot, the land disturber may choose to file an agreement in lieu of an erosion and sediment control plan with the Department of City Planning. Prior to the execution of the agreement in lieu of a plan, the owner or applicant must name a Responsible Land Disturber (RLD) who will assume the responsibility of site compliance with the Erosion and Sediment Control ordinance. The agreement in lieu of an erosion and sediment control plan form can be found in Appendix 6 of this stormwater design and construction manual.

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CHAPTER 5.0 STORMWATER QUALITY AND QUANTITY TECHNICAL CRITERIA

5.1 General Criteria Applicable to Water Quality and Quantity Compliance

The following items apply to regulated land disturbing activities within the City of Norfolk regardless of whether the technical criteria of Part II B or Part II C of the Regulations apply to a particular land disturbance project.

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 Norfolk Health Department regulations. The preservation of open space, maintenance or creation of natural buffers and other low impact design practices are encouraged as a means to both reduce the volume of stormwater runoff and improve runoff quality. The City is committed to meeting the spirit and intent of its Total Maximum Daily Load (TMDL) requirements for pollutant sources and encourages implementation of a managed meadow around all new stormwater retention, detention, or constructed wetland basins. Infiltration practices are generally discouraged in the City of Norfolk due to the presence of a high ground water table and poor soils. Any stormwater management facilities designed to detain, retain or treat stormwater runoff proposed to be constructed in City rights of way and on City property other than school property are subject to the review and approval of the Director of Public Works or their designee.

The Department of Public Works, Stormwater Management Division handles maintenance of all stormwater management facilities on public property, either annually or as requested by inspection. Ideally, BMP's that require minimal maintenance are preferred.

Best Management Practices that are preferred on City property:

1. Manufactured Treatment Devices
   -Examples that are currently accepted at time of Stormwater Construction Manual publication:
   a. CDS- Hydrodynamic Separator
   b. Hydro Downstream Defender
   c. Hydro First Defense
   d. Old Castle Dual Vortex Separator
   e. Hydroworks Hydrostorm
   f. Bioclean Sciclone
   g. Contech Cascade Separator
   h. Filterra

   *Please refer to the DEQ BMP Clearinghouse website for the most up to date list of approved MTD's. Only those that are on the list at the time of plan approval will be accepted. *

2. Underground storage/detention
3. Extended Detention Pond
4. Wet Pond
5. Grass Channel
6. Rooftop (Impervious Surface) Disconnection
7. Sheet Flow to Vegetated Filter Strip/Conserved Open Space
8. Vegetated Roof
9. Rainwater Harvesting
10. Dry Swales
11. Wet Swales
12. Constructed Wetlands
13. Filtering Practices (those that do not include media cartridges)

Best Management Practices that will be accepted on a case-by-case basis on City property:

1. Soil Compost Amendment
2. Permeable Pavement
3. Infiltration Practices
4. Bioretention (including Urban Bioretention)

Under certain circumstances, and subject to certain conditions, offsite compliance options may be utilized to meet the water quality requirements of these regulations in accordance with 9 VAC 25-870-69 and 9 VAC 25-870-99. In accordance with Virginia Code § 10.1-603.8:1, Virginia requires localities to allow the purchase of nutrient offsets for compliance with stormwater non-point nutrient runoff water quality criteria. The City allows projects with less than 2 acres of land disturbance to purchase credits. Projects must demonstrate on-site control of at least 75% of the required phosphorus reductions prior to purchasing credits for developments exceeding 2 acres of land disturbance. If eligible, credit offsets can be purchased at an approved bank as outlined in the Virginia DEQ Guidance Memo 21-2007. Documentation will be provided of 1.) the impairment status of first assessed stream or reservoir downstream of the site discharge and 2.) the closest approved bank based on proximity hierarchy criteria in the guidance memo. Even if offsite water quality compliance options are used, all site water quantity requirements must be satisfied on the project site. Where nutrient credits are proposed to meet the required pollutant reduction in whole or in part, the applicant must submit proof of credit availability from an approved nutrient bank to the City with the stormwater management plan and shall submit proof of purchase of nutrient credits to the City prior to land disturbance permit issuance.

Sites discharging to either Lake Whitehurst or Lake Wright are considered to be sources of pollution of the stormwater system (https://www.norfolk.gov/DocumentCenter/View/3026/Environmental-Codes?bidId=) and/or the water system (http://norfolk.elaws.us/code/coor_ch46.1_artiv_sec46.1-46). Sites which directly discharge into Lake Whitehurst or Lake Wright are required to provide 100% on-site water quality treatment per directive from the Department of Utilities. The purchase of off-site nutrient credits will not be allowed.

The City of Norfolk reserves the right to use any water quality credits generated by the project in excess of the site requirements for use by the City of Norfolk in fulfilling Chesapeake Bay TMDL obligations at no cost to the City.

5.2 Technical Criteria of Part II B of the Virginia Stormwater Management Regulations

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.

5.2.1 New Development

The total phosphorus load of new development projects shall not exceed 0.41 pounds per acre per year, as calculated pursuant to 9 VAC 25-870-65.

5.2.2 Redevelopment

For land-disturbing activities disturbing greater than or equal to one acre 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.

For regulated land-disturbing activities disturbing greater than 2,500 square feet and less than one acre that result in no net increase in impervious cover from the predevelopment condition, the total phosphorus load shall be reduced at least 10% below the predevelopment total phosphorus load.

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. Depending on the area of disturbance, either a 10% reduction, for disturbance of up to one acre, or a 20% reduction, for disturbance equal to one acre or greater, in the predevelopment total phosphorous load must be achieved on the remainder of the site.

For redevelopment projects, under no case will the total phosphorus load be required to be reduced to below the applicable standard for new development.

~~**5.2.3 Linear Redevelopment Projects**~~

~~The total phosphorus load discharged from any linear development project occurring on prior developed lands shall be reduced 20% below the predevelopment total phosphorus load.~~

~~The total phosphorus load shall not be required to be reduced to below the applicable standard for new development.~~

~~5.2.4~~5.2.3 Water Quality Compliance

Projects subject to the requirements of Part II B of the Regulations shall meet the water quality standards found at 9 VAC 25-870-65.

~~5.2.5~~5.2.4 Design Storms and Hydraulic Methods

The prescribed design storms are the one-year, two-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.

The following steps should be used for calculating storm water runoff.

1. Use the Norfolk Master Storm Drain Plan sheets or other appropriate mapping with elevation information to delineate drainage basin boundaries for the site. Outline the drainage area contributing storm water runoff to the site and include off-site drainage areas that contribute runoff discharge through the project site.
2. Measure drainage area and project site area in acres. Measure impervious area of project site for existing and proposed conditions. Impervious area shall include pavement, buildings, roofs and any other surface which does not allow infiltration of water into the soil. Concrete, asphalt, and gravel surfaces are considered impervious.
3. Based on size of drainage area contributing runoff to the site, use Table 5.2~~Table 5.2~~~~Table 5.2~~ to choose the runoff calculation method.
4. Calculate storm water runoff for design of the storm drain system.

All hydrologic analyses shall be based on the existing watershed characteristics and how the ultimate development condition of the subject project will be addressed.

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 hydraulic analysis for projects subject to Part II B of the Regulations.

~~5.2.6~~5.2.5 Use of BMPs from the Virginia BMP Clearinghouse Required

The BMPs listed 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.

Other approved BMPs found on the Virginia Stormwater BMP Clearinghouse Website at http://www.vwrrc.vt.edu/swc may also be utilized. Design specifications and the pollutant removal efficiencies for all approved BMPs are found on the Virginia Stormwater BMP Clearinghouse.

Where a BMP listed on the Virginia BMP Clearinghouse contains Coastal Plain design considerations, these considerations shall be employed during the design of the BMP within the City of Norfolk.

When the Forest and Open Space land use category is used in runoff reduction spreadsheet calculation, the area accounted for in this category will be considered a BMP, with required covenants and maintenance plans provided. Use of this land use category should emphasize conservation and/or restoration of hydrologically functional natural landscapes, as defined by Virginia DEQ in Guidance Memo 16-2001.

5.3 Technical Criteria of Part II C of the Virginia Stormwater Management Regulations

Sites that qualify as grandfathered sites under the Regulations may meet water quality and quantity compliance requirements by using Part II C of the Regulations until June 30, 2019. Sites that that had begun construction or that had obtained general permit coverage prior to June 30, 2014 may meet water quality and quantity compliance requirements by using Part II C of the Regulations until June 30, 2024, provided they comply with the submittal timeframes contained in Section 2.3.5.

