County of Prince Edward

Stormwater Management Program

Agreement in lieu of a Stormwater Management Plan

Date: _____ E-Permitting Number: _____

This Agreement in lieu of a stormwater management plan (Agreement) is hereby submitted by the Owner to specify the methods that will be implemented to comply with the applicable stormwater management requirements for the construction of a single-family residence. The methods to be utilized here in shall apply the stormwater management technical criteria set forth in Section 1-8 of the Prince Edward County Stormwater Ordinance to the entire land-disturbing activity and shall consider all sources of surface runoff and all sources of subsurface and groundwater flows converted to surface runoff. Compliance with this Agreement shall be deemed to satisfy the requirements of 9VAC50-60-55(B)(1-8).

PART I: CONTACT INFORMATION

Owner: _____

Address: _____

_____

Phone: _____

Tax and/or Parcel No.: _____

PART II: SITE INFORMATION

Narrative description of current site conditions

_____

_____

_____

Narrative description of final site conditions

_____

_____

_____

PART III PROPOSED STORMWATER MANAGEMENT FACILITIES

In accordance with Section 1-6(a)(4)(and (5) of the Prince Edward County Stormwater Ordinance, the Stormwater Management Best Management Practices (BMPs) and the conservation measures denoted below will be used by the Owner to manage the quality and quantity of stormwater runoff from the site. The standards and specifications for these stormwater practice BMPs can be found on the Stormwater BMP Clearinghouse Website and are described in the Appendix.

Conservation Measure for Stormwater Management	**Implemented by Owner on the Residential Lot**	**Location, including geographic coordinates (where applicable)**	**Acres Treated**	**Surface waters or karst features, if present, into which the facility will discharge**
Maximize native vegetation (trees, shrubs, etc.) on the site				
Minimize impervious cover (roof, driveway, patio, sheds, etc.) area on the site				
Minimize lawn and other grassy areas on the site				
Stabilize all denuded areas within seven (7) days of final grading with vegetative cover suitable for time of year				
Stormwater runoff leaving the site is directed to an adequate channel (natural and/or manmade)				

Stormwater Management Best Management Practice (BMP)	**Implemented by Owner on the Residential Lot**	**Location, including geographic coordinates (where applicable)**	**Acres Treated**	**Surface waters or karst features, if present, into which the facility will discharge**
Stormwater runoff leaving the site is directed to a Subdivision/Community BMP**				
Stormwater Practice #1: Rooftop Disconnection				
Stormwater Practice #2: Sheet Flow to Filter/Open Space				
Stormwater Practice #3: Grass Channel				
Stormwater Practice #4: Soil Amendments				
Stormwater Practice #6: Rainwater Harvesting				
Stormwater Practice #7: Permeable Pavement				
Stormwater Practice #8: Infiltration				
Stormwater Practice #9: Bioretention				
Stormwater Practice #10: Dry Swale				
Stormwater Practice #11: Wet Swale				
Stormwater Practice #12: Filtering Practice				
Stormwater Practice #14: Wet Pond				

**** If stormwater runoff leaving the site is directed to a subdivision/community BMP, no other BMP may be required.**

PART IV WATER QUALITY and WATER QUANTITY COMPUTATIONS

The implementation of the above designated Conservation Measures and Stormwater Management BMPs is deemed to achieve and meet the water quality and water quantity requirements of the Stormwater Management Ordinance and the Virginia Runoff Reduction Method spreadsheet. In addition, the implementation of the above designated Conservation Measures and Stormwater Management BMPs is deemed to achieve and meet all requirements of a Pollution Prevention Plan.

PART V LONG-TERM MAINTENANCE

Description of how the BMPs (in Section III) will be operated and maintained once complete:_____
_____
_____
_____

PART VI CERTIFICATION

I, _____, the Owner, agree to implement the stormwater management BMPs and conservation measures denoted above on my residential lot in accordance with the terms of this Agreement. In addition, I agree to install the denoted stormwater management BMPs per the standards and specifications for each practice located on the Virginia Stormwater BMP Clearinghouse Website. I further agree that long-term maintenance of these BMPs shall be conducted as set forth herein.

