

THE BOROUGH OF AMBLER, MONTGOMERY COUNTY, PA

ORDINANCE NUMBER 1108

AN ORDINANCE OF THE BOROUGH OF AMBLER REPEALING THE EXISTING STORMWATER MANAGEMENT ORDINANCE, TITLE 26 PART 4 OF THE CODIFIED ORDINANCES, AND ADOPTING A NEW STORMWATER MANAGEMENT ORDINANCE.

WHEREAS, as a result of increased real estate development, the Commonwealth of Pennsylvania in 1978 adopted Act 167 to regulate accelerated stormwater runoff associated with such development, and

WHEREAS, Act 167 requires regulation of stormwater at the county level, and, in turn, at the local municipal level and

WHEREAS, Montgomery County has created a new model ordinance intended to achieve continuing compliance with Act 167 and

WHEREAS, the Borough of Ambler desires and intends to remain compliant with law, including Act 167,

NOW THEREFORE, Ambler Borough Council does ORDAIN as follows:

1. Ordinance 984, Codified at Title 26, Part 4 of the Borough codified ordinances, and being the Borough's existing stormwater management ordinance, is hereby REPEALED in its entirety.
2. At Title 26, Part 4 of the codified ordinances, there shall be a new Part 4 to be called the Ambler Borough Stormwater Management Ordinance, and to consist of the following.

SUBPART A. GENERAL PROVISIONS

- §26-401. Short Title
- §26-402. Statement of Findings
- §26-403. Purpose
- §26-404. Statutory Authority
- §26-405. Applicability/ Regulated Activities
- §26-406. Exemptions
- §26-407. Repealer
- §26-408. Severability
- §26-409. Compatibility with Other Ordinances or Legal Requirements
- §26-410. Duty of Persons Engaged in the Development of Land
- §26-411. Erroneous Permit

§26-412. Change of Appendices

SUBPART B. DEFINITIONS

§26-413. Interpretation

§26-414. Definitions

SUBPART C. STORMWATER MANAGEMENT (SWM) SITE PLAN REQUIREMENTS

§26-415. SWM Site Plan Contents

§26-416. Plan Submission

§26-417. Small Project Stormwater Management Site Plan

§26-418. Stormwater Management Site Plan Review

§26-419. Modification of Plans

§26-420. Resubmission of Disapproved SWM Plans

§26-421. Authorization to Construct and Term of Validity

SUBPART D. STORMWATER MANAGEMENT

§26-422. General Requirements

§26-423. Permit Requirements by Other Governmental Entities

§26-424. Erosion and Sediment Pollution Control

§26-425. Nonstructural Project Design to Minimize Stormwater Impacts

§26-426. Groundwater Recharge

§26-427. Volume Control

§26-428. Stream Bank Erosion

§26-429. Stormwater Peak Rate Control and Management Districts

§26-430. Calculation Methodology

§26-431. Other Requirements

SUBPART E. INSPECTIONS

§26-432. Inspections

SUBPART F. FEES AND EXPENSES

§26-433. Stormwater Management Site Plan Review and Inspection Fee

§26-434. Expenses Covered by Fees

SUBPART G. MAINTENANCE RESPONSIBILITIES

§26-435. Performance Guarantee

§26-436. Responsibilities for Operation and Maintenance of Stormwater Facilities and BMPs

§26-437. Borough Review of Stormwater Facilities and BMP Operations and Maintenance Plan

§26-438. Operation and Maintenance Agreement for Privately Owned Stormwater Facilities and BMPs

§26-439. Stormwater Management Easements

SUBPART H. PROHIBITIONS

- §26-440. Prohibited Discharges and Connections
- §26-441. Roof Drains
- §26-442. Alterations of Stormwater Management BMPs

SUBPART I. ENFORCEMENT AND PENALTIES

- §26-443. Right of Entry
- §26-444. Inspection
- §26-445. Enforcement
- §26-446. Suspension and Revocation of Permits and Approvals
- §26-447. Penalties
- §26-448. Appeals

APPENDICIES.

- Appendix A Stormwater Management Design Criteria
- Appendix B Low Impact Development Practices
- Appendix C Nonstructural Project Design Checklist
- Appendix D Disconnected Impervious Area
- Appendix E Hot Spots
- Appendix F West Nile Virus Guidance
- Appendix G Small Project Stormwater Management Site Plan
- Appendix H Operation and Maintenance (O&M) Agreement for Stormwater Management Best Practices (SWM BMPs)

**CHAPTER 26 – WATER
PART 4
STORMWATER MANAGEMENT**

SUBPART A. GENERAL PROVISIONS

§26-401. Short Title

This Ordinance shall be known and cited as the “Ambler Borough Stormwater Management Ordinance”.

§26-402. Statement of Findings

The Borough Council finds that:

- A. Inadequate management of accelerated stormwater runoff resulting from development throughout a watershed increases flood flows and velocities, contributes to erosion and sedimentation, overtaxes the carrying capacity of existing streams and storm sewers, greatly increases the cost of public facilities to convey and manage stormwater, undermines floodplain management and flood reduction efforts in upstream and downstream communities, reduces groundwater recharge, and threatens public health and safety.
- B. Inadequate planning and management of stormwater runoff resulting from land development throughout a watershed can also harm surface water resources by changing the natural hydrologic patterns, accelerating stream flows (which increase scour and erosion of streambeds and streambanks, thereby increasing sedimentation), destroying aquatic habitat, and increasing aquatic pollutant concentrations and loadings such as sediments, nutrients, heavy metals, and pathogens.
- C. A comprehensive program of stormwater management (SWM), including minimization of impacts of development, redevelopment, and activities causing accelerated erosion and loss of natural infiltration, is fundamental to the public health, safety, welfare, and the protection of the people of the Borough and all of the people of the Commonwealth, their resources, and the environment.
- D. Stormwater is an important resource by providing groundwater recharge for water supplies and baseflow of streams, which also helps to protect and maintain surface water quality.
- E. Impacts from stormwater runoff can be minimized by using project designs that maintain the natural hydrologic regime and sustain high water quality, groundwater recharge, stream baseflow, and aquatic ecosystems.
- F. Federal and state regulations require certain municipalities to implement a program of stormwater controls. These municipalities are required to obtain a permit for stormwater discharges from their separate storm sewer systems under the National Pollutant Discharge Elimination System (NPDES).
- G. Non-stormwater discharges to Municipal Separate Storm Sewer System (MS4) may contribute to pollution of waters of the Commonwealth by the Borough of Ambler.

§26-403. Purpose

The purpose of this Ordinance is to promote the public health, safety, and welfare within the Borough by maintaining the natural hydrologic regime and by minimizing the harms and maximizing the benefits described in Section 26-402 of this Ordinance, through provisions designed to:

- A. Meet legal water quality requirements under state law, including regulations of 25 Pa. Code 93 to protect, maintain, reclaim, and restore the existing and designated uses of the waters of the Commonwealth.
- B. Preserve the natural drainage systems as much as possible.
- C. Manage stormwater impacts close to the runoff source, requiring a minimum of structures and relying on natural processes.
- D. Provide review procedures and performance standards for stormwater planning and management.
- E. Focus on infiltration of stormwater to maintain groundwater recharge to prevent degradation of surface and groundwater quality and to otherwise protect water resources.
- F. Prevent scour and erosion of streambanks and streambeds.
- G. Provide for proper operation and maintenance of all Stormwater Management facilities and Best Management Practices (BMPs) that are implemented within the Borough.
- H. Provide standards to meet National Pollutant Discharge Elimination System (NPDES) permit requirements.
- I. Meet legal water quality requirements under state law, including regulations at 25 Pennsylvania Code Chapter 93.4.a requiring protection and maintenance of “existing uses” and maintenance of the level of water quality to support those uses in all streams, and the protection and maintenance of water quality in “special protection” streams.
- J. Address the quality and quantity of stormwater discharges.
- K. Implement an illegal discharge detection and elimination program that addresses non-stormwater discharges into the Borough’s Separate Storm Sewer System (MS4).
- L. Preserve and restore the flood-carrying capacity of streams.
- M. Minimize impervious surfaces.
- N. Address certain requirements of the Municipal Stormwater Sewer System (MS4) NPDES Phase II Stormwater Regulations.
- O. Implement the requirements of the Wissahickon Creek Watershed Act 167 Stormwater Management Plan.

§26-404. Statutory Authority

The Borough is empowered to regulate land use activities that may affect runoff, surface and groundwater quality and quantity by the authority of:

- A. Pennsylvania Municipalities Planning Code, Act 247, as amended.
- B. The Pennsylvania Stormwater Management Act, Act 167 of October 4, 1978 (P.L. 864), as amended.
- C. The Borough Code, Act 37 of 2014/ Title 8 of the Pennsylvania Consolidated Statutes, as amended.

§26-405. Applicability/Regulated Activities

All Regulated Activities and all activities that may affect stormwater runoff, including Land Development and Earth Disturbance Activities, are subject to regulation by this Ordinance.

Regulated Activities include, but are not limited to:

1. Land development,
2. Subdivisions,
3. Prohibited or polluted discharges,
4. Alteration of the natural hydrologic regime,
5. Construction or reconstruction (Refer to Section 26-414) of or addition of new impervious or semi-pervious surfaces (i.e., driveways, parking lots, roads, etc.), except for reconstruction of roads where there is no increase in impervious surface,
6. Construction of new buildings or additions to existing buildings,
7. Redevelopment,
8. Diversion piping or encroachments in any natural or man-made channel, and
9. Non-structural and structural stormwater management Best Management Practices (BMPs) or appurtenances thereto,
10. Earth disturbance activities of equal to or greater than one thousand (1,000) square feet,
11. Any of the above regulated activities which were approved more than five (5) years prior to the effective date of this Ordinance and resubmitted for municipal approval.

