ARTICLE X

STORMWATER MANAGEMENT PLANNING AND DESIGN REQUIREMENTS

1001. Statement of Findings

The governing body of South Middleton Township finds that:

A. Inadequate management of accelerated runoff of stormwater resulting from development throughout a watershed increases flows and velocities, contributes to erosion and sedimentation, overtaxes the carrying capacity of streams and storm sewers, greatly increases the cost of public facilities to carry and control stormwater, undermines flood plain management and flood control efforts in downstream communities, reduces groundwater recharge, threatens public health and safety, and increases non-point source pollution of water resources.

B. A comprehensive program of stormwater management, including reasonable regulation of development causing accelerated runoff, is fundamental to the public health, safety and welfare and the protection of people of the Commonwealth, their resources and the environment.

C. Stormwater is an important water resource, which provides groundwater recharge for water supplies and base flow of streams, which also protects and maintains surface water quality.

1002. Purpose

The purpose of this Article is to provide stormwater management regulations that are applicable to every watershed within the Township and to regulate development in a manner consistent with the adopted countywide Act 167 watershed plan.

Further, the purpose is to promote health, safety, and welfare within the Municipality and its watersheds by minimizing the damages using planning and design requirements intended to:

A. Manage accelerated runoff, erosion, and sedimentation problems at their source by regulating activities that cause these problems.

B. Use and preserve the existing natural drainage systems.

C. Encourage recharge of groundwater where appropriate and prevent degradation of groundwater quality.

D. Maintain existing flows and quality of streams and watercourses in the Township and the Commonwealth.

E. Preserve and restore the flood-carrying capacity of streams.

F. Provide proper maintenance of all permanent storm water management facilities that are constructed in the Township.

G. Provide performance standards and design criteria for storm water management and planning.

1003. Statutory Authority

A. Primary Authority:

The municipality is empowered to regulate these activities by the authority of the Act of October 4, 1978, P.L. 864 (Act 167), 32 P.S. Section 680.1, et seq., as amended, the “Storm Water Management Act” and the Second Class Township Code Act of May 1, 1993 , P.L. 103, No. 69, as amended.

Hereafter, all land development within South Middleton Township shall be in full compliance with the requirements of the Cumberland County Storm Water Management Plan and shall be conducted in a manner consistent therewith. Any violation of the Cumberland County Storm Water Management Plan shall be considered a violation of this ordinance.

B. Secondary Authority:

The Municipality also is empowered to regulate land use activities that affect runoff by the authority of the Act of July 31, 1968, P.L. 805, No. 247, The Pennsylvania Municipalities Planning Code, as amended.

1004. Applicability

The requirements contained in this Article apply to all land development within the Township.

1005. Abrogation and Greater Restrictions

This Article supplements prior articles of this Subdivision and Land Development Article. To the extent that this Article imposes greater requirements or more complete disclosure in any respect, or to the extent that the provisions of this Article are more restrictive, it shall be deemed and interpreted to control such other provisions of the Subdivision and Land Development Article.

1006. Definitions

For the purposes of this Ordinance, certain terms and words used herein shall be interpreted as follows:

A. Words used in the present tense include the future tense; the singular number includes the plural, and the plural number includes the singular; words of masculine gender include feminine gender; and words of feminine gender include masculine gender.

B. The word “includes” or “including” shall not limit the term to the specific example but is intended to extend its meaning to all other instances of like kind and character.

C. The words “shall” and “must” are mandatory; the words “may” and “should” are permissive.

(1) Design Storm - The magnitude and temporal distribution of precipitation from a storm event measured in probability of occurrence (e.g. a 5-year-storm) and duration (e.g. 24 hours), used in the design and evaluation of stormwater management systems. Also see Return Period.

(2) Detention Volume - The volume of runoff that is captured and then infiltrated, evaporated, reused, or released into the waters of this Commonwealth at a controlled rate.

(3) DEP - The Pennsylvania Department of Environmental Protection.