I understand that the failure to implement the above denoted stormwater management BMPs and conservation measures per the standards and specifications shall be a violation of the County's Stormwater Management Ordinance. If the County's Inspector identifies needed corrective action(s) and establishes a deadline(s) for the corrective action(s), I shall implement the needed corrective action(s) by the established deadline(s).

If I fail to meet the correction action deadline(s), the Program Administrator may issue a Stop Work Order on the project and a formal Stormwater Management Plan, per the County's Stormwater Management Ordinance, shall be developed and submitted.

Owner: _____

Date: _____

Program Administrator: _____

Date: _____

Plan Reviewer: _____

Date: _____

APPENDIX: GENERAL BMP DESCRIPTION

The stormwater management practices listed in the above table can be found on the Virginia Stormwater Management BMP Clearinghouse Webpage at http://vwrrc.vt.edu/swc/NonProprietaryBMPs.html. A brief description of each practice follows:

Stormwater Practice #1: Rooftop Disconnection

Simple Description: Water from the roof of the house is released to the grassy areas of the yard.

Website Description: This strategy involves managing runoff close to its source by intercepting, infiltrating, filtering, treating or reusing it as it moves from the impervious surface to the drainage system. Two kinds of disconnection are allowed: (1) simple disconnection, whereby rooftops and/or on-lot residential impervious surfaces are directed to pervious areas, and (2) disconnection leading to an alternative runoff reduction practice(s) adjacent to the roof. Alternative practices can use less space than simple disconnection and can enhance runoff reduction rates.

Stormwater Practice #2: Sheet Flow to Open Space

Simple Description: Water from the yard and/or driveway is released to the areas of natural vegetation (trees, shrubs, etc.) not removed from the site when the lot was graded.

Website Description: Filter strips are vegetated areas that treat sheet flow delivered from adjacent impervious and managed turf areas by slowing runoff velocities and allowing sediment and attached pollutants to settle and/or be filtered by the vegetation. The two design variants of filter strips are (1) *Conserved Open Space* and (2) designed *Vegetated Filter Strips*. The design, installation, and management of these design variants are quite different, as outlined in the specification.

In both instances, stormwater must enter the filter strip or conserved open space as sheet flow. If the inflow is from a pipe or channel, an engineered level spreader must be designed in accordance with the criteria contained herein to convert the concentrated flow to sheet flow.

Stormwater Practice #3: Grass Channel

Simple Description: Water from the yard, house and/or driveway is released to a grass-lined ditch.

Website Description: Grass channels can provide a modest amount of runoff filtering and volume attenuation within the stormwater conveyance system resulting in the delivery of less runoff and pollutants than a traditional system of curb and gutter, storm drain inlets and pipes. The performance of grass channels will vary depending on the underlying soil permeability. Grass channels, however, are not capable of providing the same stormwater functions as dry swales as they lack the storage volume associated with the engineered soil media. Their runoff reduction performance can be boosted when compost amendments are added to the bottom of the swale. Grass channels are a preferable alternative to both curb and gutter and storm drains as a

stormwater conveyance system, where development density, topography and soils permit. Grass channels can also be used to treat runoff from the managed turf areas of turf-intensive land uses, such as sports fields and golf courses, and drainage areas with combined impervious and turf cover (e.g., roads and yards).

Stormwater Practice #4: Soil Amendments

Simple Description: Compost material is rototilled into the yard and a vegetative cover (grass) is planted.

Website Description: Soil restoration is an Environmental Site Design (ESD) practice applied after construction, to deeply till compacted soils and restore their porosity by amending them with compost. These soil amendments can reduce the generation of runoff from compacted urban lawns and may also be used to enhance the runoff reduction performance of downspout disconnections, grass channels, and filter strips.

Stormwater Practice #6: Rainwater Harvesting

Simple Description: Water from the roof is collected in a container (plastic drum) and saved to water shrubs, flowers or a garden. The water may be released from the container shortly after the rainfall has ended.