5.3.1 New Development

The default impervious cover to be used for determining water quality compliance under Part II C of the Regulations in the City of Norfolk is the greater of the actual impervious area of the site at the time the development plan is filed or 16%. No water quality measures are required if the post construction site impervious area will be less than or equal to the amount of impervious area on site at the time the site plan is filed. Where post construction impervious area will exceed the site impervious area as of the date the site plan is filed, the owner is responsible with removing this additional pollutant load in stormwater runoff from the increased impervious area. In no case shall the developer be required to reduce the loading from the site below 0.45 pounds of phosphorous per acre per year.

5.3.2 Redevelopment

Redevelopment projects within the City of Norfolk are required to reduce their pollutant discharge by at least 10% from the existing pollutant discharge. This reduction can be accomplished through structural and non-structural BMPs or through the use of offsite nutrient compliance options.

~~**5.3.3 Linear Development Projects**~~

~~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 the Virginia Stormwater Management Program Regulations.~~

~~5.3.4~~5.3.3 Water Quality Compliance

Water quality compliance shall be determined based on the methodology and requirements of Section 5.3.5.

~~5.3.5~~5.3.4 Stormwater Pollutant Removal Calculations

Most projects which go through site plan review are required to have stormwater Best Management Practices (BMP) to achieve post-construction water quality compliance. BMPs are methods of improving the quality of storm water runoff from developed land. The following steps should be used for selection and design of a BMP. Some BMPs may also be used for quantity control of storm water runoff as described in Section 5.4.1.

1. Determine which calculation procedure to use:

   Use the Guidance Calculation Procedure worksheets found in Appendix 1E to compute the pollutant removal requirement for the site. Worksheet A is for new development and Worksheet B is for redevelopment. New development is defined as siting new impervious surfaces on existing *pervious* surfaces. Redevelopment is defined as siting new impervious surfaces over existing

impervious surfaces. If you are not sure how to classify your project, contact the Department of Public Works, Storm Water Management~~Operations~~ Division.

2. New Development: - Guidance Calculation (Procedure Worksheet A)

   a. Calculate % impervious area of proposed site, I_{site}, based on the entire area of the site, A.

   b. Compare to % impervious area of entire watershed. **$I_{watershed}$ = 16 for Norfolk.**

   c. If $I_{site} \leq I_{watershed}$, the required pollutant removal efficiency is zero and no BMP is required.

   d. If $I_{site} > I_{watershed}$, calculate predevelopment and post development loadings. Constants and formulas are provided in the worksheet.

   e. Calculate pollutant removal efficiency requirement.

~~a.~~

BMP Selection:

   a. If $I_{site} \leq I_{watershed}$, then no BMP is required. Otherwise, the required pollutant removal efficiency is as calculated in the Worksheet.

   b. From Table 5.1~~Table 5.1~~Table 5.1, identify the BMP that will achieve the required pollutant removal efficiency as calculated.

3. Redevelopment – Guidance Calculation Procedure Worksheet B:

   a. Calculate % impervious area for predevelopment and for postdevelopment conditions

   b. Calculate predevelopment and postdevelopment loading using constants and formulas providing in the worksheet.

   c. Calculate pollutant removal efficiency requirement.

   d. Select BMP types from Table 5.1 that will provide the required pollutant removal efficiency.

   e. If no BMP type can provide the required efficiency, the site plan must be revised to satisfy the requirement. The Division of Environmental Storm Water Management may require a higher removal efficiency without reducing the size of the proposed impervious area.

4. Subdivisions Creating New Buildable Lots:

   a. Determine the maximum buildable zoning, wetlands or dune/beach, and buffer area requirements. Determine the area of proposed off-site impervious surfaces such as streets and parking.

   b. Calculate the pollutant removal efficiency requirements for the proposed parcel(s) and off-sire improvements assuming full coverage of maximum building area with impervious surfaces. See the steps outlined above for **New Development** or **Redevelopment.**

c. Identify from Table 5.1 the type of BMP necessary to meet the pollutant removal requirement that is also consistent with maximum building area, soils conditions, depth to groundwater, and other appropriate site limitations of the proposed subdivision.

d. Identify with a note on the plat the maximum buildable area of each parcel and the type of BMP needed to meet the removal requirement. The detail needed for the note will be determined by type of BMP. At a minimum, the note will include type of BMP (e.g. infiltration practices, detention/ retention) and the location (Public vs. private property, inside or outside buffer area). It is the option of the developer to identify a building area less than the maximum in order to reduce the pollutant removal requirement, as long as minimum buildable area, parking, circulation and road width requirements are met.

5. Required Site Data:

a. Identify environmental site features such as wetlands, CBPA buffer zone and coastal primary sand dunes and obtain preliminary approval from the Department of City Planning, Bureau of Environmental Services for location and size of proposed impervious surfaces (e.g. buildings and parking areas). Preliminary approval is required for structural BMP's located in the CBPA buffer zone.

b. Conduct a minimum of one, ten-foot piezometer test to determine seasonal high groundwater table.

c. Obtain a minimum of one soil sample, taken two feet above the groundwater table or at the bottom of the proposed BMP Structure to determine classification, permeability coefficient, infiltration rate, and plastic and liquid limits. For infiltration facilities, modified grass swales, and bioretention basins and swales, more soil samples are required to include the above soil information. Additionally, for bioretention or infiltration practices, the site specific permeability must be calculated at the proposed location of each measure.

~~5.3.6~~5.3.5 Best Management Practices

Table 5.1: Acceptable Best Management Practices to meet the requirements of Part II C of the Regulations

Type of BMP*	Average Total Phosphorus Removal Efficiency	Percent Impervious Cover
Vegetated Filter Strip	10%	16% - 21%
Grassed Swale	15%	
Constructed Wetlands	20%	22% - 37%
Extended Detention (2 x WQ Vol)	35%	
Retention Basin I (3 x WQ Vol)	40%	

Bioretention Basin	40%	
Bioretention Filter	50%	38% - 66%
Extended Detention-Enhanced	50%	
Retention Basin II (4 x WQ Vol)	50%	
Infiltration (1 x WQ Vol)	50%	
Sand Filter	65%	67% - 100%
Infiltration (2 x WQ Vol)	65%	
Retention Basin III (4 x WQ Vol with aquatic bench)	65%	

*Innovative or alternate BMPs not included in this table may be allowed at the discretion of the Administrator or the Department. Innovative or alternate BMPs not included in this table that target appropriate nonpoint source pollution other than phosphorous may be allowed at the discretion of the local program administrator or the department.

1. BMP Design:

Design the BMP using the guidelines found in the latest edition of the Virginia Stormwater Management Handbook. These BMP design guidelines correspond to the types shown in Table 5.1~~Table 5.1~~~~Table 5.1~~. Some BMPs, such as retention and detention basins, may also be used for storm water quantity control. Other types of BMPs may be accepted by the City if supporting data can demonstrate an acceptable pollutant removal efficiency.

2. Maintenance Agreement:

A maintenance agreement is required from the property owner by the City and is included in Appendix 5. Easement requirements for maintenance access to BMPs are discussed in Section 5.4.1.

3. Design for Multi-Use Facilities:

Construction of BMPs which result in a pond, lake, or wetlands can provide additional benefits beyond the design intent of pollutant reduction. Although not specifically required by existing criteria and regulations, design of BMPs for multi-use benefits is encouraged. The designer should consult the Division of Environmental Storm Water Management concerning additional features which could be incorporated into the BMP design. Typical additional benefits which can be designed into BMPs include:

- Wetlands Mitigation
- Public Use and Education
- Wildlife Habitat Creation
- Improved Site Aesthetics
- Water Supply Protection

A more detailed discussion of how these additional benefits could be incorporated into the BMP design and a technique for introducing alternative BMP technologies are included in the Norfolk Storm Water Management Plan.

~~5.3.7~~5.3.6 Stream Channel Erosion and Flooding Prevention

Erosion to streams and ditches shall be prevented by designing to the requirements of 9 VAC 25-870-97 of the Regulations. Flooding shall be prevented by designing to the requirements of 9 VAC 25-870-98 of the Regulations.

~~5.3.8~~5.3.7 Design Storms and Hydraulic Methods

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 that also contributes to that point of discharge.

The specified design storms shall be defined as either a 24-hour storm using the rainfall distribution recommended by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) when using NRCS methods or as the storm of critical duration that produces the greatest required storage volume at the site when using a design method such as the Modified Rational Method.

For purposes of computing 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. Pre-development and post-development runoff rates shall be verified by calculations that are consistent with good engineering practices.

Outflows from a stormwater management facility or stormwater conveyance system shall be discharged to an adequate channel.

The storm drain system shall be designed for the 10-year frequency storm and it shall be checked to meet the following requirement:

> **The postdevelopment peak runoff discharge rate from the 10-year frequency storm shall not exceed the respective predevelopment discharge rates for the 10-year frequency storm.**

The method for calculating the peak runoff discharge rate shall be as shown in Table 5.2~~Table 5.2~~~~Table 5.2~~.