§26-406. Exemptions

- A. Table 26-406.1 summarizes the exemptions from certain requirements in this Ordinance. "Proposed Impervious Surface" in Table 26-406.1 includes new, additional, or replacement impervious surface/cover. "Repaving" existing surfaces without reconstruction (see §26-410) does not constitute replacement. The Borough may deny or revoke any exemption pursuant to this Section at any time for any project that the Borough believes may pose a threat to public health, safety, property or the environment.

Table 26-406.1: Impervious Surface Exemption Thresholds

Ordinance Subpart or Section	Type of Project	< 5,000 sq. ft. Disturbed Area and Proposed Impervious Surface		≥ 5,000 sq. ft. Disturbed Area
		0 to 1,000 sq. ft.	>1,000 to 5,000 sq. ft.	
Subpart C SWM Site Plan Requirements	All Development	Exempt	Not Exempt (except residential activity)	Not Exempt
Section 26-425 Nonstructural Project Design	All Development	Exempt	Not Exempt	Not Exempt
Section 26-426 Groundwater Recharge	All Development	Exempt	Not Exempt	Not Exempt
Section 26-427 Volume Control Requirements	All Development	Exempt	Not Exempt	Not Exempt
Section 26-428 Stream Bank Erosion	Development	Exempt	Not Exempt	Not Exempt
	Redevelopment		Exempt	
Section 26-429 Peak Rate Control Requirements	All Development	Exempt	Exempt	Not Exempt
Section 26-424 Erosion and Sediment Pollution Control Requirements	See Table 26-406.2			
Subpart E Inspections	All Development	Exempt	Not Exempt	Not Exempt
Subpart G Maintenance Responsibilities	All Development	Exempt	Not Exempt	Not Exempt

Table 26-406.2: Erosion and Sediment Pollution Control Exemption Thresholds

Disturbed Area	Written E&S Plan	E&S Plan Review for Adequacy by MCCD	E&S Plan Review for Adequacy by the Borough	NPDES Permit	Written PCSM Plan Required
0 – 1,000 sq. ft.	Not required unless in HQ or EV watershed, or is a condition of other State permit.	Exempt	Exempt	Exempt	Exempt
1,000 - 5,000 sq. ft.	Required by the Borough	Exempt	Not Exempt	Exempt	Per Table 26-406.1
5,000 sq. ft. to < 1 acre	Required by the Borough	Required by Borough	Not Exempt	Exempt	Per Table 26-406.1
1 acre or greater	Required by MCCD	Required by MCCD	Not Exempt	Not Exempt	Per Table 26-406.1

- B. Agricultural activities are exempt from the peak rate control requirements and SWM Site Plan preparation requirements of this Ordinance provided the activities are performed according to the requirements of 25 Pa. Code Chapter 102.
- C. Forest management and timber operations are exempt from the peak rate control requirements and SWM Site Plan preparation requirements of this Ordinance provided the activities are performed according to the requirements of 25 Pa. Code Chapter 102.
- D. Any aspect of BMP maintenance to an existing SWM system made in accordance with plans and specification approved by the Borough is exempt.
- E. The use of land for home landscaping and/or gardening for home consumption is exempt from the requirements of this Ordinance.
- F. Exemptions from any provisions of this Ordinance shall not relieve the applicant from the requirements of Section 26-422.D through M.
- G. Infiltration Exemptions
 - a. Depth to Limiting Zone - A minimum of two (2) feet of soil suitable for infiltration must exist between the invert of the infiltration BMP and the top of the nearest limiting zone. Otherwise, the Volume Control requirement shall not be applied to the development site, and the entire volume must be treated.
- H. Hotspots
 - 1. Stormwater Hotspots – Appendix E contains a list of types of hotspots that may be recognized by the Borough. If a site is a potential hotspot, it has important implications for how stormwater is managed. First and foremost, untreated stormwater runoff from hotspots concentrated into a collection system, shall not be recharged into groundwater where it may contaminate water supplies. Therefore, the Volume Control requirement shall NOT be applied to development sites that lie within a hotspot (the entire volume must still be treated). Second, a greater level of stormwater treatment shall be applied at hotspot sites to prevent pollutant washoff after construction. The Environmental Protection Agency’s (EPA) National Pollutant Discharge Elimination System

(NPDES) stormwater program requires some industrial sites to prepare and implement a stormwater pollution prevention plan.

2. Rate of Infiltration - When infiltration is not feasible due to poor infiltration rates or hotspots, the water quality volume must be treated by an approved SMP.

I. Additional Exemption Criteria:

3. Exemption Responsibilities – An exemption shall not relieve the Applicant from implementing such measures as are necessary to protect public health, safety, or property.
4. Drainage Problems – Where drainage problems are documented or known to exist downstream of or could be expected due to the proposed activity, then the Borough may deny exemptions.
5. Exemptions are limited to specific portions of this Ordinance.
6. HQ and EV Streams – The Borough shall deny exemptions in High Quality (HQ) or Exceptional Value (EV) waters and Source Water Protection Areas (SWPA).
7. For a development taking place in stages, the entire development plan must be used in determining compliance with these exemption criteria. The starting point from which to consider tracts as “parent tracts” in which future subdivisions and respective impervious area computations are cumulatively considered shall be the date of the municipal adoption of the original Ambler Borough Stormwater Management Plan Ordinance [Ordinance 984, February 17, 2004].
 - a. For example: If a property owner proposes a 300-square-foot shed after adoption of the municipal stormwater management ordinance, that property owner would be exempt from site plan and peak rate control requirements. If, at a later date, the property owner proposes to construct a garage and driveway adding an additional 1,300 square feet of impervious surface, the applicant would be required to submit a SWM Site Plan or Small Project SWM Site Plan demonstrating the stormwater control requirements for the total impervious surface of 1,600 square feet.

§26-407. Repealer

Any other Ordinances, provisions or regulations of the Borough inconsistent with any of the provisions of this Ordinance are hereby repealed to the extent of the inconsistencies only.

§26-408. Severability

In the event that a court of competent jurisdiction declares any section or provision of this Ordinance invalid, such decision shall not affect the validity of any of the remaining provisions of this Ordinance.

§26-409. Compatibility with Other Ordinances or Legal Requirements

Approvals issued pursuant to this Ordinance do not relieve the Applicant of the responsibility to secure required permits or approvals for activities regulated by any other applicable code, rule, act, or ordinance, including Title 25 PA Code, Chapters 92, 102 and 105.

§26-410. Duty of Persons Engaged in the Development of Land

Notwithstanding any provision(s) of this Ordinance, including exemptions, any landowner or any person engaged in the alteration or development of land that may affect stormwater runoff characteristics shall implement such measures as are reasonably necessary to prevent injury to health, safety, or other property. Such measures also shall include actions as are required to manage the rate, volume, direction, and quality of resulting stormwater runoff in a manner that otherwise adequately protects health, safety, property, and water quality.

§26-411. Erroneous Permit

Any permit or authorization issued or approved based on false, misleading, or erroneous information provided by an applicant is void without the necessity of any proceedings for revocation. Any work undertaken or use established pursuant to such permit or other authorization is unlawful. No action may be taken by a board, agency, or employee of the Borough purporting to validate such a violation.

§26-412. Change of Appendices

The Appendices listed below are incorporated herein by reference, as amended and shall be updated periodically as necessary by Resolution of Borough Council:

1. Appendix A – Stormwater Management Design Criteria
2. Appendix B – Low Impact Development Practices
3. Appendix C – Nonstructural Project Design Checklist
4. Appendix D – Disconnected Impervious Area
5. Appendix E – Hot Spots
6. Appendix F – West Nile Virus Guidance
7. Appendix G – Small Project Stormwater Management Site Plan
8. Appendix H – Operation and Maintenance (O&M) Agreement for Stormwater Management Best Practices (SWM BMPs)

SUBPART B. DEFINITIONS

§26-413. Interpretation

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.

§26-414. Definitions

Accelerated Erosion – The removal of the surface of the land through the combined action of man’s activity and natural processes at a rate greater than that which would occur because of the natural process alone.

Agricultural Activities – Activities associated with agriculture such as agricultural cultivation, agricultural operation, and animal heavy use areas. This includes the work of producing crops including tillage, land clearing, plowing, disking, harrowing, planting, harvesting crops, or pasturing and raising of livestock and installation of conservation measures. Construction of new buildings or impervious area is not considered an agricultural activity.

Alteration – As applied to land, a change in topography as a result of the moving of soil and rock from one location or position to another; also the changing of surface conditions by causing the surface to be more or less impervious; land disturbance.

Annual Exceedance Probability – See Return Period.

Applicant – A landowner, developer or other person who has filed an application for approval to the Borough of Ambler to engage in any Regulated Activity defined in Section 26-405 above.

As-Built Drawings – Engineering or site drawings maintained by the Contractor as he constructs the project and upon which he documents the actual locations of the building components and changes to the original contract documents. These documents, or a copy of same, are turned over to the Qualified Professional at the completion of the project.

Average Recurrence Interval – See Return Period.

Bankfull – The channel at the top-of-bank, or point from where water begins to overflow onto a floodplain.

Baseflow – Portion of stream discharge derived from groundwater; the sustained discharge that does not result from direct runoff or from water diversions, reservoir releases, piped discharges, or other human activities.

BMP (Best Management Practice) – Activities, facilities, designs, measures or procedures used to manage stormwater impacts from Regulated Activities, to meet State Water Quality Requirements, to promote groundwater recharge and to otherwise meet the purposes of this Ordinance. Stormwater BMPs are commonly grouped into one of two broad categories or measures: “structural” or “non-structural.” In this Ordinance, non-structural BMPs or measures refer to operational and/or behavior-related practices that attempt to minimize the contact of pollutants with stormwater runoff, whereas structural BMPs or measures are those that consist of a physical device or practice that is installed to capture and treat stormwater runoff. Structural BMPs include, but are not limited to, a wide variety of practices and devices, from large-scale retention ponds and constructed wetlands, to small-scale underground treatment systems, infiltration facilities, filter strips, bio-retention, wet ponds, permeable paving, grassed swales, sand filters, detention basins, and manufactured devices. Structural Stormwater BMPs are permanent appurtenances to the project site.