Website Description: Rainwater harvesting systems intercept, divert, store and release rainfall for future use. The term rainwater harvesting is used in this specification, but it is also known as a cistern or rainwater harvesting system. Rainwater that falls on a rooftop is collected and conveyed into an above- or below-ground storage tank where it can be used for non-potable water uses and on-site stormwater disposal/infiltration. Non-potable uses may include flushing of toilets and urinals inside buildings, landscape irrigation, exterior washing (e.g. car washes, building facades, sidewalks, street sweepers, fire trucks, etc.), fire suppression (sprinkler) systems, supply for chilled water cooling towers, replenishing and operation of water features and water fountains, and laundry, if approved by the local authority. Replenishing of pools may be acceptable if special measures are taken, as approved by the appropriate regulatory authority.

In many instances, rainwater harvesting can be combined with a secondary (down-gradient) runoff reduction practice to enhance runoff volume reduction rates and/or provide treatment of overflow from the rainwater harvesting system.

Stormwater Practice #7: Permeable Pavement

Simple Description: The driveway or parking area is not compacted and constructed of small blocks that are not set in concrete (grouted) that allows water to drain through the blocks into the ground.

Website Description: Permeable pavements are alternative paving surfaces that allow stormwater runoff to filter through voids in the pavement surface into an underlying stone reservoir, where it is temporarily stored and/or infiltrated. A variety of permeable pavement surfaces are available, including **pervious concrete**, **porous asphalt** and permeable **interlocking**

concrete pavers. While the specific design may vary, all permeable pavements have a similar structure, consisting of a surface pavement layer, an underlying stone aggregate reservoir layer and a filter layer or fabric installed on the bottom.

The thickness of the reservoir layer is determined by both a structural and hydrologic design analysis. The reservoir layer serves to retain stormwater and also supports the design traffic loads for the pavement. In low-infiltration soils, some or all of the filtered runoff is collected in an underdrain and returned to the storm drain system. If infiltration rates in the native soils permit, permeable pavement can be designed without an underdrain, to enable full infiltration of runoff. A combination of these methods can be used to infiltrate a portion of the filtered runoff.

Stormwater Practice #8: Infiltration

Simple Description: Water from the roof or driveway is directed into a dug trench that is filled with a compost material and the water is filter by the compost before entering the ground.

Website Description: Infiltration practices use temporary surface or underground storage to allow incoming stormwater runoff to exfiltrate into underlying soils. Runoff first passes through multiple pretreatment mechanisms to trap sediment and organic matter before it reaches the practice. As the stormwater penetrates the underlying soil, chemical and physical adsorption processes remove pollutants. Infiltration practices have the greatest runoff reduction capability of any stormwater practice and are suitable for use in residential and other urban areas where *measured* soil permeability rates exceed 1/2 inch per hour. To prevent possible groundwater contamination, infiltration should not be utilized at sites designated as stormwater hotspots.

Stormwater Practice #9: Bioretention

Simple Description: Water is directed and released into a excavated (dug) depression (low spot) in the yard that is planted with grasses, trees and shrubs to filter the water.

Website Description: Individual bioretention areas can serve highly impervious drainage areas less than two (2) acres in size. Surface runoff is directed into a shallow landscaped depression that incorporates many of the pollutant removal mechanisms that operate in forested ecosystems. The primary component of a bioretention practice is the filter bed, which has a mixture of sand, soil, and organic material as the filtering media with a surface mulch layer. During storms, runoff temporarily ponds 6 to 12 inches above the mulch layer and then rapidly filters through the bed. Normally, the filtered runoff is collected in an underdrain and returned to the storm drain system. The underdrain consists of a perforated pipe in a gravel layer installed along the bottom of the filter bed. A bioretention facility with an underdrain system is commonly referred to as a *Bioretention Filter*.

Bioretention can also be designed to infiltrate runoff into native soils. This can be done at sites with permeable soils, a low groundwater table, and a low risk of groundwater contamination. This design features the use of a "partial exfiltration" system that promotes greater groundwater recharge. Underdrains are only installed beneath a portion of the filter bed, above a stone "sump" layer, or eliminated altogether, thereby increasing stormwater infiltration. A bioretention facility without an underdrain system, or with a storage sump in the bottom is commonly referred to as a

Bioretention Basin.