If the proposed storm water drainage system does not limit the postdevelopment peak runoff discharge rate to equal the predevelopment rate for the 10-year frequency storm, the system design shall be modified to meet this requirement. The peak runoff discharge rate shall be defined as the maximum runoff rate leaving the site and discharging into a natural or man-made receiving channel, pipe, or storm drain system at each point of discharge.

If the City determines that the site is not required to limit its postdevelopment peak discharge rate to the predevelopment peak discharge rate for the 10-year storm, the site shall meet the requirements for discharging to an adequate channel as described in Virginia Erosion and Sediment Control Minimum

Standard #19, *Virginia Erosion and Sediment Control Regulations* (9 VAC 25-840-40). *The Virginia Erosion and Sediment Control Handbook*, 1992, Chapter 4 describes how to apply the requirements for an adequate receiving channel.

The following steps should be used for calculating storm water runoff from a project:

1. Use the Norfolk Master Storm Drain Plan sheets or other appropriate mapping with elevation information to delineate drainage basin boundaries for the site. Outline the drainage area contributing storm water runoff to the site and include off-site drainage areas that contribute runoff discharge through the project site.

2. Measure drainage area and project site area in acres. Measure impervious area of project site for existing and proposed conditions. Impervious area shall include pavement, buildings, roofs and any other surface which does not allow infiltration of water into the soil. Concrete, asphalt, and gravel surfaces are considered impervious.

3. Utilize the 10-year, 24 hour storm for hydraulic design.

4. Based on size of drainage area contributing runoff to the site, use Table 5.2~~Table 5.2~~~~Table 5.2~~ to choose the runoff calculation method.

5. Calculate storm water runoff for design of the storm drain system.

Table 5.2: Runoff Calculation Methods

Approved Procedure	Total Drainage Area
• Rational Method • Modified Rational Method (peak discharge only)	≤ 20 Acres
• SCS Graphical Peak Discharge Method (peak discharge only) • SCS Tabular Method (runoff hydrograph)	> 20 Acres

Table 5.3: Design Storms

System Component	Minimum Design Storm Frequency
• On-Site Storm Drain System • Local Street System • Minor Storm Drain System • Collector Street System • Major Trunk Line • Regional Storm Water Facility • Pump Station	10-year

Definitions of System Components

- *On-Site Storm Drain System* – Privately owned storm drain system that includes pipes, inlets, ditches, culverts and retention or detention basins. It usually connects to a City-owned minor storm drain system or major trunk line system. The owner shall provide drainage for a minimum design storm. A greater design storm may be used to lessen the risk of flooding.
- *Local Street System* - Runoff from a local street will be conveyed by a minor storm drain system and in some cases by a major trunk line system. Spacing of curb drop inlets and diameter of connecting pipes will determine the amount of storm water runoff that can be conveyed off of the street.
- *Minor Storm Drain System* – Total drainage area to this City-owned system is less than 20 acres. A minor system usually conveys the storm water runoff from local streets.
- *Collector Street System* – Runoff from a collector street is usually conveyed by a major trunk line system. A collector street is usually used as an emergency route and should have lower flooding risk than a secondary road.
- *Major Trunk Line System* – Total drainage area to this system is 20 acres or more. The system is usually characterized by a combination of two or more minor systems into a major trunk line which is City-owned. A major trunk line will be more likely to flood when undersized due to the combination of peak flows from contributing minor storm drain systems.
- *Regional Storm Water Facility* – Usually a retention pond or lake that drains an area of 10 acres or more. Design requires calculation of the total volume of runoff for the design year storm. A regional storm water facility shall allow a 100-year design storm to pass without flooding surrounding structures.
- *Pump Stations* – Pump stations are usually located at underpasses of collector or arterial streets used as primary routes. Pump stations may also be located in other areas to provide flood control. The pump station and underpass storm drain system, if present, should be designed for peak discharge rate.

5.4 City of Norfolk Design Criteria

This section provides the specific criteria and approved methods for design of storm water drainage systems in the City of Norfolk. The user should contact the Department of Public Works, Storm Water Management~~Operations~~ Division to obtain any revisions to the criteria made subsequent to issuance of this manual.

The latest versions of the City of Norfolk standard notes and details must be incorporated into the design and included on all stormwater management and erosion and sediment control plans submitted for review. In addition to the requirements specified in the Virginia Stormwater Management Handbook and the Virginia Stormwater BMP Clearinghouse, the following requirements must be complied with when designing stormwater management systems for new development and redevelopment projects in the City of Norfolk, regardless of the procedure being utilized to meet water quality and quantity compliance.

5.4.1 Storm Drain System

The criteria and steps for designing a storm drain system are listed below. The components of a storm drain system consist of inlet structures, pipe laterals and trunk lines, manholes, junction chambers, culverts, channels, and detention/retention basins. The Virginia Stormwater Management Handbook and Virginia Department of Transportation (VDOT) Drainage Manual provide guidelines for designing inlets, piping, culverts, open channels, detention basins, and for computing the hydraulic grade line.

Inlet Design:

If pavement gutters are present, the amount of flow in the gutter must be calculated to check the spread of water on the pavement. Maximum spread shall be the lesser of 7 feet or one-half of the vehicle travel way in each direction for rainfall intensity of 3.5 inches per hour. Inlets along the gutter shall be spaced and sized to limit the spread to the maximum width.

Pipe System Design:

Pipe laterals and trunk lines usually consist of two or more pipes in a series connected by one or more drop inlets. This step should follow the location, spacing and design of all drop inlets. Figure 5.1~~Figure 5.1~~~~Figure 5.1~~ shows the design criteria for pipe systems.

Since a tail water elevation of 1.7 (NAVD 88) corresponds to an annual high tide and is frequently exceeded, it should be considered as the minimum design reference elevation for storm drain system tail water calculations.

Hydraulic Grade Line (HGL):

This is the final step in design of a pipe system. The hydraulic grade line is calculated to determine, for the design year storm, the elevation the water will rise in inlets, manholes, or junctions. The hydraulic grade line elevation shall not exceed the curb flow line grade at the inlet opening or manhole rim elevation.

Culvert Design:

A culvert conveys surface water across or from a street or road right-of-way. A culvert must be designed to support the embankment and road for traffic conveyance. Where a culvert is constructed in the 100-year flood plain, it shall allow the 100-year flood to pass over the culvert without raising the water surface elevation more than one foot over existing conditions. The minimum culvert diameter shall be 12 inches for a length of 50 feet or less. For lengths over 50 feet, the minimum diameter shall be 15 inches. The minimum diameter for a culvert under a driveway entrance is ~~12~~ 15 inches.

The headwater elevation for the design discharge shall not exceed an elevation which is 18 inches below the edge of shoulder of the road. The following upstream controls may also limit the headwater elevation:

- upstream property damage
- headwater depth/culvert diameter or depth = 1.0 to 1.5
- low point in the road grade that is not at the culvert location
- ditch or ground elevations that will permit flow to divert around culvert
- elevations established to delineate floodplain zoning

The outlet velocity shall be computed for the design discharge and erosion control shall be provided in accordance with VDOT criteria contained in the VDOT Drainage Manual.

At culvert sites where a heavy volume of debris is expected, debris control structures shall be provided. For culverts without endwalls or headwalls, the potential for failure due to buoyancy forces shall be checked.

If the outfall channel consists of material which could experience erosion, the following criteria shall apply:

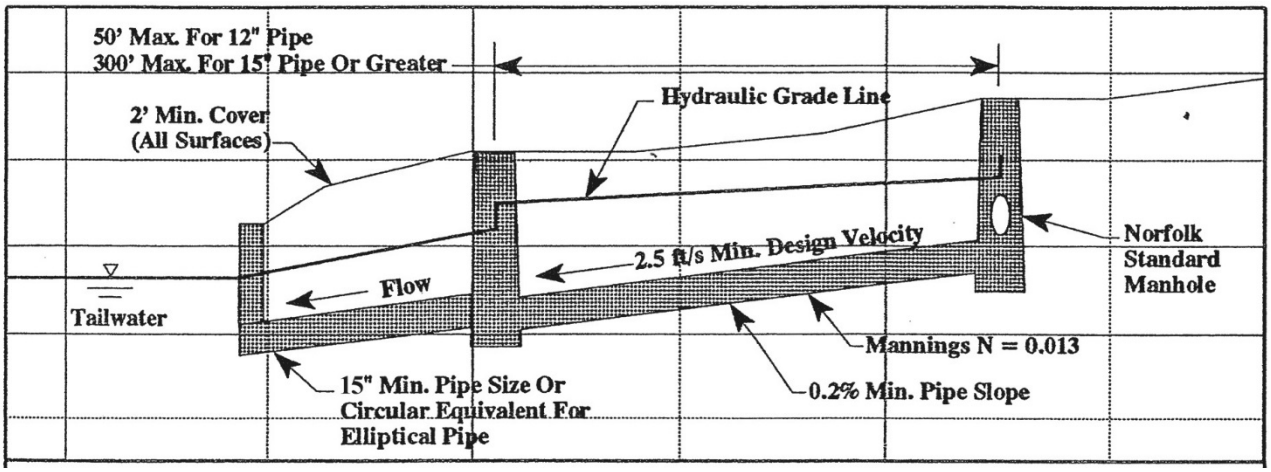
- The outlet velocity shall be computed for the design discharge.
- Erosion Control Treatment - Type A & B shall be in accordance with the VDOT Standard EC-1.
- Special Design Energy Dissipaters - shall consist of heavy rip rap or other structures designed to provide protection for the specific site conditions.