BMP Manual – Pennsylvania Stormwater Best Management Practices Manual, No. 363 0300 002 (December 2006).

Borough of Ambler – Ambler Borough, Montgomery County, Pennsylvania

Borough Engineer – A professional engineer (PE) licensed as such in the Commonwealth of Pennsylvania, duly appointed as the Engineer for the Borough, planning agency, or joint planning commission.

Buffer – The area of land immediately adjacent to any stream, measured perpendicular to and horizontally from the top-of-bank on both sides of a stream. See: Top-of-bank.

Channel – An open drainage feature through which stormwater flows. Channels include, but shall not be limited to, natural and man-made watercourses, swales, streams, ditches, canals, and pipes that continuously or intermittently convey flowing water.

Channel Erosion – The widening, deepening, or headward cutting of channels and waterways caused by stormwater runoff or bankfull flows.

Cistern – An underground reservoir or tank for storing rainwater.

Conservation District – The Montgomery County Conservation District.

Culvert – A structure with its appurtenant works which carries water under or through an embankment or fill.

Dam – A man-made barrier, together with its appurtenant works, constructed for the purpose of impounding or storing water or another fluid or semifluid. A dam may include a refuse bank, fill, or structure for highway, railroad, or other purposes that impounds or may impound water or another fluid or semifluid.

DEP (or PADEP) - The Pennsylvania Department of Environmental Protection.

Design Professional (Qualified) – A Pennsylvania Registered Professional Engineer, Registered Landscape Architect or Registered Professional Land Surveyor trained to develop stormwater management plans.

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. See also: Return Period.

Detention Basin – An impoundment designed to collect and retard stormwater runoff by temporarily storing the runoff and releasing it at a predetermined rate. Detention basins are designed to drain completely soon after a rainfall event, and to become dry until the next rainfall event.

Detention Volume- The volume of runoff that is captured and released into the waters of the Commonwealth at a controlled rate.

Developer – Any landowner, agent of such landowner or tenant with the permission of such landowner who makes or causes to be made a subdivision of land or a land development or a person who seeks to undertake any Regulated Earth Disturbance Activity at a project site in the Borough of Ambler.

Development – Any human-induced change to improved or unimproved real estate, whether public or private, including, but not limited to, land development, construction, installation, or expansion of a building or other structure, land division, street construction, and site alteration such as embankments, dredging, grubbing, grading, paving, parking or storage facilities, excavation, filling, stockpiling, or clearing. As referenced in this ordinance development includes both new development and redevelopment.

Development Site – The specific area of land where any regulated activity set forth in Section 26-405 is planned, conducted, or maintained. See Also: Project Site

Diameter at Breast Height (DBH) – The outside bark diameter at breast height which is defined as four and one half (4.5) feet (1.37m) above the forest floor on the uphill side of the tree.

Diffused Drainage Discharge – Drainage discharge that is not confined to a single point location or channel, including sheet flow or shallow concentrated flow.

Discharge – 1. (verb) To release water from a project, site, aquifer, drainage basin or other point of interest; 2. (noun) The rate and volume of flow of water such as in a stream, generally expressed in cubic feet per second. See also Peak Discharge.

Discharge Point – The point at which runoff is released from a stormwater facility.

Directly Connected Impervious Area(DCIA) – An impervious or impermeable surface that is directly connected to a stormwater drainage or conveyance system, leading to direct runoff, decreased infiltration, decreased filtration, and decreased time of concentration.

Disconnected Impervious Area (DIA) – An impervious or impermeable surface that is 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 D: Disconnected Impervious Areas.

Disturbed Areas – Unstabilized land where an earth disturbance activity is occurring or has occurred.

Ditch – A man-made waterway constructed for irrigation or stormwater conveyance purposes.

Drainage Conveyance Facility – A stormwater management facility designed to transport stormwater runoff that includes channels, swales, pipes, conduits, culverts, and storm sewers.

Drainage Easement – A right granted by a landowner to a grantee allowing the use of private land for stormwater management purposes.

Earth Disturbance Activity– A construction or other human activity which disturbs the surface of land including, but not limited to, clearing and grubbing, grading, filling, excavations, embankments, land development, agricultural plowing or tilling, timber harvesting activities, road maintenance activities, mineral or fluid extraction, and the moving, depositing, stockpiling, or storing of soil, rock, or earth materials.

Emergency Spillway – A conveyance area that is used to pass peak discharge greater than the maximum design storm controlled by the stormwater facility.

Encroachment – A structure or activity that changes, expands, or diminishes the course, current, or cross-section of a watercourse, floodway, or body of water.

Erosion – The natural process by which the surface of the land is worn away by water, wind or chemical action.

Erosion and Sediment Control Plan – A site-specific plan identifying BMPs to minimize accelerated erosion and sedimentation. For agricultural plowing or tilling activities, the Erosion and Sediment Control Plan is that portion of a Conservation Plan identifying BMPs to minimize accelerated erosion and sedimentation.

Exceptional Value Waters – Surface waters having qualities that satisfy one (1) or more of the conditions established in Pennsylvania Code Title 25 Environmental Protection, Chapter 93, Water Quality Standards, §93.4b(b) and is a surface water of exceptional ecological significance.

Existing Condition – The dominant land cover during the 5-year period immediately preceding a proposed Regulated Activity. If the initial condition of the site is undeveloped land, the land use shall be considered as “meadow” unless the Borough determines that the natural land cover has a lower Curve Number (CN) or Rational “c” value, such as forested lands.

Existing Recharge Area – An undisturbed surface area or depression where stormwater collects, a portion of which infiltrates and replenishes groundwater.

FEMA – Federal Emergency Management Agency.

Flood – A temporary condition of partial or complete inundation of land areas from the overflow of streams, rivers, and other waters of the Commonwealth.

Floodplain – A relatively flat or low land area adjoining a stream, river or watercourse which is subject to partial or complete inundation or any area subject to the unusual and rapid accumulation or runoff of surface waters from any source. Per the definition in Section 27-202 of the Borough Zoning Ordinance, the one hundred year floodplain shall be that delineated by HUD/FIA in the flood boundary for the Borough of Ambler.

Floodway – The designated area of a floodplain required to carry and discharge flood waters of a given magnitude. Per the definition in Section 27-202 of the Borough Zoning Ordinance, the floodway shall be capable of accommodating the flood of the one hundred year magnitude.

Forest Management/Timber Operations – Planning and associated activities necessary for the management of forest lands. These include timber inventory and preparation of forest management plans, silvicultural treatment, cutting budgets, logging road design and construction, timber harvesting, site preparation, and reforestation.

Freeboard – A vertical distance between the elevation of the design high-water and the top of a dam, levee, tank, basin, swale, or diversion berm. The space is required as a safety margin in a pond or basin.

Grade – 1. (noun) A slope, usually of a road, channel, or natural ground specified in percent and shown on plans as specified herein. 2. (verb) To finish the surface of a roadbed, the top of an embankment, or the bottom of an excavation.

Groundwater – Water beneath the earth’s surface that supplies wells and springs and is within the saturated zone of soil and rock.

Groundwater Recharge – The replenishment of existing natural underground water supplies from precipitation or overland flow.

HEC-HMS – The U.S. Army Corps of Engineers, Hydrologic Engineering Center (HEC) - Hydrologic Modeling System (HMS). This model was used to model the Wissahickon Creek Watershed during the Act 167 plan development and is the basis for the standards and criteria of this Ordinance.

High Quality Waters – Surface waters having qualities that satisfy one (1) or more of the conditions established by Pennsylvania Code Title 25 Environmental Protection, Chapter 93, Water Quality Standards, §93.4b(a) and supports a high quality aquatic community.

Hot Spot – An area where land use or activities generate highly contaminated runoff, with concentrations of pollutants in excess of those typically found in stormwater. Typical pollutant loadings in stormwater may be found in Chapter 8 Section 6 of the Pennsylvania Stormwater Best Management Practices Manual, Pennsylvania Department of Environmental Protection (PADEP) no. 363.0300.002 (2006). More information concerning hot spots may be found in Appendix E.

Hydrograph – A graph representing the discharge of water versus time at a selected point in the drainage system.

Hydrologic Regime – The hydrologic cycle or balance that sustains quality and quantity of stormwater, baseflow, storage, and groundwater supplies under natural conditions.

Hydrologic Soil Group (HSG) – A classification of soils by the Natural Resources Conservation Service, formerly the Soil Conservation Service, into four runoff potential groups. The groups range from ‘A’ soils, which are highly permeable and have produce less runoff, to ‘D’ soils, which have lower permeability and produced increased runoff.

Impervious Surface (Impervious Area) – A surface that prevents the infiltration of water into the ground. Impervious surfaces include, but are not limited to, roofs, parking areas, driveways, streets and sidewalks. Any surface areas designed to be gravel or crushed stone shall be assumed to be impervious surfaces.

Impoundment – A retention or detention basin designed to retain stormwater runoff and release it at a controlled rate.

Infill Development– Development that occurs on smaller parcels that are undeveloped, but are within or in very close proximity to urban or densely developed areas. Infill development usually relies on existing infrastructure and does not require an extension of water, sewer, or other public utilities.

Infiltration – Movement of surface water into the soil, where it is absorbed by plant roots, evaporated into the atmosphere, or percolated downward to recharge groundwater.

Infiltration Structures – A structure designed to direct runoff into the underground water (e.g., French drains, seepage pits or seepage trenches).

Initial Abstraction (I_a) – The value used to calculate the volume or peak rate of runoff in the soil cover complex method. It represents the combination of the rainfall depths retained on vegetation, stored on the soil surface, and infiltrated prior to the start of runoff.

Inlet – The upstream end of any structure through which water may flow.