(4) Disconnected Impervious Area (DIA) - An impervious or impermeable surface which has its stormwater runoff disconnected from any stormwater drainage or conveyance system and is redirected or directed to a pervious area which allows for infiltration, filtration, and increased time of concentration as specified in Appendix B, Disconnected Impervious Area.

(5) Disturbed Area - An unstabilized land area where an Earth Disturbance Activity is occurring or has occurred.

(6) Earth Disturbance Activity - A construction or other human activity which disturbs or exposes the underlying soil, including, but not limited to, clearing and grubbing; grading; excavations; embankments; road maintenance; building construction; the moving, depositing, stockpiling, or storing of soil, rock or earth materials.

(7) Existing Condition - The initial condition of a project site prior to the proposed construction.

(8) FEMA - Federal Emergency Management Agency

(9) Forest Management/Timber Operations - Planning and activities necessary for the management of forestland. These include conducting a timber inventory, preparation of forest management plans, silvicultural treatment, cutting budgets, logging road design and construction, timber harvesting, site preparation and reforestation.

(10) Hydrologic Soil Group (HSG) – Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. Infiltration rates of soils vary widely and are affected by subsurface permeability as well as surface intake rates. Soils are classified into four HSG's (A, B, C, and D) according to their minimum infiltration rate, which is obtained for bare soil after prolonged wetting. The NRCS defines the four groups and provides a list of most of the soils in the United States and their group classification. The soils in the area of the development site may be identified from a soil survey report that can be obtained from local NRCS offices or conservation district offices. Soils become less pervious as the HSG varies from A to D (NRCS).

(11) Karst - A type of topography or landscape characterized by surface depressions, sinkholes, rock pinnacles/uneven bedrock surface, underground drainage and caves. Karst is formed on carbonate rocks, such as limestone or dolomite.

(12) NRCS - USDA Natural Resources Conservation Service (previously SCS).

(13) Regulated Earth Disturbance Activity - Activity involving Earth Disturbance subject to regulation under 25 Pa. Code Chapters 92, Chapter 102, or the Clean Streams Law.

(14) Retention Volume/Removed Runoff - The volume of runoff that is captured and not released directly into the surface waters of this Commonwealth during or after a storm event.

(15) Return Period - The average interval, in years, within which a storm event of a given magnitude can be expected to occur one time. For example, the 25-year return period rainfall would be expected to occur on average once every 25 years; or stated in another way, the probability of a 25-year storm occurring in any one year is 0.04 (i.e. a 4% chance).

(16) State Water Quality Requirements - The regulatory requirements to protect, maintain, reclaim, and restore water quality under Pennsylvania Code Title 25 and the Clean Streams Law.

(17) Stormwater Management Facility - Any structure, natural or man-made, that, due to its condition, design, or construction, conveys, stores, or otherwise affects stormwater runoff. Typical stormwater management facilities include, but are not limited to, detention and retention basins, open channels, storm sewers, pipes, and infiltration facilities.

(18) Stormwater Management Best Management Practices - Is abbreviated as BMPs or SWM BMPs throughout this Ordinance.

(19) USDA - United States Department of Agriculture.

1007. General Requirements

A. A Stormwater Management Site Plan (SWMSP) prepared in accordance with the hereinafter provisions, shall be required for each subdivision or land development plan. As an integral part of the SWMSP, Erosion and Sedimentation Control measures shall be included. A SWMSP must be approved prior to the construction of any improvements.

B. All SWMSPs shall be prepared and certified by a Professional Engineer; provided, however, that a SWMSP may be prepared by a Professional Land Surveyor if said plan constitutes an Incidental Stormwater Management Plan as defined by Article II of this Ordinance.

C. Township Liability

The degree of stormwater management sought by the provisions of this Article is considered reasonable for regulatory purposes. This Article shall not create liability on the part of the Township, any appointed or elected official of the Township, the Cumberland County Conservation District, or any officer, Engineer or employee thereof for any erosion, sediment pollution or flood damages that result from reliance on this Section or any administrative decision lawfully made thereunder.