Table 5.3: Required Energy Dissipation Devices for Various Discharge Rates

Outlet Velocity (fps)	Culvert End Treatment	
	End Section	Endwall, or Headwall with Curtain Walls
0 - 6	None	None
6 - 10	EC-1 Type A	None
10 - 14	EC-1 Type A	EC-1 Type A
14 - 19	EC-1 Type B	EC-1 Type B
19+	Special Design	Special Design

SOURCE: *VDOT DRAINAGE MANUAL*

Figure 5.1: Pipe System Design



Design Criteria:

1. Storm drain design shall be in accordance with Chapter 4 of the VDOT Drainage Manual. Where design criteria conflict, Norfolk criteria in this manual shall take precedence.
2. Storm drain systems shall be designed to convey peak storm water flows based on the design storm required in Table 5.

~~2. Table 5.~~
3. ~~Table 5.~~3.
4. Maximum hydraulic grade line elevation for the design year storm shall not exceed curb flowline grade at inlet opening or manhole rim elevation.
5. Maximum spread shall be 7 ft. or one-half of the vehicle travelway in each direction for rainfall intensity of 3.5 in/hr.
6. Tailwater elevation, the initial outfall hydraulic grade, shall be the highest of:
    - elevation corresponding to 80% of outfall pipe diameter; or
    - elevation 1.7 (NAVD 88 with 92 adjustment, City of Norfolk 2000)

   For systems that outfall to Lake Whitehurst use a tailwater elevation of 5.5 (NAVD 88 92 adjustment).
7. Outfall erosion protection shall be in accordance with VDOT standards.
8. Proposed storm drain systems which convey public water through private properties shall have a drainage easement. Easement widths are calculated by methods described in Section 5.4.1 and shown on Figure 5.2. ·

Pipe Materials:

1. Storm drain pipes shall be reinforced concrete pipe.
2. Storm drain pipes in right-of-way and subject to vehicular traffic shall be VDOT Class III.
3. Other types of pipe materials may be considered by the City in non-traffic areas.
~~3.~~4. Minimum final depth of cover or all storm sewer pipes shall be two (2) feet. Where minimum cover cannot be obtained, increase the class of pipe subject to the written approval of the Department of Public Works.

Construction Standards:

1. Inlet structures, conduit, outfall structures, manholes and drainage components required to construct a system shall be in accordance with VDOT Road and Bridge Standards, Volumes I and II, latest edition.
2. When specified by the Department of Public Works, the storm drain system shall be constructed in accordance with Norfolk standards.

Open Channel Design:

Roadside ditches, median ditches and man- made channels that convey storm water runoff are classified as open channels.

Roadside and median ditches shall have an adequate capacity to convey a design year storm applicable to the type of roadway. A 2-year frequency storm shall be used in the design of the roadside or median ditch lining for erosion control.

Man-made drainage channels other than roadside ditches shall convey a minimum 10- year design storm. The channel lining shall also be designed for the 10-year frequency storm. The City may require a higher design storm frequency for man-made channels depending upon location, flood risk, future needs and environmental considerations.

In accordance with the policy of the Department of Public Works, Storm Water Management~~Operations~~ Division, natural channels shall not be modified or disturbed if possible. If a natural channel or floodplain encroachment is unavoidable, then a detailed environmental, regulatory, hydraulic and legal evaluation of such action shall be made.

There are several reasons why a ditch or channel should not be filled in and piped and they are listed below:

- The ditch may contain tidal wetlands and/or be a water of the United States or a state water and may require permits from natural resource agencies for impacts to the ditch.
- Pollutants in the storm water runoff are treated by filtration through the grass, infiltration

through the soil, and some settling of sediments.

- More runoff can be stored in a ditch than in a pipe system and this helps to prevent flooding of properties.
- Flow velocities are decreased by the vegetated lining in a ditch and this helps prevent erosion downstream.
- Natural habitat for wildlife is provided by the vegetated banks of ditches.

Some existing ditches may have erosion, sedimentation, and stagnant water problems that can be fixed by maintenance and repairs. If ditch health or safety problems cannot be solved by maintenance or repair, the Department of Public Works, Storm Water Management ~~Operations~~ Division will determine if the ditch should be piped.

Storm Water Detention:

BMP facilities such as retention or detention basins that are designed to improve storm water runoff quality may also be used to control the quantity of runoff. The BMP shall be designed to treat the required water quality volume and, for quantity control, it shall be sized for 10-year storm. A retention or detention basin shall also be checked so that a 100-year design storm can pass without flooding surrounding structures.

Maintenance:

The storm water system designer must address the considerations for maintenance of the system during the design phase of the project. These factors can be categorized as follows:

- Location
- Easements
- Landscaping

Location:

The location of storm water piping, manholes, BMPs and related structures shall be designed to take into account natural topography and runoff patterns. In no case will storm water be allowed to be redirected to another drainage area. Natural drainage courses shall be utilized wherever possible to convey treated runoff from the site. The designer should make an effort to maximize overland flow and vegetative filters as they improve the performance of the BMP.

Easements:

Proposed drainage systems which convey public storm water through private properties shall have drainage easements to provide access to the system. Subject to a minimum width of fifteen (15) feet, easement widths for pipes and closed culverts are calculated by:

W = 2d + D +2 (rounded to nearest 5')
Where: d = Depth to invert
D = Diameter of pipe or total width of closed culvert
W = Easement width in feet

Minimum easement widths for open ditches or culverts shall be calculated by:

W = Tw + 12
Where: Tw = Top width of ditch or culvert
W = Easement width in feet

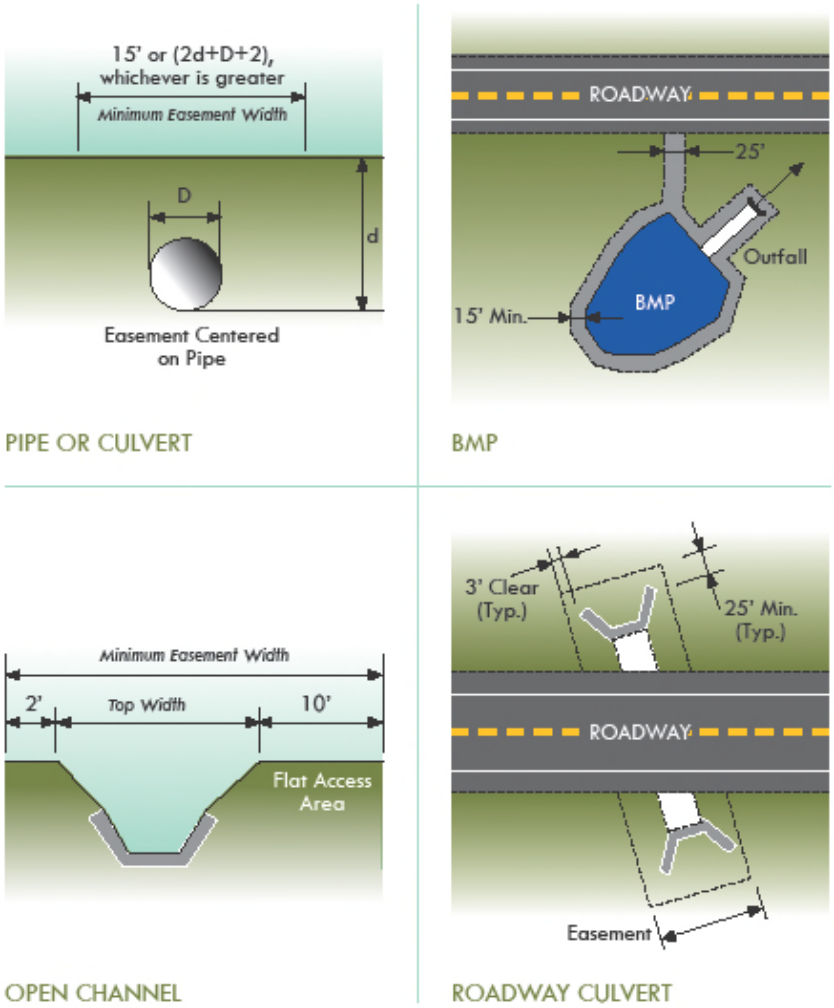
For culverts crossing roadway projects, the minimum easement shall be extended to 25 feet beyond the end of the culvert or wing wall structure.