Intermittent Stream – A stream that flows only part of the time. Flow generally occurs for several weeks or months in response to seasonal precipitation or groundwater discharge.

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.

Land Development – Any of the following activities:

- (i) The improvement of one lot or two or more contiguous lots, tracts, or parcels of land for any purpose involving:

- a. A group of two or more residential or nonresidential buildings, whether proposed initially or cumulatively, or a single nonresidential building on a lot or lots regardless of the number of occupants or tenure, or
 - b. The division or allocation of land or space, whether initially or cumulatively, between or among two or more existing or prospective occupants by means of, or for the purpose of, streets, common areas, leaseholds, condominiums, building groups, or other features;
- (ii) A subdivision of land;
 - (iii) Development in accordance with Section 503(1.1) of the PA Municipalities Planning Code.

Limiting Zone – A soil horizon or condition in the soil profile or underlying a stratum that includes one of the following:

- (i) A seasonal high water table, whether perched or regional, determined by direct observation of the water table or indicated by soil mottling.
- (ii) A rock with open joints, fracture or solution channels, or masses of loose rock fragments, including gravel, with sufficient fine soil to fill the voids between the fragments.
- (iii) A rock formation, other stratum, or soil condition that is so slowly permeable that it effectively limits downward passage of water.

Lot – A designated parcel, tract, or area of land established by a plat or otherwise as permitted by law and to be used, developed, or built upon as a unit.

Main Stem (Main Channel) – Any stream segment or other runoff conveyance used as a reach in the Wissahickon Creek Watershed hydrologic model.

Manning Equation (Manning Formula) – A method for calculation of velocity of flow (e.g., feet per second) and flow or discharge rate (e.g., cubic feet per second) in open channels based upon channel shape, roughness, depth of flow, and slope. “Open channels” may include closed conduits so long as the flow is not under pressure.

MCCD – The Montgomery County Conservation District.

Municipality – Borough of Ambler, Montgomery County, Pennsylvania.

Natural Hydrologic Regime – See Hydrologic Regime.

Nonpoint Source Pollution – Pollution that enters a waterbody from diffuse origins in the watershed and does not result from discernible, confined, or discrete conveyances.

Nonstormwater Discharges – Water flowing in stormwater collection facilities, such as pipes or swales, which are not the result of a rainfall event or snowmelt.

NPDES – National Pollutant Discharge Elimination System, the Federal government’s system for issuance of permits under the Clean Water Act, which is delegated to DEP in Pennsylvania.

NRCS – Natural Resource Conservation Service of the U.S. Department of Agriculture (previously the Soil Conservation Service (SCS)).

Outfall – “Point source” as described in 40 CFR §122.2 at the point where the Borough’s storm sewer system discharges to Surface Waters of the Commonwealth.

Outlet – Points of water disposal to a stream, river, lake, tidewater, or artificial drain.

Parent Tract – The parcel of land from which a land development or subdivision originates, determined from the date of Borough adoption of this Ordinance.

Peak Discharge – The maximum rate of stormwater runoff from a specific storm event.

Penn State Runoff Model (PSRM) – The computer-based hydrologic model developed at the Pennsylvania State University.

Perennial Stream – A stream which contains water at all times except during extreme drought.

Person – An individual, firm, association, organization, partnership, trust, company, corporation, unit of government, public utility or any other legal entity whatsoever which is recognized by law as the subject of rights and duties.

Pervious Surface – A surface that allows the infiltration of water into the ground.

Pipe – A culvert, closed conduit, or similar structure (including appurtenances) that conveys stormwater.

Planning Commission – The Planning Commission of the Borough of Ambler.

Point Source – Any discernible, confined and discrete conveyance including but not limited to, any pipe, ditch, channel, tunnel or conduit from which stormwater is or may be discharged as defined in State Regulations at 25 PA. Code Section 92.1.

Post Construction – Period after construction during which disturbed areas are stabilized, stormwater controls are in place and functioning, and all proposed improvements in the approved land development plan are completed.

Predevelopment – See Existing Condition.

Pretreatment – Techniques employed in stormwater BMPs to provide storage or filtering to trap coarse materials and other pollutants before they enter the system, but not necessarily designed to meet the water quality volume control requirements (WQ_v) of Section 26-427.

Project Site – The specific area of land where any Regulated Earth Disturbance Activities in the Borough of Ambler are planned, conducted, or maintained.

Qualified Professional - Any person licensed by the Pennsylvania Department of State or otherwise qualified by law to perform the work required by the Ordinance.

Rational Formula – A rainfall-runoff relation used to estimate peak flow.

Recharge – The replenishment of groundwater through the infiltration of rainfall, other surface waters, or land application of water or treated wastewater.

Record Drawings – Original documents revised to present the as-built conditions and subsequently provided by the Engineer to the Client. The Engineer reviews the Contractor's as-built drawings against his/her own records for completeness, then either turns these over to the Client or transfers the information to a set of reproducible, in both cases for the Client's permanent records. Record drawings are not the same as record plans submitted for recording with the County in accordance with the Municipalities Planning Code (Act 247).

Recurrence Interval– See Return Period.

Redevelopment – Any development that requires demolition or removal of existing structures or impervious surfaces at a site and replacement with new impervious surfaces. Maintenance activities such as top-layer grinding and re-paving are not considered to be redevelopment. Interior remodeling projects and tenant improvements are also not considered to be redevelopment. Utility trenches in streets are not considered redevelopment unless more than 50 percent of the street width, including shoulders, is removed and re-paved.

Regulated Activities – Any Earth Disturbance Activities or any activities that involve the alteration or development of land in a manner that may affect stormwater runoff.

Regulated Earth Disturbance Activity–Activity involving earth disturbance subject to regulation under 25 PA Code 92, 25 PA Code 102, or the Clean Streams Law.

Release Rate – The percentage of existing conditions peak rate of runoff from a site or subarea to which the proposed conditions peak rate of runoff must be reduced to protect downstream areas.

Repaving – Replacement of an impervious surface that does not involve reconstruction of an existing paved (impervious) surface (e.g., addition of a new layer of asphalt over an existing paved surface).

Replacement Paving – Reconstruction of and full replacement of an existing paved (impervious) surface (e.g., demolition and removal of surface layer, foundation, and base course; and subsequent reconstruction of the entire sequence).

Retention Basin – A structure in which stormwater is stored and not released during the storm event. Retention basins are designed for infiltration purposes, and do not have an outlet. The retention basin must infiltrate stored water in 3 days or less.

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

Return Period (or Average Recurrence Interval) - The average interval, in years, within which a storm event of a given or greater magnitude can be expected to recur. The reciprocal of the return period is the annual exceedance probability of the storm even, that is, the probability that the storm event is equaled or exceeded in any one year period. For example, the 25-year return period rainfall would be expected to recur on the average of once every 25 years, or conversely would have a 1/25 or 4% chance of occurrence or exceedance in any given year.

Riparian Buffer – An area of land adjacent to a body of water and managed to maintain the integrity of stream channels and shorelines to 1) reduce the impact of upland sources of pollution by trapping, filtering, and converting sediments, nutrients, and other chemicals, and 2) supply food, cover and thermal protection to fish and other wildlife.

Road Maintenance – Earth disturbance activities within the existing road cross-section, such as grading and repairing existing unpaved road surfaces, cutting road banks, cleaning or clearing drainage ditches and other similar activities.

Roof Drains – A drainage conduit or pipe that collects water runoff from a roof and leads it away from the structure.

Runoff – Any part of precipitation, as well as any other flow contributions, that flows over the land surface.

SALDO – Subdivision and Land Development Ordinance.

Sediment - Soils or other materials transported by water, air or gravity as a product of erosion.

Sediment Pollution – The placement, discharge, or any other introduction of sediment into the Waters of the Commonwealth.

Sedimentation – The process by which mineral or organic matter is accumulated or deposited by the movement of water, air or gravity. Once this matter is deposited (or remains suspended) it is typically referred to as “sediment”.

Seepage Pit/Seepage Trench – An area of excavated earth filled with loose stone or similar coarse material into which surface water is directed for infiltration into the underground water. More information on Seepage Pits may be found in the PA BMP Manual, December 2006, Chapter 6, Section 4.

Separate Storm Sewer System – A conveyance or system of conveyances (including roads with drainage systems, Borough streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) primarily used for collecting and conveying stormwater runoff.

Shallow Concentrated Flow – Stormwater runoff flowing in shallow, defined ruts prior to entering a defined channel or waterway.

Sheet Flow – A flow process associated with broad, shallow water movement on sloping ground surfaces that is not channelized or concentrated.

Slope – the degree of deviation of a surface plane from the horizontal, usually expressed in percentage, as derived by dividing the vertical distance by the horizontal distance over which the vertical change is measured. A steep slope shall be considered any “slope” with a deviation of fifteen percent (15%) or greater.

Soil Cover Complex Method – A method of runoff computation developed by NRCS that is based on relating soil type and land use/cover to a runoff parameter called curve number (CN).

Source Water Protection Area (SWPA) – The zone through which contaminants, if present, are likely to migrate and reach drinking water wells or surface water intakes.

Special Protection Subwatersheds – Watersheds that have been designated in Pennsylvania Code Title 25 Environmental Protection, Chapter 93 Water Quality Standards as special value (EV) or high quality (HQ) waters.

Spillway – A conveyance that is used to pass the peak discharge of the maximum design storm that is controlled by the stormwater facility.

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

Storm Frequency – The number of times that a given storm “event” occurs or is exceeded on average in a stated period of years. See: Return Period.

Storm Sewer – A system of pipes and/or open channels that convey intercepted runoff and stormwater from other sources excluding domestic sewage and industrial waste.

Stormwater – The drainage runoff generated by precipitation reaching the ground surface.

Stormwater Management Best Management Practices – Is abbreviated as **BMPs** or **SWM BMPs** throughout this Ordinance.