D. SWM Site Plans approved by the Municipality shall be on site throughout the duration of the Land Development.

E. For all Regulated Earth Disturbance Activities, erosion and sediment control BMPs shall be designed, implemented, operated, and maintained during the Regulated Earth Disturbance Activities (e.g., during construction) to meet the purposes and requirements of this Ordinance and to meet all requirements under the Pennsylvania Code Title 25 and the Clean Streams Law. Various BMPs and their design standards are listed in the *Erosion and Sediment Pollution Control Program Manual* (E&S Manual), Commonwealth of Pennsylvania, Department of Environmental Protection, No. 363-2134-008 (2000), as amended and updated.

E. For land development taking place in stages, the entire proposed new development plan must be used in determining conformance with this Ordinance. The date of adoption of this Article shall be the starting point from which to consider "parent tracts" in which future land development and respective impervious area computations shall be cumulatively considered.

G. Stormwater flows/direct discharges onto adjacent property shall not be created, increased, decreased, relocated, concentrated, or otherwise altered without written notification to the adjacent property owner(s). Such stormwater flows shall be subject to the requirements of this Ordinance.

H. The design of all facilities over Karst shall include an evaluation of measures to minimize adverse effects in accordance with the procedures outlined in Section 7.4 (Special Management Areas – Karst Areas) of the most current version "The Pennsylvania Stormwater Best Management Practices Manual" SWM Manual.

I. Storage facilities should completely drain both the volume control and rate control capacities within 72 hours from the end of the design storm subject to site conditions.

J. The design storm precipitation depth estimates to be used in the analysis of peak rates of discharge should be obtained from the Precipitation-Frequency Atlas of the United States, Atlas 14, Volume 2, U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), National Weather Service, Hydrometeorological Design Studies Center, Silver Spring, Maryland, 20910. NOAA's Atlas 14[5] can be accessed at Internet address: http://hdsc.nws.noaa.gov/hdsc/pfds/

PENNDOT's Storm Intensity-Duration-Frequency Curves are based upon the Atlas. The curves for Region 4 are acceptable to use.

K. For the SCS soil-cover complex method, Type II 24-hour storm distribution curves should be used.

L. All Stormwater Management Plans shall be prepared using the Best Management Practices (BMPs) contained in the latest version of the *Stormwater Management Best Practices Manual.*

All SWM BMPs shall be designed, implemented, operated, and maintained to meet the purposes and requirements of this Ordinance and to meet all requirements under Title 25 of the Pennsylvania Code, the Clean Streams Law, and the Storm Water Management Act.

M. All natural drainage ways and existing contouring of pre-development drainage patterns shall be preserved to the maximum extent possible. Post-development drainage patterns shall simulate pre-development patterns. Hydraulic capacity analysis shall be provided for all downstream conveyance.

N. The engineer preparing the calculations shall provide a signed and dated statement indicating that he/she has been to the site for the purpose of conducting a visual inspection in order to determine the existing ground cover. The date of the site inspection shall be included in said statement.

1008. Volume Controls

Water volume controls shall be implemented using the *Design Storm Method* in Subsection A. The *Simplified Method* in Subsection B may be used for projects with a disturbed area less than one (1) acre. For projects with an area equal or less than one (1) acre that do not require hydrologic routing to design the stormwater facilities, this Ordinance establishes no preference for either methodology; therefore, the applicant may select either methodology on the basis of economic considerations, the intrinsic limitations on applicability of the analytical procedures associated with each methodology, and other factors.

A. *The Design Storm Method* (see Section 8.7 of the latest version of the *Stormwater Management Best Practices Manual*) may be used for any size project. This method requires detailed modeling based on site conditions.

1. Do not increase the post-development total runoff volume for all storms equal to or less than the 2-year 24-hour duration precipitation.

2. For modeling purposes, calculate existing (pre-development) stormwater runoff and infiltration volumes based on existing site conditions, as verified through design phase soil infiltration testing.