BMPs which collect public storm water and are located on private properties shall have easements. A minimum 25-foot access easement from a paved, public street to the BMP shall be provided. In addition, a minimum 15-foot flat clear maintenance easement located-around the perimeter of the BMP shall be provided. Access from public or private streets shall be provided to allow maintenance of privately owned BMPs. See Figure 5.2 for easement dimensions.

Landscaping:

Landscaping in maintenance access zones shall be limited to grass and small caliper shrubs.

Figure 5.2: Easement Width Calculation



5.4.2 Coastal Plain Design Criteria

In addition to City of Norfolk specified design criteria, all BMPs proposed for use in the City of Norfolk shall incorporate all of the Coastal Plain design criteria specified in the Virginia BMP Clearinghouse. In addition, designers should consider the information contained in Section 1 of the Hampton Roads Planning District Commission Report *Land and Water Quality in Hampton Roads, Phase II, November 2013* contained in Appendix 3.

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CHAPTER 6.0 REQUIREMENTS FOR WATER QUALITY RETROFITS TO EXISTING SITES

Projects developed specifically to improve the quality of runoff leaving an existing developed site or from upstream developed areas and not designed to treat stormwater runoff from new land development or redevelopment will follow guidance developed by the Virginia Department of Environmental Quality for assessing MS4 compliance with the Chesapeake Bay Total Maximum Daily Load. In addition to BMPs listed on the Virginia Stormwater BMP Clearinghouse and techniques approved by the Chesapeake Bay Program, water quality retrofits may include, but are not limited to:

- Expansion or enhancement of existing storm water BMPs;
- Shoreline and buffer management;
- Stream restoration; and,
- Improvements to the storm water conveyance ditches, and wetland restoration.

While the DEQ guidance allows for flexibility in project design, projects are encouraged to meet the design standards of the Virginia Stormwater BMP Clearinghouse Manual to the extent practicable. Greater effort should be made to meet standards required by the City of Norfolk Design and Specification Manual and Section 1 of the Hampton Roads Planning District Commission Report *Land and Water Quality in Hampton Roads, Phase II, November 2013*. Construction of stormwater quality retrofit projects are not subject to the technical requirements of Part II B or Part II C of the regulations pertaining to post construction water quality; however, water quantity requirements must be maintained at the existing value. Projects exceeding 2,500 square feet must demonstrate compliance with erosion and sediment control Minimum Standard 19. Construction of water quality retrofits remain subject to all other regulations regarding land disturbing activities in the City of Norfolk.

6.1 Resilience Quotient

The Department of City Planning conducts inspections for the requirements of the Resilience Quotient during construction for Single Family Construction. The Department of Public Works, Department of Environmental Stormwater Management conducts routine inspections during construction for commercial/industrial properties, and post-construction inspections at a minimum of once every 5 years for the Resilience Quotient. Fulfilling the Resilience Quotient requirements, does not negate satisfying stormwater quantity requirements for the site.

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CHAPTER 7.0 LAND DISTURBANCE REQUIREMENTS

7.1 Required Bonds

All development subject to the City's site plan review process per Chapter 26 of the Zoning Ordinance is required to provide a performance bond for the stormwater infrastructure. Bonds shall be provided in the form of a surety bond, letter of credit, or escrow account, and will be collected by the Department of Public Works, Right-of-Way Division prior to the issuance of a land disturbing permit.

7.1.1 Bond Amount Calculation

The contractor is to provide an itemized cost estimate for all components of the stormwater infrastructure based on the City's approved stormwater bond estimate form. The bond estimate will be reviewed and approved by the Storm Water Engineer or his designee.

7.1.2 Inspection

Sites will be inspected by the Department of Public Works, Storm Water Management Division ~~Operations~~. Deficiency punch lists will be prepared, and sent back to the contractor for review and action. This process will continue until there are no longer any punch list items needing action. When the final site inspection and final cost estimates for the bonds are approved, and all re-inspections have resulted in no further punch list items, the bond can be released, a certificate of occupancy (CO) will be issued, and the site will enter the defect surety process.

7.1.3 Special Performance Security Bond

In most cases, a developer may request to use a Special Performance Surety Process to allow for incomplete items (final layer of asphalt, residential sidewalks, street trees and buffer plant materials [delayed due to inappropriate planting season, drought, etc.]) when releasing the bond. This process follows the performance bond process above, where cost estimates for incomplete items are reviewed and resubmitted for approval by the Storm Water Engineer or his designee. Once the surety bond has been accepted, the incomplete items should be completed within the first year of the two year Defect Bond period, with the remaining year of the defect period covering these items for faulty workmanship and materials.

7.1.4 Bond Release Procedures

Bonds will be released by the Department of Public Works, Right-Of-Way upon completion of a final inspection of the storm water infrastructure performed by the Storm Water Engineer or his designee, and submittal and final approval of construction record drawings and any other construction certifications to ensure that stormwater infrastructure installation was performed in accordance with the approved site plan by the Storm Water Engineer or his designee. For all stormwater infrastructure within the right-of-way, a copy of the CCTV must be submitted for review by the Storm Water Engineer or his designee prior to release of bond.

7.1.5 Defect Security Bond Process

Once a CO has been issued, a defect surety bond is to be submitted for review and approval by the Storm Water Engineer or his designee. The defect bond lasts for two years. At least 90 days prior to the

expiration of the defect bond, the site will be inspected by the Department of Public Works, Storm Water Management Division~~Operations~~. Deficiency punch lists will also be prepared, and sent back to the contractor for review and action. When the final site inspection has been completed with no further punch list items, and all of the Special Performance Surety Bond items have been completed, the defect bond is released / allowed to expire and all surety institutions are notified by the Department of Public Works, Right-of-Way Division.

Note: If part of the site within contributing drainage area served by the system does not have permanent stabilization for E&S control and/or storm water infrastructure is not 100% installed and functional, then the full bond will not be released and the project may be subject to partial bond release up to 1 year.

7.2 BMP Maintenance Agreement (Stormwater Declaration of Covenants)

The appropriate BMP maintenance agreement must be executed by the applicant and the City of Norfolk prior to site plan approval for all proposed permanent stormwater management features. It is recommended that the owner or agent submit the Declaration of Covenants to the Storm Water Management Division for review prior to submitting the document for execution. The appropriate BMP maintenance agreement templates contained in Appendix 5 shall be utilized by all applicants.

7.2.1 Maintenance Manual Required

The maintenance agreement must also include a site specific BMP maintenance manual specifying the frequency and scope of BMP inspections for each permanent BMP and detailing a schedule of maintenance for each of the proposed BMPs.

At a minimum, the manual shall contain the design plans depicting the size and location of drainage and maintenance easements, the sizing calculations for the BMPs, an inspection checklist for each BMP, any information on maintenance items or frequencies from the manufacturer of any BMP component and typical corrective action(s) for each inspection item on the checklist. Much of this information can be found on the Virginia BMP Clearinghouse website or from the manufacturer of a proprietary BMP.

7.2.2 Recordation

The property owner or his designee is responsible for recording the Declaration of Covenants at the Circuit Court Clerk's Office (150 St. Paul's Blvd., Norfolk, VA 23510) and for providing a copy of the recorded document and stamped Cover Sheet to the Department of Public Works, Storm Water Management Division; http://www.norfolk.gov/index.aspx?nid=1499. The applicant is required to pay all recordation fees associated with the BMP Maintenance Agreement (Stormwater Declaration of Covenants). ~~Executed BMP maintenance agreements are recorded by the Department of Public Works, Operations Division with the Clerk's Office of the Circuit Court of the City of Norfolk. The applicant is required to pay all recordation fees for BMP maintenance agreements.~~

7.2.3 Transfer

A BMP owner must notify the City when they transfer any of their ownership rights or responsibilities for the facility to another party. The owner shall supply the Department of Public Works, Storm Water Management~~Operations~~ Division with a copy of the document of transfer, executed by both parties and a copy the maintenance agreement acknowledged by both parties. Upon the City's receipt of the document to transfer, the conveying owner of the property will be released from all liability arising under the Declaration of Covenants subsequent to the date of conveyance.

7.3 Proof of Construction General Permit Coverage

All land disturbing activities that equal or exceed one acre (43,560 square feet), and land disturbing activities exceeding 2,500 square feet that are part of a larger common plan of development or sale, shall receive coverage under the general permit (VAR10).