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

Stormwater Management Plan – The watershed plan or plans for managing those land use activities that will influence stormwater runoff quality and quantity and that would impact the Wissahickon Creek watershed adopted by Montgomery and Philadelphia Counties as required by the Act of October 4, 1978, P.L. 864 (Act 167)

Stormwater Management (SWM) Site Plan - The plan prepared by the Applicant or the Applicant's representative indicating how stormwater runoff will be managed at a project site to meet the requirements of this Ordinance. Small Project SWM Site Plans may be prepared for certain projects.

Stream – A flow of water in a natural channel or bed either perennial or intermittent. Examples include brooks, creeks, rivulets or small rivers.

Stream Buffer – The land area adjacent to each side of a stream essential to maintaining water quality (see Buffer).

Stream Enclosure – A bridge, culvert, or other structure in excess of one hundred (100) feet in length upstream to downstream which encloses a regulated water of the Commonwealth.

Streambank Erosion – The widening, deepening, or headward cutting of channels and waterways, cause by stormwater runoff or bankfull flows.

Subarea (Subwatershed) – The smallest drainage unit of a watershed for which stormwater management criteria have been established in the Stormwater Management Plan.

Subdivision – The division or redivision of a lot, tract, or parcel of land by any means into two or more lots, tracts, parcels, or other divisions of land including changes in existing lot lines for the purpose, whether immediate or future, of lease, partition by the court for distribution to heirs or devisees, transfer of ownership, or building or lot development; provided, however, that the subdivision by lease of land for agricultural purposes into parcels of more than ten acres not involving any new street or easement of access or any residential dwelling shall be exempted. See also: Land Development.

Surface Waters of the Commonwealth – Any and all rivers, streams, creeks, rivulets, impoundments, ditches, watercourses, storm sewers, lakes, dammed water, wetlands, ponds, springs and all other bodies or channels of conveyance of surface water, or parts thereof, whether natural or artificial, perennial or intermittent, within or on the boundaries of this Commonwealth.

Swale – A low-lying stretch of land that gathers or carries surface water runoff.

Timber Operations – See: Forest Management.

Time-of-concentration (T_c) – The time required for surface runoff to travel from the hydraulically most distant point of the watershed to a point of interest within the watershed. This time is the combined total of overland flow time and flow time in pipes or channels, if any.

Top-of-bank – Highest point of elevation in a stream channel cross-section at which a rising water level just begins to flow outside of the channel and over the floodplain.

Vegetated Swale – A natural or man-made waterway, usually broad and shallow, covered in erosion resistant grasses, used to convey surface water.

Vernal Pool – Seasonal depressional wetlands that are covered by shallow water for variable periods from winter to spring but may be completely dry for most of the summer and fall.

Watercourse – A channel or conveyance of surface water having defined bed and banks, whether natural or artificial, with perennial or intermittent flow.

Waters of the Commonwealth – Rivers, streams, creeks, rivulets, impoundments, ditches, watercourses, storm sewers, lakes, dammed water, wetlands, ponds, springs and other bodies or channels of conveyance of surface and underground water, or parts thereof, whether natural or artificial, within or on the boundaries of the Commonwealth.

Watershed – Region or area drained by a river, watercourse or other body of water, whether natural or artificial.

Wet Basin – Pond for urban runoff management that is designed to detain urban runoff and always contains water.

Wetland – Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, fens and similar areas.

Wissahickon Creek Watershed Act 167 Stormwater Management Plan – The watershed plan for managing those land use activities that will influence stormwater runoff quality and quantity and that would impact the Wissahickon Creek watershed adopted by Montgomery and Philadelphia Counties as required by the Act of October 4, 1978, P.L. 864 (Act 167).

Woods – A natural groundcover with more than one (1) viable tree of a DBH of six (6) inches or greater per fifteen hundred (1,500) square feet which existed for a minimum of three (3) consecutive years.

SUBPART C. Stormwater Management (SWM) Site Plan Requirements

§26-415. SWM Site Plan Contents

The SWM Site Plan shall consist of a general description of the project, including calculations, maps, and plans. A note on the maps shall refer to the associated computations and Erosion and Sediment (E&S) Control Plan by title and date. The cover sheet of the computations and E&S Control Plan shall refer to the associated maps by title and date. All SWM Site Plan materials shall be submitted to the Borough in a format that is clear, concise, legible, neat, and well organized; otherwise, the Borough may not accept the SWM Site Plan for review.

The following items shall be included in the SWM Site Plan:

A. General

1. General description of the project.
2. All stormwater management facilities must be located on a plan and detailed description of proposed stormwater management techniques, including drainage and

construction specifications of the materials to be used for the stormwater management facilities.

3. Complete hydrologic, hydraulic, and structural computations for all stormwater management facilities.
4. An erosion and sediment control plan. The applicant is required to obtain a letter of approval or adequacy from the Montgomery County Conservation District for the Erosion and Sediment Control Plan.
5. A general description of proposed nonpoint source pollution controls.
6. The SWM Site Plan Application and completed fee schedule form and associated fee.
7. The SWM Site Plan Checklist.

B. Maps

Prepare an Existing Resource and Site Analysis Map (ERSAM) showing environmentally sensitive areas including, but not limited to, steep slopes, ponds, lakes, streams, wetlands, hydric soils, vernal pools, stream buffers, floodplains, hydrologic soil groups, closed topographic depressions and recharge areas. Land development, existing recharge areas, and any other requirements specifically outlined in the municipal SALDO also shall be included.

Map(s) of the project area shall be submitted on 24-inch x 36-inch sheets and/or shall be prepared in a form that meets the requirements for recording at the offices of the Recorder of Deeds of Montgomery County. Map(s) for a Stormwater Management Plan filed as part of a Land Development Application shall meet the requirements for both the SALDO and this Ordinance. The contents of the map(s) shall include, but not be limited to:

1. The location of the project relative to highways, municipal boundaries, or other identifiable landmarks.
2. Existing contours at intervals of two (2) feet or less. In areas of slopes greater than [10] percent, 5-foot contour intervals may be used.
3. Existing streams, lakes, ponds, or other waters of the Commonwealth within the project area.
4. Other physical features including flood hazard boundaries, stream buffers, existing drainage courses, areas of natural vegetation to be preserved, and the total extent of the upstream area draining through the site.
5. The locations of all existing and proposed utilities, sanitary sewers, and water lines within fifty (50) feet of property lines.
6. A map, which may be provided as an overlay, showing soil names and boundaries.
7. Limits of earth disturbance, including the type and amount of impervious area that is proposed.
8. Proposed structures, roads, paved areas, and buildings.
9. Final contours at intervals of two (2) feet or less. In areas of steep slopes (greater than ten [10]percent), 5-foot contour intervals may be used.

10. The name of the development, the name and address of the owner of the property, and the name of the individual or firm preparing the plan.
11. The date of submission.
12. A graphic and written scale of one (1) inch equals no more than fifty (50) feet; for tracts of twenty (20) acres or more, the scale shall be one (1) inch equals no more than one hundred (100) feet.
13. A north arrow.
14. The total tract boundary and size with distances marked to the nearest foot and bearings to the nearest degree.
15. Existing and proposed land use(s).
16. A key map showing all existing man-made features beyond the property boundary that would be affected by the project.
17. Location of all open channels.
18. Overland drainage patterns and swales.
19. A 15-foot wide access easement around all stormwater management facilities to provide ingress to and egress from a public right-of-way, where necessary, or appropriate at discretion of the Borough.
20. The location of all erosion and sediment control facilities.
21. A note on the plan indicating the location and responsibility for maintenance of stormwater management facilities that would be located off site. All off-site facilities shall meet the performance standards and design criteria specified in this Ordinance located within this Borough.
22. A statement, signed by the Applicant, acknowledging that any revision to the approved drainage plan must be approved by the Borough, and that a revised erosion and sediment control plan must be submitted to the Borough and Montgomery County Conservation District for approval.
23. The following signature block for the Design Engineer:

“I, (Design Engineer), on this date (date of signature); hereby certify that this drainage plan meets all requirements of the Department of Environmental Protection’s (DEP’s) regulations and this Ordinance.”

C. Supplemental Information to be Submitted to the Borough

1. The following information shall be submitted by the Applicant and shall include:
 - a. The overall stormwater management concept for the project designed.
 - b. Stormwater runoff computations required by this Ordinance.
 - c. Stormwater management techniques to be applied both during and after development.

- d. Expected project time schedule.
 - e. Development stages or project phases, if so proposed.
 - f. An Operations and Maintenance (O&M) Plan in accordance with Section 26-437 of this Ordinance.
- 2. A description of the effect of the project (in terms of runoff volumes and peak flows) on adjacent properties and on any existing municipal stormwater collection system that may receive runoff from the project site.
 - 3. An Approved Highway Occupancy Permit from the Pennsylvania Department of Transportation (PennDOT) District office when drainage towards PennDOT property is proposed.
- D. Stormwater Management Facilities
- 1. When infiltration measures such as seepage pits, beds, or trenches are used, the locations of existing and proposed septic tank infiltration areas and wells must be shown.
 - 2. All calculations, assumptions, and criteria used in the design of the stormwater management facilities must be shown.

§26-416. Plan Submission

The Borough requires submission of a complete SWM Site Plan, as specified in this Ordinance.

- A. Proof of application or documentation of required permit(s) or approvals for the programs listed below shall be part of the plan:
 - 1. NPDES Permit for Stormwater Discharges from Construction Activities.
 - 2. Any other permit under applicable state or federal regulations.
- B. Six (6) copies of the SWM Site Plan shall be submitted and distributed as follows:
 - 1. Three (3) copies to the Borough accompanied by the requisite Borough fees.
 - 2. Two (2) copies to the Montgomery County Conservation District.
 - 3. The Borough Engineer (where applicable).
 - 4. The Montgomery County Planning Commission will be notified by letter regarding submission of the SWM Plan to the Borough and MCCD, and that no SWM Plan need be submitted to MCPC.
- C. When the SWM Site Plan is associated with a Subdivision and/or Land Development; the submission requirements of the Borough Subdivision and Land Development Ordinance shall be followed.
- D. Any submissions to the agencies listed above that are found to be incomplete shall not be accepted for review and shall be returned to the Applicant with a notification in writing of the specific manner in which the submission is incomplete.
- E. Additional copies shall be submitted as requested by the Borough, Montgomery County Conservation District, or PADEP.