3. Calculations of the post-development peak discharge shall assume that all areas being disturbed during construction will be reduced by one Hydrologic Soil Group category level (e.g. Ha B is reduced to Ha C, etc.)

B. *The Simplified Method* (see Section 8.7 of the latest version of the *Stormwater Management Best Practices Manual*) provided below is independent of site conditions and should be used if the Design Storm Method is not followed. This method is not applicable to Regulated Activities greater than one (1) acre or for projects that require design of stormwater detention or rate control facilities. For new impervious surfaces:

1. Stormwater facilities shall be sized to capture at least the first two inches (2") of runoff from all new impervious surfaces.

2. At least the first one inch (1.0") of runoff from new impervious surfaces shall be permanently removed from the runoff flow -- i.e. it shall not be released into the surface waters of this Commonwealth. Removal options include reuse, evaporation, transpiration, and infiltration.

3. Infiltration facilities should be designed to accommodate infiltration of the entire permanently removed runoff; however, in all cases at least the first one-half inch (0.5") of the permanently removed runoff should be infiltrated.

4. The second one inch (1.0") of runoff from new impervious surfaces should be detained using structural and non-structural BMPs (as outlined in the most current version of the SWM Manual) and released at a controlled rate.

5. Development eligible under this method are exempt from the requirements of Section 1009, Rate Controls.

1009. Rate Controls

For the 1-, 2-, 5-, 10-, 25-, 50-, and 100-year storms, the post-development peak discharge rates will follow the applicable approved release rate maps contained in the latest version of the Cumberland County Stormwater Management Plan.

1010. Additional Design Criteria

A. Emergency spillways as a minimum shall be set at an elevation to allow discharge from the pond during the 100-year storm. In no case, however, shall the composite outflow from the primary release device(s) and the emergency spillway exceed pre-development rates. Spillways shall be provided structural stability. As such, locating spillways within the embankment is prohibited unless adequate reinforcing is provided.

Permanent spillway control measures/facilities shall be designed to assure that the peak runoff from the 100-year return-frequency, 24-hour event inches is able to be passed without eroding outfalls and downstream drainage facilities.

Permanent spillway control measures/facilities shall be designed assuming that the primary outfall structures are inoperative during the design flood.

B. Any stormwater management facility designed to store runoff and requiring a berm or embankment. The height of the berm or embankment will be set so as to provide a minimum 1 foot of freeboard above the maximum pool elevation for the 100-year post-development flow.

C. Subsurface infiltration facilities designed for runoff peak attenuation shall be allowed only after all other alternatives have been explored and found not to be practical for the proposed subdivision or land development. Lack of sufficient area to install other alternatives shall not be an acceptable reason for allowing infiltration facilities.

D. Culverts, pipes, and storm sewers shall be designed for a ten- (10) year storm with a five (5) minute time of concentration (Tc). Designs based upon calculation of actual Tc will be allowed if pipe size exceeds 36" in diameter based upon said five- (5) minute Tc. Supporting documentation verifying the same is required. In the event, however, that a culvert passes beneath a public roadway, it

shall be designed in such a manner to prevent the roadway from inundation during a twenty-five (25) year storm.

E. All pipes shall be consist of straight runs. There should be no bends in any pipes.

F. The SWMSP shall include calculations indicating velocities of flow, grades, sizes, and capacities of water carrying structures, debris or sedimentation basins, and retention and detention ponds and sufficient design information to construct such facilities.

G. Maximum permitted channel velocities are as follows:

1. Three (3) feet per second where only sparse vegetation can be established.

2. Four (4) feet per second under normal conditions where vegetation can be established by seeding.

3. Five (5) feet per second where a dense, vigorous sod can be quickly established or where water can be temporarily diverted during establishment of vegetation.