7.3.1 Presentation of Coverage Letter

The Owner or Operator of a land disturbing activity subject to coverage under the general permit shall provide the Department of City Planning, Bureau of Environmental Services with a copy of the general permit coverage verification upon receipt by the Owner or Operator. Proof of coverage for regulated land disturbing activities is required to be presented prior to the issuance of a City of Norfolk land disturbance or fill permit.

For projects required to obtain coverage under the general permit, prior to land disturbance permit issuance, the applicant shall submit a complete stormwater pollution prevention plan containing all of the required elements found at 9 VAC 25-880-70 Part II to the Department of City Planning – Bureau of Environmental Services for review and initial approval.

7.3.2 Responsible Land Disturber Required

Prior to the issuance of the land disturbance permit or fill permit, a Responsible Land Disturber or individual holding a certificate of Erosion and Sediment Control Inspection must be named in accordance with Section 15-8 of the Code of the City of Norfolk.

7.3.3 Issuance of Land Disturbance Permit

Upon the applicant paying the required fee and providing proof of site plan approval where required, proof of stormwater management plan approval, proof of erosion and sediment control plan approval or, for single family residences, an executed agreement in lieu of an erosion and sediment control plan and, where required, an agreement in lieu of a stormwater management plan, the designation of a Responsible Land Disturber (RLD), a copy of proof of coverage under the VSMP Construction General permit if applicable, completed land disturbance permit application, proof of the purchase of non-point nutrient offsets if applicable and upon review and approval of the project SWPPP by the Department of Planning – Bureau of Environmental Services, a land disturbance permit shall be issued.

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CHAPTER 8.0 CONSTRUCTION PHASE INSPECTIONS AND MAINTENANCE

8.1 Pre-Construction Conference

After issuance of the land disturbing permit and after the establishment of initial erosion and sediment control measures, the identified Responsible Land Disturber must schedule a pre-construction conference with the Department of City Planning, Bureau of Environmental Services. Staff from the Department of Public Works, Storm Water Management~~Operations~~ Division will attend the pre-construction conference where there are permanent stormwater management facilities proposed or where public stormwater infrastructure will be installed including where proposed connections between private and public stormwater conveyance systems will be made.

The pre-construction conference is held at the project site and a review of the approved erosion and sediment control and stormwater management plans is conducted with the owner, contractor and/or Responsible Land Disturber. In addition, the project stormwater pollution prevention plan (SWPPP) (if applicable) is again reviewed for compliance

8.2 Construction General Permit Stormwater Pollution Prevention Plan Review

Each land disturbing activity receiving general permit coverage from the Commonwealth is required to develop, implement, maintain and update a project specific stormwater pollution prevention plan (SWPPP) for the land disturbing activity. The SWPPP shall contain the elements listed in 9 VAC 25-870-54 of the Regulations and the requirements of the general permit found at 9 VAC 25-880-70.

For projects required to obtain coverage under the general permit, prior to land disturbance permit issuance, the applicant shall submit a complete stormwater pollution prevention plan containing all of the required elements found at 9 VAC 25-880-70 Part II to the Department of City Planning – Bureau of Environmental Services for review and initial approval.

During project construction, City staff shall periodically review the project stormwater pollution prevention plan. Failure to have a complete SWPPP on site during construction or failure to implement the SWPPP or approved stormwater management or erosion and sediment control plans may result in the issuance of a "STOP WORK" order for the site until the SWPPP is deemed complete by the Department of City Planning, Bureau of Environmental Services during project construction.

8.2.1 Modification to a Stormwater Pollution Prevention Plan

The project SWPPP must be amended when, at the discretion of the City of Norfolk, there is a change in design, construction, operation or maintenance that has significant effect on discharge of pollutants not addressed by existing SWPPP.

8.2.2 Maintenance of the SWPPP by the Operator

The SWPPP must be maintained by the operator at a central location onsite. If an onsite location is unavailable, a notice of the SWPPP's location must be posted at a location visible from the public right of

way near the main entrance at the construction site listing the location of the SWPPP and the name and contact number for the operator.

8.3 Pollution Prevention Plan Required

Each land disturbing activity requiring coverage under the general permit shall develop, implement and maintain a plan for implementing pollution prevention measures during construction activities.

8.3.1 Pollution Prevention Plan Contents

The pollution prevention plan shall detail the design, installation, implementation, and maintenance of effective pollution prevention measures to minimize the discharge of pollutants. At a minimum, the pollution prevention plan must:

1. Describe measures and practices implemented to minimize discharge of pollutants from equipment and vehicle washing, wheel wash water and other wash waters. Wash waters must be treated prior to discharge;

2. Describe measures and practices implemented to minimize exposure of all materials on site to precipitation and stormwater;

3. Describe measures and practices implemented to minimize discharge of pollutants from spills and leaks and implement chemical spill and leak prevention and response procedures;

4. Describe the measures and practices implemented to prohibit wastewater from washout of concrete, unless managed by appropriate control;

5. Describe the measures and practices implemented to prohibit wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, and other construction materials;

6. Describe the measures and practices implemented to prohibit discharges of fuels, oils or other pollutants used in vehicle/equipment operation/ maintenance;

7. Describe the measures and practices implemented to prohibit discharges of soaps or solvents used in vehicle/equipment washing;

Discharges from dewatering activities are prohibited unless managed by appropriate controls. Dewatering controls shall be selected based on the pollutants contained in the dewatering discharge. Pollutants expected in dewatering discharges (including sediment) should be described in the pollution prevention plan and appropriate controls for each identified pollutant described.

8.3.2 Pollution Prevention Plan Review

Staff from the Department of City Planning Bureau of Environmental Services will review the site pollution prevention plan during the SWPPP review, at the preconstruction meeting and then periodically during construction activities.

8.3.3 Modification and Update to Pollution Prevention Plan

Where staff determines the pollution prevention plan is inadequate to either minimize or prohibit the discharge of pollution with stormwater runoff in accordance with Section 8.2.1, the plan shall be amended

and additional measures or practices added to the site and their installation, inspection and maintenance described in the pollution prevention plan.

8.4 Land Disturbance and Construction General Permit Inspections

Staff from the Department of City Planning, Bureau of Environmental Services and the Department of Public Works, Storm Water Management~~Operations~~ Division conduct periodic inspections of active construction projects to determine site compliance with the Regulations and Code of the City of Norfolk. All single family homes subject to an approved Stormwater Management Plan or an executed Agreement in Lieu of a Stormwater Management Plan will be inspected for compliance with the provision of the Plan or Agreement by the Department of Public Works, Storm Water Management Division. Inspections will review site compliance with erosion and sediment control plan and stormwater management plan, implementation and updating of the pollution prevention plan and development and implementation of additional control measures to address an approved total maximum daily load (TMDL) implementation plan.

8.5 Corrective Action Policy

Failure to comply with the land disturbance permit; approved erosion and sediment control, stormwater management, stormwater pollution prevention or pollution prevention plans; or, the general permit may result in an unauthorized discharge and a violation of local, state and federal laws and regulations.

If the City determines that an unauthorized discharge has occurred from a construction activity, it must be contained so that it will not flow from the site or enter groundwater, even if this requires removal, treatment, and disposal of onsite or offsite soil.

Any observed violations of approved plans or issued permits excluding the need for performing routine maintenance to existing silt fence, existing inlet protection, and an existing construction entrance will be considered a violation against the site. Unauthorized discharges from failed erosion and sediment control measures or stormwater pollution prevention measures are violations of the Code of the City of Norfolk.

If violations are noted during the duration of construction then a summons may be issued in accordance with Chapter 15-11 of the Code of the City of Norfolk - Erosion and Sediment Control Ordinance which is a class one misdemeanor punishable by not more than 12 months in prison and / or a $2,500 per day fine. Each day of non-compliance shall constitute a separate offence. Discharges that occur in an egregious manner may result in the issuance of an immediate notice of violation, stop work order or summons.

If unauthorized discharges from construction activity occur other than those in violation of Chapter 15 of the Code of the City of Norfolk including but not limited to the discharge of oil, petroleum or lubricants form vehicle fueling or maintenance, paint waste and wash out water, concrete washout rinse water or concrete residue, etc., the responsible party will be in violation of Chapter 41.1-4 of the Code of the City of Norfolk - Pollution of the Storm Water System which is a class one misdemeanor, punishable by a $2,500/day fine.

In addition to these remedies, the City of Norfolk reserves the right to utilize all authorities granted under 9 VAC 25-870-116 of the Regulations, §62.1-44.15:37 and §62.1-44.15:49 of the Code of Virginia and the Norfolk City Code.

Additionally, the responsible party will be required to clean the spill or discharge. If the responsible party fails to mitigate the discharge, the City of Norfolk will abate the spill/discharge and charge the responsible party for any clean-up costs associated with the release.