§26-417. Small Project Stormwater Management Site Plan

- A. Residential projects proposing less than or equal to 2,000 square feet of impervious surface and less than 5,000 square feet of earth disturbance qualify as a small project. The requirements of a Small Project Stormwater Management Plan are presented in Appendix G.

§26-418. Stormwater Management Site Plan Review

- A. The SWM Site Plan must be consistent with this Ordinance. If any submissions are found to be incomplete, the municipalities have the option of notifying the applicant and requesting specific information missing from the submission. The application review clock will not start until the Borough has determined that the submission is complete.
- B. The Stormwater Management (SWM) Site Plan shall be reviewed by a Qualified Professional on behalf of the Borough for consistency with the provisions of this Ordinance. After review, the Qualified Professional shall provide a written recommendation for the Borough to approve or disapprove the SWM Site Plan. If it is recommended to disapprove the SWM Site Plan, the Qualified Professional shall state the reasons for the disapproval in writing. The Qualified Professional also may recommend approval of the SWM Site Plan with conditions and, if so, shall provide the acceptable conditions for approval in writing. The SWM Site Plan review and recommendations shall be completed within the time allowed by the Municipalities Planning Code for reviewing subdivision plans.
- C. The Borough will notify the applicant in writing within 45 days whether the SWM Site Plan is approved or disapproved. If the SWM Site Plan involves a Subdivision and Land Development Plan, the notification period is 90 days. If a longer notification period is provided by other statute, regulation, or ordinance, the applicant will be so notified by the Borough. If the Borough disapproves the SWM Site Plan, the Borough shall cite the reasons for disapproval in writing.

§26-419. Modification of Plans

A modification to a submitted SWM Site Plan that involves a change in SWM BMPs or techniques, or that involves the relocation or redesign of SWM BMPs, or that is necessary because soil or other conditions are not as stated on the SWM Site Plan as determined by the Borough shall require resubmission of the SWM Site Plan in accordance with this Subpart.

§26-420. Resubmission of Disapproved SWM Plans

A disapproved SWM Site Plan may be resubmitted, with revisions addressing the Borough's concerns, to the Borough in accordance with this Subpart. The applicable review fee must accompany a resubmission of a disapproved SWM Site Plan.

§26-421. Authorization to Construct and Term of Validity

The Borough's approval of an SWM Site Plan authorizes the regulated activities contained in the SWM Site Plan for a maximum term of validity of 5 years following the date of approval. The Borough may specify a term of validity shorter than 5 years in the approval for any specific SWM Site Plan. Terms of validity shall commence on the date the Borough signs the approval for an SWM Site Plan. If an approved SWM Site Plan is not completed according to Section 26-432 within the term of validity, the Borough may consider the SWM Site Plan disapproved and may revoke any and all

permits. SWM Site Plans that are considered disapproved by the Borough shall be resubmitted in accordance with Section 26-420.

SUBPART D. STORMWATER MANAGEMENT

§26-422. General Requirements

- A. For any of the activities regulated by this Ordinance, unless preparation of a Stormwater Management (SWM) Site Plan is specifically exempted, the preliminary or final approval of subdivision and/or land development plans, the issuance of any building or occupancy permit, the commencement of any earth disturbance activity shall not proceed until the Property Owner or Applicant or his/her agent has received written approval from the Borough of a SWM Site Plan that demonstrates compliance with the requirements of this Ordinance, and a written approval of an adequate Erosion and Sediment (E&S) Control Plan from the Borough or Montgomery County Conservation District, when and as required.
- B. SWM Site Plans approved by the Borough, in accordance with Subpart C, shall be on-site throughout the duration of the Regulated Activity.
- C. The Borough may, after consultation with the Department of Environmental Protection (DEP), approve measures for meeting the state water quality requirements other than those in this Ordinance, provided that they meet the minimum requirements of, and do not conflict with, state law including but not limited to the Clean Streams Law.
- D. For all regulated earth disturbance activities, Erosion and Sediment (E&S) control Best Management Practices (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 Title 25 of the Pennsylvania Code and the Clean Streams Law. Various BMPs and their design standards are listed in the Erosion and Sediment Pollution Control Manual, No. 363-2134-008 (April 15, 2000), as amended and updated.
- E. For all Regulated Activities, implementation of the volume controls in Section 26-427 is required.
- F. Impervious areas:
 1. For Land Development:
 - a. The measurement of impervious areas shall include all of the impervious areas in the total proposed development even if development is to take place in stages.
 - b. For development taking place in stages, the entire development plan must be used in determining conformance with this Ordinance.
 - c. The total impervious coverage allowable per the applicable Zoning District must be used in determining conformance with this Ordinance.
 3. For projects that add impervious area to a parcel, the total impervious area within the limits of disturbance is subject to the requirements of this ordinance area.
- G. Stormwater flows onto adjacent property shall not be created, increased, decreased, relocated, or otherwise altered without written notification of the adjacent property owner(s)

by the applicant. Such stormwater flows shall be subject to the requirements of this Ordinance.

- H. All Regulated Activities shall include such measures as necessary to:
 - 1. Protect health, safety and property;
 - 2. Meet the water quality goals of this Ordinance by implementing measures to:
 - a. Minimize disturbance to floodplains, wetlands, and wooded areas.
 - b. Create, maintain, repair or extend riparian buffers.
 - c. Avoid erosive flow conditions in natural flow pathways.
 - d. Minimize thermal impacts to waters of the Commonwealth.
 - e. Disconnect impervious surfaces (i.e., Disconnected Impervious Areas, DIAs) by directing runoff to pervious areas, wherever possible. See Appendix D for details on DIAs.
 - 3. To the maximum extent practicable, incorporate the techniques for Low Impact Development Practices (e.g., protecting existing trees, reducing areas of impervious surface, cluster development, and protecting open space) described in the *Pennsylvania Stormwater Best Management Practices Manual*, Pennsylvania Department of Environmental Protection (PADEP) no. 363-0300-002(2006). See Appendix B for a summary description.
- I. The design of all facilities over karst features shall include an evaluation of measures to minimize adverse effects.
- J. Infiltration BMPs should be dispersed on-site, made as shallow as practicable, and located to maximize use of natural on-site infiltration features while still meeting the other requirements of this Ordinance.
- K. Storage facilities shall completely drain both the volume control and rate control capacities over a period of time not less than 24 and not more than 72 hours from the end of the design storm.
- L. The Design Storms to be used in the analysis of peak rates of discharge are listed in Appendix A: Table A-1.
- M. For all regulated activities, 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.
- N. Various BMPs and their design standards are listed in the *Pennsylvania Stormwater Best Management Practices Manual* (PA BMP Manual).

§26-423. Permit Requirements by Other Governmental Entities

Approvals issued and actions taken under this Ordinance do not relieve the Applicant of the responsibility to secure required permits or approvals for activities regulated by any other code, law, regulation or ordinance.

§26-424. Erosion and Sediment Pollution Control

- A. No regulated earth disturbance activities within the Borough of Ambler shall commence until approval by the Borough of an Erosion and Sediment Control Plan for construction activities. Where a regulated earth disturbance activity occurs in connection with a subdivision or land development, compliance with this Part shall be a component of the subdivision or land development application.
- B. Approval of Earth Disturbance Activities is required by the Borough per Table 26-406.2.
- C. The Applicant must comply with Title 25 Chapter 102 of the PA Code and any other applicable State, County and Borough codes. PADEP requires an NPDES Construction Activities permit and an engineered Post-Construction SWM Plan for projects proposing earth disturbance greater than 1-acre.
- D. Evidence that the necessary permit(s) for regulated earth disturbance activities have been received from the appropriate PADEP regional office or the MCCD must be provided to the Borough.
- E. A copy of the approved Erosion and Sediment Control Plan and any applicable permits, as required by DEP regulations, shall be available at the project site at all times.
- F. Additional erosion and sediment control standards and criteria are recommended to be applied where infiltration BMPs are proposed. They shall include the following:
 - 1. Areas proposed for infiltration BMPs shall be protected from sedimentation and compaction during the construction phase to maintain maximum infiltration capacity.
 - 2. Infiltration BMPs shall not be constructed nor receive runoff, until the entire drainage areas tributary to the infiltration BMPs have achieved final stabilization.

§26-425. Nonstructural Project Design to Minimize Stormwater Impacts

The design of all regulated activities should include the following to minimize stormwater impacts:

(See Appendix C for a Nonstructural Project Design Checklist.)

- A. The Applicant should find practicable alternatives to the surface discharge of stormwater, the creation of impervious surfaces, and the degradation of waters of the Commonwealth and must maintain as much as possible the natural hydrologic regime of the site.
- B. An alternative is practicable if it is available and capable of implementation after taking into consideration existing technology and logistics in light of overall project purposes and other municipal requirements.