4. Six (6) feet per second where well-established sod is in existence.

H. Maximum permitted channel velocities are as follows:

For lined water carrying channels the following velocities are required:

channel lining	maximum velocity
6-inch rock rip-rap	6 feet per second
9-inch rock rip r-ap	8 feet per second
Asphalt	7 feet per second
Durable Bedrock	8 feet per second
12-inch rock rip-rap	9 feet per second
Concrete or steel	12 feet per second

I. The normal maximum velocity of open channel flows shall not exceed ten (10) feet per second.

J. Stormwater runoff channels shall be designed to avoid trapping excess sediment, except if structures are so designed to trap sediment. In all instances, the minimum velocity of stormwater through runoff channels shall be one and one-half (1.5) feet per

second. The minimum slope on impervious surfaces shall be 1% and 2% on pervious surfaces.

K. Energy dissipaters/erosion control devices shall be placed at the outlets of all pipes where flow velocities exceed maximum permitted channel velocities.

L. Vertical pipes, inlets and other surface water receiving structures shall be installed with trash racks, or so designed to control trash accumulation.

M. All piping used in the stormwater drainage system shall be CMP galvanized steel, aluminum alloy, smooth-lined HDPE plastic or reinforced concrete. A minimum pipe size of eighteen (18) inches in diameter shall be used in all roadway systems proposed for dedication to the Township. A minimum pipe size of twelve (12) inches in diameter is permitted on private facilities that receive no off-site drainage. Pipes shall be designed so as to provide a minimum velocity of two and one-half (2.5) feet per second when flowing full. Arch pipe may be used in lieu of round pipe where cover or utility conflict conditions exist.

N. All storm drainage piping discharging to the ground surface shall be provided with either reinforced concrete head walls or metal pipe end sections compatible with the pipe size involved. A rip rap apron of adequate length shall be provided at all surface discharge points in order to minimize erosion. The apron shall extend to the crown of the pipe. Rip-rap size shall be determined by flow velocity leaving the system.

O. Storm drainage inlets shall be provided at all low points and hydraulically intermediate points on a system. Location spacing of inlets shall be based on the hydraulic capacity of each inlet related to the flow received and the amount of flow bypass from upstream inlets. Inlets shall be placed so street drainage shall not cross intersections or one half the width of the adjacent travel lane.

P. All street inlet tops shall be a combination curb/gutter inlet referred to as PennDOT type “C” with a ten (10) inch curb reveal to allow an automatic depressed condition to exist when used on an eight (8) inch curb. Weepholes shall be provided on all inlet tops. In private parking areas, streets and yard areas with no curbing, type “M” inlet tops shall be used.

Q. Wetlands shall be delineated on all subdivision and land development plans that involve construction improvements or

earthmoving activities. In those instances where single lots are being accessed from existing public streets, with driveways crossing wetlands, said wetland area must be delineated and a note placed on the plan advising the future lot owner of the requirements to comply with all necessary wetlands regulation. In all other instances, it shall be the responsibility of the developer to investigate the presence of wetlands on his site. A Certification Statement to this effect shall be placed on the plan by the designer preparing the plan.

R. In all areas involving residential a typical individual lot Erosion and Sedimentation Control Plan or notation shall be placed on the subdivision or land development plan. The notation shall indicate that compliance with the typical individual lot Erosion and Sedimentation Control Plan is a requirement of land development approval and violators of this requirement may be subject to the Preventative Remedies contained in Section 515.1 of the Pennsylvania Municipalities Planning Code and the penalty provisions of Section 1504 herein.

S. Storm drain systems adjacent to state highways should be designed such that PENNDOT regulations or policies, as may be amended from time to time, do not require the Township to be the applicant on an highway occupancy permit.

1011. Stormwater Management Site Plan Requirements

A. The Municipality shall not approve any SWM Site Plan that is deficient in meeting the requirements of this Ordinance. At its sole discretion and in accordance with this Article, when a SWM Site Plan is found to be deficient, the Municipality shall notify the applicant of the deficiencies and require a resubmission, or in the case of minor deficiencies the Municipality may accept submission of modifications.

C. Provisions for permanent access or maintenance easements as determined necessary by the municipality for all physical SWM BMPs, such as ponds and infiltration structures, to implement the operation and maintenance plan discussed in item E.9 below shall be included.