8.6 Permanent Stormwater Management Facility Construction Inspections

The Department of Public Works, Storm Water Management ~~Operations~~ Division shall be contacted at least two working days prior to the intended inspection date for scheduling the inspection of the construction of permanent stormwater management facilities that receive, treat or convey public water or the tie-in point from a private conveyance and/or treatment system and the public stormwater system. The frequency of construction phase stormwater infrastructure inspections will be established at the pre-construction conference and the specific structures and items requiring City inspection will be provided to the contractor by the City.

8.7 Construction Record Drawings and Record Certifications

Two (2) hard copies and one (1) electronic copy of construction record drawings for permanent stormwater management facilities shall be submitted to the Department of Public Works, Storm Water Management~~Operations~~ Division in accordance with 9 VAC 25-870-108 and 9 VAC 25-870-112. The construction record drawing shall be appropriately sealed and signed by a professional registered in the Commonwealth of Virginia, and contain a certification statement attesting that the stormwater management facilities have been constructed in accordance with the approved stormwater management plan. The certification shall also contain a table of actual volumes at the completion of construction for all stormwater practices using retention or detention as a treatment mechanism.

For wet ponds, the survey shall include both topography of the area within the pond maintenance area as well as the bathymetry of the completed pond.

For infiltration and bioretention facilities, the as-built survey shall include a post-construction infiltration test calculating the rate of infiltration in inches per hour (in/hr) within the feature soil media and immediately below the bottom of the feature in the substrate.

For manufactured BMPs, submit manufacturer supplied activation letters certifying that the BMP was installed and activated per manufacturer standards and specifications.

8.8 Submittal of Proof of Construction General Permit Notice of Termination

Prior to the release of the stormwater performance bond for a project with general permit coverage, the permit holder must submit a copy of the completed Notice of Termination form submitted to the Department of City Planning – Bureau of Environmental Services.

CHAPTER 9.0 POST CONSTRUCTION STORMWATER MANAGEMENT FACILITY INSPECTION AND MAINTENANCE

9.1 Inspection Frequency

All non-proprietary permanent stormwater management facilities, including conservation management areas, except those on a single family lot serving that lot alone, shall be inspected at least once every five years by the Department of Public Works, Storm Water Management~~Operations~~ Division. An owner of a single family lot with a stormwater management facility on the lot shall ensure that the facility continues to function in accordance with its original design and shall comply with the conditions recorded on the plat and contained in the declaration of covenants on file with the City.

Owners of proprietary BMPs, including underground detention/infiltration structures and pervious pavement/pavers/asphalt, shall submit maintenance certifications and the results of infiltration testing performed in accordance with the provisions of "Appendix 4B – Encased Falling Head Infiltration Testing Procedure for use in the City of Norfolk" to the Department of Public Works, Storm Water Management~~Operations~~ Division at the frequency specified by the manufacturer but not less than once every five years. Site inspections will occur at least once every 5 years by the Department of Public Works, Division of Environmental Stormwater Management.

All single family homes subject to an approved Stormwater Management Plan or an executed Agreement in Lieu of a Stormwater Management Plan will be inspected for compliance with the provisions of the Plan or Agreement by the Department of Public Works, Storm Water Management Division."

9.2 Certification of Inspection Reports

Inspection reports required to be submitted by proprietary BMP owners in Section 9.1 shall be signed by either an individual holding a valid stormwater management inspector certification from the Virginia Department of Environmental Quality, by a Virginia licensed professional engineer, architect, land surveyor or landscape architect or by a person who works under the direction and oversight of the licensed professional engineer, architect, landscape architect, or land surveyor provided the inspection report is signed and sealed by the licensed professional overseeing the inspector.

9.3 Stormwater Management Facility Corrective Action Plans

Deficiencies identified through the performance of an inspection shall be corrected by the owner of the facility to restore its design and function to that which meets or exceeds the design contained in the approved facility certified record drawing in accordance with the recorded declaration of covenants and Chapter 41.1-5 of the Code of the City of Norfolk, Virginia. In the event that the Director of Public Works determines that emergency maintenance to a stormwater management facility is needed to protect the health, safety and general welfare of the citizens of the City of Norfolk, it will be undertaken by the Department of Public Works, Storm Water Management~~Operations~~ Division in accordance with the provisions of the BMP Maintenance Agreement.

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CHAPTER 10.0 EXCEPTIONS FROM THE STORMWATER MANAGEMENT REQUIREMENTS

10.1 Procedure for Requesting an Exception

Exception requests to the requirements of the stormwater management requirements shall be submitted in writing as part of the stormwater management plan during the plan review process.

10.2 Exception Request Evaluation

An exception may be granted provided that:

a. the exception is the minimum necessary to afford relief,

b. reasonable and appropriate conditions shall be imposed as necessary upon any exception granted so that the intent of the Act and the Regulations are preserved,

c. granting the exception will not confer any special privileges that are denied in other similar circumstances, and

d. exception requests are not based upon conditions or circumstances that are self-imposed or self-created.

Economic hardship alone is not sufficient reason to grant an exception from the requirements of the stormwater management requirements.

Under no circumstance shall an exception to the requirement that the regulated land-disturbing activity obtain required state permits, nor shall an exception be granted to approve the use of a BMP not found on the Virginia Stormwater BMP Clearinghouse Website.

Exceptions to requirements for phosphorus reductions shall not be allowed unless offsite options available through 9 VAC 25-870-69 have been considered and found not available.

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CHAPTER 11.0 HEARINGS AND APPEALS

11.1 Hearings

Any permit applicant or permittee aggrieved by any action associated with this manual by a City representative without a formal hearing, or by inaction of the City representative, may request in writing a formal hearing by the VSMP Authority Hearing Board. The VSMP Authority Hearing Board will be made up of members of the City of Norfolk Planning and Public Works Departments consisting of the Environmental Services Bureau Manager (Chair), Storm Water Senior Construction Project Manager, Storm Water Civil Engineer III, and Zoning Administrator or their designees. A verbatim record of the hearing will be recorded by the City and maintained in the project file by the Department of Planning, Bureau of Environmental Services.

A written petition requesting a hearing must be filed with the Department of Planning, Bureau of Environmental Services Bureau Manager within 30-days of the action. Failure to submit a written petition within the timeframe specified by this section shall constitute unconditional acceptance of the action of the City.

The petition submitted by the aggrieved party and the testimony of witnesses, including City staff members, will be presented at the next scheduled VSMP Authority Hearing Board. Board hearings will be scheduled within 30-business days from receipt of a petition. Follow-up investigations will be conducted, where necessary, by the Department of Planning, Bureau of Environmental Services Bureau Manager. The Hearing Board will offer a majority rule decision on the matter and provide the decision in writing to the aggrieved party. This written decision will be retained as part of the record. The applicant or Department impacted may appeal the decision of the VSMP Authority Board.

11.2 Appeal of Decision

Any permit applicant or permittee, or person subject to the requirement of this manual, including City staff, aggrieved by any decision of the VSMP Authority Hearing Board process may appeal the decision in writing to the Director of Public Works or his designee.

The Director will schedule a hearing within 15-business days after receiving the formal petition for appeal. The review will be based upon a review of the record from the formal hearing and argument of the parties to the appeal. The decision made by the Director or his designee shall be provided in writing to the party filing the appeal.

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CHAPTER 12.0 APPENDICES

Appendix 1: Engineering Calculations

1A – Appendix 11-A VSWMH HCS Soil Group by Soil Series

1B – Appendix 11-B VSWMH - Rainfall Depths in Virginia

Recommend replacing hardcopy tables with a hyperlink to NOAA Atlas 14

1C– Appendix 11-C VSWMH – Rainfall-Runoff Curves for Selected CN

1D – Virginia Runoff Reduction Method (VRRM) Worksheets

Note: All VRRM calculations shall be performed using the 2011 Virginia Clearinghouse Standards. The most current version of the worksheets may be found at https://swbmp.vwrrc.vt.edu/vrrm/

~~1E – Norfolk Guidance Calculation Procedure Worksheets~~

Appendix 2: Norfolk Standard Notes and Details

2A – Norfolk Standard Engineering Details

Replace existing document with either a hardcopy of or a hyperlink to NCDS2021.12

2B – Norfolk Standard Notes

ADD:

THE CONTRACTOR SHALL PROMPTLY NOTIFY THE NORFOLK FIRE MARSHALL'S OFFICE, NDRC, AND VDEQ OF ANY CHEMICAL SPILLS IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REPORTING REQUIREMENTS.

COMPLIANCE WITH VSMP REQUIREMENTS DOES NOT ABSOLVE THE CONTRACTOR FROM COMPLIANCE WITH OTHER LOCAL, STATE, AND FEDERAL REGULATORY REQUIREMENTS AND PERMITS.