Stormwater Practice #10: Dry Swale

Simple Description: A shallow ditch that has been rototilled and compost added to the soil and is planted in grass to filter water from the roof, yard or driveway. The shallow ditch does not generally hold water (standing water) for a long period of time.

Website Description: Dry swales are essentially bioretention cells that are shallower, configured as linear channels, and covered with turf or other surface material (other than mulch and ornamental plants).

The dry swale is a soil filter system that temporarily stores and then filters the desired Treatment Volume (T_v). Dry swales rely on a pre-mixed soil media filter below the channel that is similar to that used for bioretention. If soils are extremely permeable, runoff infiltrates into underlying soils. In most cases, however, the runoff treated by the soil media flows into an underdrain, which conveys treated runoff back to the conveyance system further downstream. The underdrain system consists of a perforated pipe within a gravel layer on the bottom of the swale, beneath the filter media. Dry swales may appear as simple grass channels with the same shape and turf cover, while others may have more elaborate landscaping. Swales can be planted with turf grass, tall meadow grasses, decorative herbaceous cover, or trees.

Stormwater Practice #11: Wet Swale

Simple Description: A shallow ditch that generally holds water (standing water) for an extended period of time and has plants that need wet conditions to survive.

Website Description: Wet swales can provide runoff filtering and treatment within the conveyance system and are a cross between a wetland and a swale. These linear wetland cells often intercept shallow groundwater to maintain a wetland plant community. The saturated soil and wetland vegetation provide an ideal environment for gravitational settling, biological uptake, and microbial activity. On-line or off-line cells are formed within the channel to create saturated soil or shallow standing water conditions (typically less than 6 inches deep).

Stormwater Practice #12: Filtering Practice

Simple Description: A designed and engineered concrete box that traps and filters water before releasing the water to a ditch.

Website Description: Stormwater filters are a useful practice to treat stormwater runoff from small, highly impervious sites. Stormwater filters capture, temporarily store, and treat stormwater runoff by passing it through an engineered filter media, collecting the filtered water in an underdrain, and then returning it back to the storm drainage system. The filter consists of two chambers: the first is devoted to settling, and the second serves as a filter bed consisting of a sand or organic filter media.

Stormwater filters are a versatile option because they consume very little surface land and have

few site restrictions. They provide moderate pollutant removal performance at small sites where space is limited,. However, sand filters have limited or no runoff volume reduction capability, so designers should consider using up-gradient runoff reduction practices, which have the effect of decreasing the Treatment Volume (and size) of the filtering practices. Filtering practices are also suitable to provide special treatment at a designated stormwater hotspots. For a list of potential stormwater hotspots that merit treatment by filtering practices, consult the Stormwater Design Specification No. 8 (Infiltration).

Stormwater filters depend mainly on physical treatment mechanisms to remove pollutants from stormwater runoff, including gravitational settling in the sedimentation chamber, straining at the top of the filter bed, and filtration and adsorption onto the filter media. Microbial films often form on the surface of the filter bed, which can also enhance biological removal. Filters are usually designed only for water quality treatment.

Stormwater Practice #14: Wet Pond

Simple Description: A permanent pond that collects water from the roof, driveway and/or yard.

Website Description: Wet ponds consist of a permanent pool of standing water that promotes a better environment for gravitational settling, biological uptake and microbial activity. Runoff from each new storm enters the pond and partially displaces pool water from previous storms. The pool also acts as a barrier to re-suspension of sediments and other pollutants deposited during prior storms. When sized properly, wet ponds have a residence time that ranges from many days to several weeks, which allows numerous pollutant removal mechanisms to operate. Wet ponds can also provide extended detention (ED) above the permanent pool to help meet channel protection requirements.

Designers should note that a wet pond is the final element in the roof-to-stream runoff reduction sequence, so one **should be considered *only* if there is remaining Treatment Volume or Channel Protection Volume to manage after all other upland runoff reduction options have been considered and properly credited.** Wet ponds may be allowed in certain coastal plain situations where the water table is within 3 feet of the ground surface.