D. The SWM Site Plan shall provide the following information:

1. General description of the project.

2. The overall stormwater management concept for the project.

3. A determination of Site Conditions in accordance with the Site Assessment procedures outlined in Chapter 4 of the most current version of the *Stormwater Management Best Practices Manual.*. A site assessment shall be completed for projects proposed in areas of carbonate geology or karst topography.

4. Stormwater runoff design computations and documentation as specified in this Ordinance, or as otherwise necessary to demonstrate that measures have been taken to meet the requirements of this Ordinance.

5. Calculations shall be accompanied by the following supporting data:

    1. Either singular or composite inflow and outflow hydrographs.

    2. Stage-storage data.

    3. Stage-discharge data.

    4. Storage-routing calculations.

    5. Other data as required by the Township Engineer.

4. Expected project time schedule.

5. A soil erosion and sediment control plan, where applicable, as prepared for and submitted to the approval authority.

6. The effect of the project (in terms of runoff volumes, water quality, and peak flows) on surrounding properties and adjacent aquatic features and on any existing stormwater conveyance system that may be affected by the project.

7. Details, plans, and profile drawings of all SWM BMPs including drainage structures, pipes, open channels, and swales.

8. SWM Site Plan shall show the locations of existing and proposed on-lot wastewater facilities and water supply wells.

9. Construction specifications for the materials to be used for stormwater management facilities.

9. The SWM Site Plan shall include an operation and maintenance (O&M) plan for all proposed physical stormwater management

facilities. This plan shall address long-term ownership and responsibilities for operation and maintenance as well as schedules for O&M activities. The O & M plan will become part of the Stormwater Maintenance Agreement.

1012. Plan Submission

Two (2) copies of the SWM Site Plan shall be submitted.

1013. As-built Plan

The Applicant shall be responsible for including on the as-built plans required by Section 1303 all SWM BMPs included in the approved SWM Site Plan. The as-built plans and an explanation of any discrepancies with the construction plans shall be submitted to the Municipality.

1014. Responsibilities of Developers and Landowners

A. Facilities, areas, or structures used as Stormwater Management BMPs shall be enumerated as permanent real estate appurtenances and recorded as deed restrictions or conservation easements that run with the land.

C. The Operation and Maintenance Agreement shall be recorded as a restrictive deed covenant that runs with the land.

D. The Municipality may take enforcement actions against an owner for any failure to satisfy the provisions of this Article.

1015. Operation and Maintenance Agreements

The owner is responsible for Operation and Maintenance of the SWM BMPs. If the owner fails to adhere to the Operation and Maintenance Agreement (see the sample Operations and Maintenance Agreement at the end of this section), the Municipality may perform the services required and charge the owner appropriate fees. Non-payment of fees may result in a lien against the property or other judicial action.

1016. Prohibited Discharges and Connections

A. Any drain or conveyance, whether on the surface or subsurface, which allows any non-stormwater discharge including, but not limited to, sewage, process wastewater, wash water, ammonia, chlorine, petroleum products (gasoline, fuel oil, etc.) pesticides, pollutants and other hazardous materials to enter the waters of the Commonwealth is prohibited.

Handling and disposal of all materials and wastes shall comply with all Federal and State requirements. Structural and non-structural BMPs, in accordance with Chapters 5 and 6 of the most current version of the SWM Manual, shall be implemented where necessary to preserve the quality of stormwater runoff.

B. Discharges to Waters of the Commonwealth which are not composed entirely of stormwater shall be prohibited, except (1) as provided in subsection C below, and (2) discharges allowed under a state or federal permit.