§26-426. Groundwater Recharge

Infiltration Best Management Practices (BMPs) shall meet the following minimum requirements unless the site qualifies for an exemption from the infiltration requirements of this ordinance as listed in Section 26-406:

- 1. Infiltration BMPs intended to receive runoff from developed areas shall be selected based on suitability of soils and site conditions (See Table A-6 in Appendix A for a list of Infiltration BMPs). Infiltration BMPs shall be constructed on soils that have the following characteristics:

- a. A minimum soil depth of twenty-four (24) inches between the bottom of the infiltration BMPs and bedrock or seasonally high water table.
 - b. An infiltration rate sufficient to accept the additional stormwater load and dewater completely as determined by field tests. A minimum of 0.2 inches/hour (in/hr) shall be utilized and for acceptable rates a safety factor of 50% should be applied for design purposes (e.g., for soil which measured 0.4 in/hr, the BMP design should be 0.2in/hr to ensure safe infiltration rates after construction.)
 - c. All open-air infiltration facilities shall be designed to completely infiltrate the runoff volume within three (3) days (72 hours) from the start of the design storm.
 - d. All subsurface and contained facilities such as capture-and-reuse systems must have storage available equivalent to the Water Volume Control amount.
 - e. Pretreatment (See Section 26-414) shall be provided prior to infiltration.
2. Soils - A detailed soils evaluation of the project site shall be prepared for all regulated activities and to determine the suitability for infiltration facilities. The evaluation shall be performed by a Qualified Professional, and, at a minimum, address soil permeability, depth to bedrock, and subgrade stability. The general process for designing an infiltration BMP shall be:
- a. Analyze hydrologic soil groups as well as natural and man-made features within the site to determine general areas of suitability for infiltration practices. In areas where development on fill material is under consideration, conduct geotechnical investigations of sub-grade suitability; infiltration may not be ruled out without conducting these tests.
 - b. Perform field tests, such as double ring infiltrometer or hydraulic conductivity tests (at the level of the proposed infiltration surface) to determine the appropriate hydraulic conductivity rate. Percolation tests are not accepted for design purposes.
 - c. Design the infiltration structure based on field determined capacity at the level of the proposed infiltration surface and based on a safety factor of 50%.
 - d. If on-lot infiltration structures are proposed, it must be demonstrated to the Borough that the soils are conducive to infiltrate on the lots identified.
 - e. An impermeable liner shall be required in detention basins where the possibility of groundwater contamination exists. A detailed hydrogeologic investigation may be required by the Borough.
3. The infiltration facility shall be sized based upon the following volume criteria:
Where practicable and appropriate the recharge volume shall be infiltrated on site. The recharge volume shall be equal to one inch of runoff (I) over all proposed impervious surfaces.
The Re_v required shall be computed as:

$$Re_v = (1 \text{ inch}/12 \text{ inches}) * (I)$$

Where:

Re_v = Recharge Volume (cubic feet)

I = Impervious Area (square feet) (per 26-422.F)

An asterisk (*) in equations denotes multiplication.

§26-427. Volume Control

The low impact development practices provided in the BMP Manual shall be utilized for all regulated activities to the maximum extent practicable. Water Volume Controls shall be implemented using the *Design Storm Method* in Subsection A or the *Simplified Method* in Subsection B below. For regulated activity areas equal to 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. All regulated activities greater than one (1) acre must use the Design Storm Method.

- A. The *Design Storm Method* (CG-1 in the BMP Manual) is applicable to any size of regulated activity. This method requires detailed modeling based on site conditions.
1. The post-development total runoff volume for all storms equal to or less than the 2-year, 24-hour storm event shall not be increased.
 2. For modeling purposes:
 - a. Existing (predevelopment) nonforested pervious areas must be considered meadow.
 - b. Twenty (20) percent of existing impervious area, when present, shall be considered meadow in the model for existing conditions.
- B. The *Simplified Method* (CG-2 in the BMP 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 storage facilities. For new impervious surfaces:
1. Stormwater facilities shall capture at least the first two (2) inches of runoff from all new impervious surfaces.
Volume (cubic feet) = (2/12) * Impervious Surfaces (square feet)
 2. At least the first one (1) inch 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 the Commonwealth. Removal options include reuse, evaporation, transpiration, and infiltration.
Volume (cubic feet) = (1/12) * Impervious Surfaces (square feet)
 3. Wherever possible, infiltration facilities should be designed to accommodate infiltration of the entire permanently removed runoff; however, in all cases at least the first half (0.5) inch of the permanently removed runoff should be infiltrated.

4. This method is exempt from the requirements of Section 26-429, Peak Rate Controls.

§26-428. Stream Bank Erosion (Channel Protection)

- A. If a perennial or intermittent stream passes through the site, the Applicant shall install either of the following options.
 1. A riparian buffer extending a minimum of ten (10) feet to either side of the top-of-bank of the channel. The buffer area shall be established and maintained in an undisturbed state. This buffer area may be maintained as a meadow with minimal mowing of the grassed area, or as a forested buffer, being planted with appropriate native vegetation (refer to Appendix B of the BMP Manual for plant lists). If an existing buffer is legally prescribed (i.e., deed, covenant, easement, etc.) and it exceeds the requirements of this Ordinance, the existing buffer shall be maintained. This does not include lakes or wetlands.
 2. Another option or options among available best management practices within the BMP Manual, design standards and alternatives that collectively are substantially equivalent to a riparian buffer in effectiveness, to reduce runoff in a volume equivalent to the volume reduction of a riparian buffer described above.
- B. Applicants shall adhere to the following Stream Bank Erosion/Channel Protection Requirements:
 1. In addition to the control of water quality volume (in order to minimize the impact of stormwater runoff on downstream stream bank erosion), the primary requirement is to design a BMP to detain the proposed conditions 2-year, 24-hour storm event to the existing conditions 1-year flow using the SCS Type II distribution. Additionally, provisions shall be made (such as adding a small orifice at the bottom of the outlet structure or a sand filter) so that the proposed conditions 1-year, 24-hour storm event takes a minimum of twenty-four (24) hours to drain from the facility from a point when the maximum volume of water from the 1-year, 24-hour storm event is captured (i.e., the maximum water surface elevation is achieved in the facility). Release of water can begin at the start of the storm (i.e., the invert of the water volume control orifice is at the invert of the facility).
 2. The minimum orifice diameter in the outlet control structure shall be three (3) inches, in addition a trash rack shall be installed to prevent clogging. On sites with drainage areas that do not provide enough runoff volume to allow a 24-hour attenuation with the 3-inch orifice, orifice sizes less than three (3) inches can be utilized, provided that the design will prevent clogging of the intake. It is recommended that the design, to accommodate maintenance, include a replaceable and/or porous media filter cartridges.

§26-429. Stormwater Peak Rate Control and Management Districts

- A. Standard for managing runoff from each subarea in the Watershed for the 2-, 5-, 10-, 25-, 50-, and 100-year design storms are shown in Table 26-417.1 below.

TABLE 26-429.1

**PEAK RATE CONTROL STANDARDS BY
STORMWATER MANAGEMENT DISTRICT IN THE
WISSAHICKON CREEK WATERSHED**

District	Proposed Condition Design Storm		Existing Condition Design Storm
B	2-year	Reduce to	1-year
	5-year		2-year
	10-year		5-year
	25-year		10-year
	50-year		25-year
	100-year		50-year

- B. Off-site Areas – When calculating the allowable peak runoff rates, developers do not have to account for runoff draining into the subject development site from an off-site area. On-site drainage facilities shall be designed to safely convey off-site flows through the development site.
- C. Site Areas – The stormwater management site area is the only area subject to the management district criteria. Non-impacted areas or non-regulated activities bypassing the stormwater management facilities would not be subject to the management district criteria.
- D. Alternate Criteria for Redevelopment Sites - For redevelopment sites, one of the following minimum design parameters shall be accomplished, whichever is most appropriate for the given site conditions as determined by the Borough;
 - 1. Meet the full requirements specified by Table 26-429.1 and Section 26-430.A through Section 26-430.J.
 - or
 - 2. Reduce the total impervious surface on the site by at least twenty (20) percent based upon a comparison of existing impervious surface to proposed impervious surface.
- E. Stormwater Control Measures which increase storage or infiltration volume, and which are not associated with new land development or redevelopment activity that increases runoff volume above existing levels, are exempt from the peak rate requirements of this ordinance, so long as peak outflow is not increased.

§26-430. Calculation Methodology

- A. The following criteria shall be used for runoff calculations:
 - 1. For development sites not considered redevelopment, the ground cover used to determine the existing conditions runoff volume and flow rate shall be as follows:
 - i. Wooded sites shall use a ground cover of “woods in good condition.” A site is classified as wooded if a continuous canopy of trees exists over a ¼ acre.

- ii. The undeveloped portion of the site including agriculture, bare earth, and fallow ground shall be considered as “meadow in good condition,” unless the natural ground cover generates a lower curve number (CN) or Rational “c” value (i.e., woods) as listed in Tables A-4 or A-7 in Appendix A.
 - 2. For development and redevelopment sites, the ground cover used to determine the existing conditions runoff volume and flow rate for the developed portion of the site shall be based upon actual land cover conditions. If the developed site contains impervious surfaces, 20 percent of the impervious surface area shall be considered meadow in the model for existing conditions.
- B. Stormwater runoff peak discharges from all development sites with a drainage area of greater than 2 acres shall be calculated using a generally accepted calculation technique that is based on the NRCS Soil Cover Complex Method. Table 26-427.1 summarizes acceptable computation methods. The method selected by the Qualified Professional shall be based on the individual limitations and suitability of each method for a particular site. The Borough may allow the use of the Rational Method ($Q=CIA$) to estimate peak discharges from drainage areas that contain less than 2 acres.
 - Q = Peak flow rate, cubic feet per second (CFS)
 - C = Runoff coefficient, dependent on land use/cover
 - I = Design rainfall intensity, inches per hour
 - A = Drainage Area, acres.
- C. All calculations consistent with this ordinance using the Soil Cover Complex Method shall use the appropriate design rainfall depths for the various return period storms according to Table A-1 in Appendix A. If a hydraulic computer model such as PSRM or HEC-1/ HEC-HMS is used for stormwater runoff calculations, then the duration of rainfall shall be 24-hours.