ALL NEW CURBS RECEIVING FLOW SHALL HAVE INTEGRAL CURB AND GUTTER AS PROVIDED IN THE NORFOLK CITY DESIGN STANDARDS.

ALL STORM DRAINAGE SHALL BE INSTALLED TO WITHIN 0.1 FEET (ONE-TENTH OF ONE FOOT) OF THYE ELEVATION SHOWN ON THE PLAN, OR AS SPECIFIED IN WRITING BY THE CITY.

MINIMUM STORM SEWER SLOPES INDICATED ON THE PLANS ARE ABSOLUTE MINIMUMS. LESSER SLOPES WILL NOT BE ACCEPTED UNLESS IN WRITING BY THE CITY.

CONTRACTOR TO BE RESPONSIBLE FOR ALL CORRECTION COSTS (I.E. PLAN REVISION, PHYSICAL CORRECTION, ETC.) REQUIRED AS A RESULT OF NONCOMPLIANCE WITH THE TOLERANCES STATED HEREIN.

ALL STORM SEWER PIPES, MANHOLES, AND CURB INLETS SHALL BE CLEANED OF DEBRIS AND ERODED MATERIALS DURING THE FINAL STAGES OF CONSTRUCTION.

ALL STORM DRAINAGE FEATURES SHALL BE COMPLETED AS SOON AS FEASIBLE IN THE CONSTRUCTION SCHEDULE.

TEMPORARY DRAINAGE DURING CONSTRUCTION SHALL BE PROVIDED BY THE CONTRACTOR TO RELIEVE AND PREVENT FLOODING IN AREAS THAT MAY CAUSE DAMAGE OR NUISANCE TO ROADWAYS AND PRIVATE PROPERTY.

PRECAST STRUCTURES SHALL BE BUILT AND ASSEMBLED IN ACCORDANCE WITH CITY OF NORFOLK STANDARDS AND SPECIFICATIONS AND OTHER APPLICABLE STANDARDS.

ALL NEW DRAINAGE STRUCTURES SHALL HAVE VDOT STD. IS-1 INLET SHAPING.

WHERE DRAINAGE PIPE IS SUBJECTED TO VEHICULAR LOADING, REINFORCED CONCRETE PIPE (RCP), CLASS III MINIMUM, SHALL BE UTILIZED. NON-RCP PIPE MAY BE UTILIZED OUTSIDE OF TRAFFIC AREAS WHEN APPROVED IN WRITING BY THE DEPARTMENT OF PUBLIC WORKS, STORM WATER MANAGEMENT DIVISION.

ALL METAL PIPES CULVERTS AND STORM SEWERS SHALL BE INSTALLED IN ACCORDANCE WITH DRAWING PB-1 OF THE VIRGINIA DEPARTMENT OF TRANSPORTATION ROAD AND BRIDGE STANDARDS.

ALL STORM SEWER PIPE JOINTS SHALL BE INSTALLED SILT FREE, SHALL BE WRAPPED AS DETAILED IN THE NORFOLK CITY DESIGN STANDARDS (NCDS2021.12), AND SECURED IN PLACE PRIOR TO BACKFILLING.

ALL BMPS SHOULD BE KEPT FREE FROM BOTH PRIVATE AND PUBLIC UTILITIES., UTILITIES ENCROACHING UPON BMPS SHALL BE RELOCATED WHEN DIRECTED BY THE DEPARTMENT OF PUBLIC WORKS, STORM WATER MANAGEMENT DIVISION.

ALL SITE DRAINAGE MUST BE DIRECTED TO THE CITY RIGHT-OF-WAY, AN APPROVED CITY-MAINTAINED DRAINAGE SYSTEM, NATURAL WATERWAY, OR TO WATERS OF THE UNITED STATES.

TEMPORARY DRAINAGE DURING CONSTRUCTION SHALL BE PROVIDED BY THE CONTRACTOR TO RELIEVE AREAS THAT MAY CAUSE DAMAGE TO ROADWAYS OR PRIVATE PROPERTY.

THE STORMWATER MANAGEMENT/BMP FACILITY AND ASSOCIATED STORMWATER CONVEYANCE SYSTEMS FOR THIS PROJECT REQUIRE THE SUBMISSION, REVIEW, AND APPROVAL BY THE DEPARTMENT OF PUBLIC WORKS, STORM WATER MANAGEMENT DIVISION OF A RECORD DRAWING (AS-BUILT) AND CONSTRUCTION CERTIFICATION PRIOR TO RELEASE OF THE CO. RECORD DRAWING AND CONSTRUCTION CERTIFICATION IS REQUIRED TO BE RECORDED AND CHECKED BY A LICENSED SURVEYOR.

THE CONTRACTOR SHALL PROVIDE PROJECT RECORD DRAWINGS, INCLUDING BMP DRAWINGS, IN BOTH HARDCOPY FORMAT AND IN AN ELECTRONIC FORMAT ACCEPTABLE TO THE DEPARTMENT OF PUBLIC WORKS, STORM WATER MANAGEMENT DIVISION.

CONTRACTOR TO CONTACT DEPARTMENT OF PUBLIC WORKS STORM WATER MANAGEMENT DIVISION AT 823-4089 (48-HOUR NOTICE) FOR PRE-CONSTRUCTION CONFERENCE AND INSPECTION REQUIREMENT WHEN A BMP IS PROPOSED AND/OR TIE-IN TO THE CITY STORM DRAIN SYSTEM IS PLANNED.

TO THE EXTENT PRACTICAL, CONSTRUCT SIDEWALKS TO AVOID CONFLICTS WITHIN THE PAVEMENT TO INCLUDE MANHOLES, HANDHOLES, SANITARY CLEANOUTS, AND WATER MAIN VALVES. INCLUDE PROVISIONS FOR CONVEYING DOWNSPOUT FLOWS BENEATH OR THROUGH SIDEWALKS.

TO THE EXTENT PRACTICAL, BMPS HAVING AN INFILTRATION FUNCTION, INCLUDING POROUS PAVEMENTS, SHOULD BE PROTECTED FROM COMPACTION FROM CONSTRUCTION ACTIVITIES AND PERSONNEL.

TREES SHOULD BE SELECTIVELY REMOVED AND ONLY AS NECESSARY FOR GRADING ASSOCIATED WITH THE PROJECT AND AS SPECIFIED IN THE APPROVED E&S PLAN.

MINIMUM FINAL HEIGHT OF COVER OR ALL STORM SEWER PIPES SHALL BE TWO (2) FEET. WHERE MINIMUM COVER CANNOT BE OBTAINED, INCREASE THE CLASS OF PIPE SUBJECT TO THE WRITTEN APPROVAL OF THE DEPARTMENT OF PUBLIC WORKS.

SITES WHICH DIRECTLY DISCHARGE INTO LAKE WHITEHURST OR LAKE WRIGHT ARE REQUIRED TO PROVIDE 100% ON-SITE WATER QUALITY TREATMENT PER DIRECTIVE FROM THE DEPARTMENT OF UTILITIES. THE PURCHASE OF OFF-SITE NUTRIENT CREDITS WILL NOT BE ALLOWED.

FOR PROJECTS REQUIRING THE PURCHASE OF WATER QUALITY CREDITS, MODIFY THE FOLLOWING NOTE ACCORDINGLY AND PLACE ON THE PROJECT COVER SHEET IN BOLD TEXT:

> CREDITS TOTALING X LB/YEAR OF TOTAL PHOSPHORUS (TP) HAVE BEEN PURCHASED FROM XYZ BANK TO FULFILL PROJECT WATER QUALITY REQUIREMENTS.

Appendix 3: Section 1 from the Hampton Roads Planning District Commission Report *Land and Water Quality in Hampton Roads, Phase II, November 2013*

Appendix 4: Approved Stormwater Management Practices

4A – Norfolk Modifications to the Approved Virginia BMP Clearinghouse Practices

4B – Encased Falling Head Infiltration Testing Procedure for use in the City of Norfolk

4C – DEQ Guidance Memo 21-2007

Appendix 5: BMP Maintenance Standards

5A – Standard Declaration of Covenants (BMP Maintenance Agreement)

5B – Subdivision Declaration of Covenants

5C – Pollutant Reduction Declaration of Covenants

~~5D – BMP Inspection Agreement~~

5D~~E~~ – Appendix 9-C VSWMH Sample BMP Inspection Checklists

Appendix 6: Norfolk Sample Forms

6A – Land Disturbance Permit Application

Recommend replacing hardcopies with hyperlinks to the most recent documents.

6B – Agreement in Lieu of a Erosion and Sediment Control Plan

6C – Stormwater Pre-Construction Checklist

6D – Stormwater Best Management Practice Reporting Form

Appendix 7: Stormwater Program Fees (As set forth annually by the Norfolk City Council)

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