C. The following discharges are authorized unless they are determined to be significant contributors to pollution to the waters of this Commonwealth:

- Discharges from fire fighting activities	- Flows from riparian habitats and wetlands
- Potable water sources including water line flushing	- Uncontaminated water from foundations or from footing drains
- Irrigation drainage	- Lawn watering
- Air conditioning condensate	- Dechlorinated swimming pool discharges
- Springs	- Uncontaminated groundwater
- Water from crawl space pumps	- Water from individual residential car washing
- Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (unless all spill material has been removed) and where detergents are not used	- Routine external building wash down (which does not use detergents or other compounds)

D. In the event that the Municipality or DEP determines that any of the discharges identified in Subsection C, significantly contribute to pollution of the waters of this Commonwealth, the Municipality or DEP will notify the responsible person(s) to cease the discharge.

1017. Roof Drains and Sump Pumps

Roof drains and sump pumps shall not discharge to any impervious area, if site conditions permit.

1018. Alteration of SWM BMPs

No person shall modify, remove, fill, landscape, or alter any SWM BMPs, facilities, areas, or structures, without the written approval of the Municipality.

1019. Disconnected Impervious Area (DIA)

A. Rooftop Disconnection

When rooftop downspouts are directed to a pervious area that allows for infiltration, filtration, and increased time of concentration, the rooftop may qualify as completely or partially Disconnected Impervious Area (DIA) and a portion of the impervious rooftop area may be excluded from the calculation of total impervious area.

A rooftop is considered to be completely or partially disconnected if it meets the requirements listed below:

- The contributing area of rooftop to each disconnected discharge is 500 square feet or less, and
- The soil, in proximity of the roof water discharge area, is not designated as hydrologic soil group “D” or equivalent, and
- The overland flow path from roof water discharge area has a positive slope of 5% or less.

For designs that meet these requirements, the portion of the roof that may be considered disconnected depends on the length of the overland path as designated in Table B.1.

Table B.1: Partial Rooftop Disconnection	
Length of Pervious Flow Path *	**Roof Area Treated as Disconnected**
(ft)	(% of contributing area)
0 – 14	0
15 – 29	20
30 – 44	40
45 – 59	60
60 – 74	80
75 or more	100
* Flow path cannot include impervious surfaces and must be at least 15 feet from any impervious surfaces.	

B. Pavement Disconnection

When pavement runoff is directed to a pervious area that allows for infiltration, filtration, and increased time of concentration, the contributing pavement area may qualify as a DIA that may be excluded from the calculation of total impervious area. This applies generally only to small or narrow pavement structures such as driveways and narrow pathways through otherwise pervious areas (e.g. a walkway or bike path through a park).

Pavement is disconnected if the pavement, or area adjacent to the pavement, meets the requirements below:

- The contributing flow path over impervious area is not more than 75 feet, and
- The length of overland flow is greater than or equal to the contributing length, and
- The soil is not designated as hydrologic soil group “D” or equivalent, and
- The slope of the contributing impervious area is 5% or less, and
- The slope of the overland flow path is 5% or less.

If the discharge is concentrated at one or more discrete points, no more than 1,000 square feet may discharge to any one point. In addition, a gravel strip or other spreading device is required for concentrated discharges. For non-concentrated discharges along the edge of the pavement, this requirement is waived; however, there must be a provision for the establishment of vegetation along the pavement edge and temporary stabilization of the area until vegetation becomes stabilized.

REFERENCE

Philadelphia Water Department. 2006. *Stormwater Management Guidance Manual.* Section 4.2.2: ***Integrated Site Design.*** Philadelphia, PA.

SAMPLE OPERATION AND MAINTENANCE AGREEMENT
STORMWATER MANAGEMENT BEST MANAGEMENT PRACTICES (SWM BMPs)

THIS AGREEMENT, made and entered into this _____ day of _____, 20___, by and between _____, (hereinafter the "Landowner"), and _____, Cumberland County, Pennsylvania, (hereinafter "Municipality");

WITNESSETH

WHEREAS, the Landowner is the owner of certain real property as recorded by deed in the land records of Cumberland County, Pennsylvania, Instrument Number _____, (hereinafter "Property").

WHEREAS, the Landowner is proceeding to build and develop the Property; and

WHEREAS, the SWM BMP Operation and Maintenance Plan approved by the Municipality (hereinafter referred to as the "Plan") for the property identified herein, which is attached hereto as and made part hereof, as approved by the Municipality, provides for management of stormwater within the confines of the Property through the use of BMPs; and

WHEREAS, the Municipality, and the Landowner, his successors and assigns, agree that the health, safety, and welfare of the residents of the Municipality and the protection and maintenance of water quality require that on-site SWM BMPs be constructed and maintained on the Property; and

WHEREAS, the Municipality requires, through the implementation of the SWM Site Plan, that SWM BMPs as required by said Plan and the Municipal Stormwater Management Ordinance be constructed and adequately operated and maintained by the Landowner, successors and assigns.

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

1. The Landowner shall construct the BMPs in accordance with the plans and specifications identified in the SWM Site Plan.

2. The Landowner shall operate and maintain the BMPs as shown on the Plan in good working order in accordance with the specific maintenance requirements noted on the approved SWM Site Plan.

3. The Landowner hereby grants permission to the Municipality, its authorized agents and employees, to enter upon the property, at reasonable times and upon presentation of proper credentials, to inspect the BMPs whenever necessary. Whenever possible, the Municipality shall notify the Landowner prior to entering the property.

4. In the event the Landowner fails to operate and maintain the BMPs per paragraph 2, the Municipality or its representatives may enter upon the Property and take whatever action is deemed necessary to maintain said BMP(s). It is expressly understood and agreed that the Municipality is under no obligation to maintain or repair said facilities, and in no event shall this Agreement be construed to impose any such obligation on the Municipality.

5. In the event the Municipality, pursuant to this Agreement, performs work of any nature, or expends any funds in performance of said work for labor, use of equipment, supplies, materials, and the like, the Landowner shall reimburse the Municipality for all expenses (direct and indirect) incurred within 10 days of receipt of invoice from the Municipality.

6. The intent and purpose of this Agreement is to ensure the proper maintenance of the onsite BMPs by the Landowner; provided, however, that this Agreement shall not be deemed to create or effect any additional liability of any party for damage alleged to result from or be caused by stormwater runoff.

7. The Landowner, its executors, administrators, assigns, and other successors in interests, shall release the Municipality from all damages, accidents, casualties, occurrences or claims which might arise or be asserted against said employees and representatives from the construction, presence, existence, or maintenance of the BMP(s) by the Landowner or Municipality.

8. The Landowner, its executors, administrators, assigns, and other successors in interests, shall inspect the BMPs at a minimum of once every 2 years to ensure their continued functioning.

This Agreement shall be recorded at the Office of the Recorder of Deeds of Cumberland County, Pennsylvania, and shall constitute a covenant running with the Property and/or equitable servitude, and shall be binding on the Landowner, his administrators, executors, assigns, heirs and any other successors in interests, in perpetuity.

ATTEST:

WITNESS the following signatures and seals:

(SEAL)

For the Municipality:

_____

For the Landowner:

_____

ATTEST:

_____ (Township)

County of Cumberland, Pennsylvania

I, _____, a Notary Public in and for the County and State aforesaid, whose commission expires on the _____ day of _____, 20_____, do hereby certify that _____ whose name(s) is/are signed to the foregoing Agreement bearing date of the _____ day of _____, 20_____, has acknowledged the same before me in my said County and State.

GIVEN UNDER MY HAND THIS _____ day of _____, 20_____.

_____ _____

NOTARY PUBLIC **(SEAL)**

ATTEST:

_____ (Township)

County of Cumberland, Pennsylvania

I, _____, a Notary Public in and for the County and State aforesaid, whose commission expires on the _____ day of _____, 20_____, do hereby certify that _____ whose name(s) is/are signed to the foregoing Agreement bearing date of the _____ day of _____, 20_____, has acknowledged the same before me in my said County and State.

GIVEN UNDER MY HAND THIS _____ day of _____, 20_____.

_____ _____

NOTARY PUBLIC **(SEAL)**