TABLE 26-430.1
Acceptable Computation Methodologies for Stormwater Management Plans

METHOD	METHOD DEVELOPED BY	APPLICABILITY
TR-20 (or commercial computer package based on TR-20)	USDA NRCS	Applicable where use of full hydrology computer model is desirable or necessary.
TR-55 (or commercial computer package based on TR-55)	USDA NRCS	Applicable for land development plans within limitations described in TR-55.
HEC-1/ HEC-HMS	US Army Corps of Engineers	Applicable where use of full hydrologic computer model is desirable or necessary.
PSRM	Penn State University	Applicable where use of full hydrologic computer model is desirable or necessary; simpler than TR-20 or HEC-1.

Rational Method (or commercial computer package based on Rational Method)	Emil Kuichling(1889)	Peak Discharge only for sites less than 2 acres or as approved by the Borough and/or Borough Engineer
Other Methods	Varies	Other computation methodologies approved by the Borough and/or Borough Engineer.

- D. All calculations using the Rational Method shall use rainfall intensities consistent with appropriate times-of-concentration for overland flow and return periods from Table A-1 in Appendix A. Times-of-concentration for overland flow shall be calculated using the methodology presented in Chapter 3 of *Urban Hydrology for Small Watersheds*, NRCS, TR-55 (as amended or replaced from time to time by NRCS). Times-of-concentration for channel and pipe flow shall be computed using Manning’s equation.
- E. Runoff Curve Numbers (CN) for both existing and proposed conditions to be used in the soil cover complex method shall be based on Table A-4 in Appendix A.
- F. Runoff coefficients (C) for both existing and proposed conditions for use in the Rational Method shall be consistent with Table A-7 in Appendix A.
- G. Runoff from proposed sites graded to the subsoil will not have the same runoff conditions as the site under existing conditions because of soil compaction, even after top-soiling or seeding. The proposed condition “CN” or “C” shall increase by 5% to better reflect proposed soil conditions.
- H. The Manning equation is preferred for one-dimensional, gradually-varied, open channel flow. In other cases, appropriate, applicable methods should be employed; however, early coordination with the Borough is necessary.
- I. Outlet structures for stormwater management facilities shall be designed to meet the performance standards of this Ordinance using the generally accepted hydraulic analysis technique or method of the Borough.
- J. The design of any stormwater detention facilities intended to meet the performance standards of this Ordinance shall be verified by routing the design storm hydrograph through these facilities using the Storage-Indication Method. The design storm hydrograph shall be computed using an acceptable calculation method (Table 26-427.1) that produces a full hydrograph. The Borough may approve the use of any generally accepted full hydrograph approximation technique that shall use a total runoff volume that is consistent with the volume from a method that produces a full hydrograph.

§26-431. Other Requirements

- A. Hot Spots
 - 1. The use of infiltration BMPs is prohibited on hot spot land use areas. Examples of hot spots are listed in Appendix E.
 - 2. Stormwater runoff from hot spot land uses shall be pretreated. In no case may the same BMP be employed consecutively to meet this requirement. Guidance regarding acceptable methods of pre-treatment is located in Appendix E.

B. West Nile Guidance Requirements

All wet basin designs shall incorporate controls consistent with the West Nile Guidance found in Appendix F.

SUBPART E. Inspections

§26-432. Inspections

- A. The Borough shall inspect all phases of the installation of the Best Management Practices (BMPs) and/or stormwater management (SWM) facilities as deemed appropriate by the Borough.
- B. During any stage of the work, if the Borough determines that the BMPs and/or stormwater management (SWM) facilities are not being installed in accordance with the approved SWM plan, the Borough, shall revoke any existing permits or other approvals and issue a cease and desist order until a revised SWM Site Plan is submitted and approved, as specified in this Ordinance, and until the deficiencies are corrected.
- C. A final inspection of all BMPs and/or SWM facilities shall be conducted by the Borough to confirm compliance with the approved Stormwater Management Site Plan prior to the issuance of any Occupancy Permit.
- D. The applicant and/or developer shall be responsible for providing as-built plans of all SWM BMPs included in the approved SWM Site Plan. The as-built plans and an explanation of any discrepancies, which were reviewed and received approval by the Borough, shall be submitted to the Borough.
- E. The as-built submission shall include a certification of completion signed and sealed by a Qualified Professional verifying that all permanent SWM BMPs have been constructed according to the approved plans and specifications. If any Qualified Professionals contributed to the construction plans, they must sign and seal the completion certificate.
- F. Final plans based upon the Record Drawings must be submitted to the Borough for the project to be eligible for the issuance of a Certificate of Occupancy.

SUBPART F. FEES AND EXPENSES

§26-433. Stormwater Management Site Plan Review and Inspection Fee

Fees shall be established by the Borough to cover plan review and construction inspection costs incurred by the Borough. All fees shall be paid by the Applicant. A review and inspection fee schedule shall be established by Resolution of Borough Council. The Borough may periodically update the fee schedule to ensure that its costs are adequately reimbursed.

§26-434. Expenses Covered by Fees

The fees authorized by this Ordinance (unless otherwise waived by the Borough) shall, at a minimum, cover:

- A. Borough Administrative Costs.
- B. Borough Legal Costs.
- C. Borough Engineering Costs.
- D. The review of the Stormwater Management Site Plan by the Borough.
- E. The review of As-Built Drawings.
- F. Site Inspections.
- G. The inspection of SWM facilities and drainage improvements during construction.
- H. The final inspection at the completion of the construction of the SWM facilities and drainage improvements presented in the SWM Site Plan.
- I. Any additional work required to enforce any permit provisions regulated by this Ordinance, correct violations, and assure proper completion of stipulated remedial actions.

SUBPART G. MAINTENANCE RESPONSIBILITIES

§26-435. Performance Guarantee

- A. For subdivisions and land developments, the Applicant shall provide a financial guarantee to the Borough for the timely installation and proper construction of all stormwater management (SWM) facilities as:
 - 1. Required by the approved SWM Site Plan equal to or greater than the full construction cost of the required controls; or
 - 2. The amount and method of payment provided for in the Subdivision and Land Development Ordinance.
- B. For other regulated activities, the Borough shall require a financial guarantee from the Applicant.

§26-436. Responsibilities for Operation and Maintenance of Stormwater Facilities and BMPs

- A. The owner of any land upon which stormwater facilities and BMPs will be placed, constructed, or implemented, as described in the stormwater facility and BMP Operations and Maintenance (O&M) plan, shall record the following documents in the Office of the Recorder of Deeds for Montgomery County, within ninety (90) days of approval of the stormwater facility and BMP O&M plan by the Borough:
 - 1. The O&M plan, or a summary thereof,
 - 2. O&M agreements under Section 26-438, and
 - 3. Easements under Section 26-439.

The developer or builder shall immediately notify the Borough Secretary of the book and page wherein said documents are recorded and shall supply a copy of the recorded documents. If such information is not received within 100 days of the approval of the stormwater facility and BMP O&M plan by the Borough, the stormwater facilities and BMP O&M plan shall not be

considered an approved plan for the purpose of this Subpart. Additional Operation and Maintenance Agreement guidance can be found in Appendix H.

- B. The Borough may suspend or revoke any approvals granted for the project site upon discovery of failure on the part of the owner to comply with this section.
- C. The following items shall be included in the Stormwater Facility and BMP O&M Plan:
 - 1. Map(s) of the project area, in a form that meets the requirements for recording at the offices of the Recorder of Deeds of Montgomery County, and shall be submitted on 24-inch x - 36-inch sheets. The contents of the maps(s) shall include, but not be limited to:
 - i. Clear identification of the location and nature of stormwater facilities and BMPs.
 - ii. The location of the project site relative to highways, Borough boundaries or other identifiable landmarks.
 - iii. Existing and final contours at intervals of two (2) feet, or others as appropriate.
 - iv. Existing streams, lakes, ponds, or other bodies of water within the project site area.
 - v. Other physical features including flood hazard boundaries, sinkholes, streams, existing drainage courses, and areas of natural vegetation to be preserved.
 - vi. The locations of all existing and proposed utilities, sanitary sewers, and water lines on site and within 50 feet of property lines of the project site.
 - vii. Proposed final changes to the land surface and vegetative cover, including the type and amount of impervious area that would be added.
 - viii. Proposed final structures, roads, paved areas, and buildings, and
 - ix. A twenty (20)-foot-wide access easement around all stormwater facilities and BMPs that would provide ingress to and egress from a public right-of-way.
 - 2. A description of how each stormwater facility and BMP will be operated and maintained, and the identity and contact information associated with the person(s) responsible for O&M.
 - 3. The name of the project site, the name and address of the owner of the property, and the name of the individual or firm preparing the plan, and
 - 4. A statement, signed by the facility owner, acknowledging that the stormwater facilities and BMPs are fixtures that can be altered or removed only after approval by the Borough.
- D. The Stormwater Facility and BMP O&M Plan for the project site shall establish responsibilities for the continuing O&M of all stormwater facilities and BMPs, as follows:
 - 1. If a plan includes structures or lots which are to be separately owned and in which streets, sewers and other public improvements are to be dedicated to the Borough, stormwater facilities and BMPs may also be offered for dedication to and maintained by the Borough.
 - 2. If a plan includes O&M by single ownership, or if sewers and other public improvements are to be privately owned and maintained, the O&M of stormwater facilities and BMPs shall be the responsibility of the owner or private management entity.

- E. The Borough shall make the final determination on the continuing O&M responsibilities. The Borough reserves the right to accept or reject the O&M responsibility for any or all of the stormwater facilities and BMPs.
- F. Facilities, areas, or structures used as BMPs shall be enumerated as permanent real estate appurtenances and recorded as deed restrictions or conservation easements that run with the land.
- G. The O&M Plan shall be recorded as a restrictive deed covenant that runs with the land.
- H. The Borough may take enforcement actions against an owner for any failure to satisfy the provisions of this Subpart and this Ordinance.

§26-437. Borough Review of Stormwater Facilities and BMP Operations & Maintenance Plan

- A. The Borough shall review the Stormwater Facilities and BMP O&M Plan for consistency with the purposes and requirements of this ordinance, and any permits issued by PADEP.
- B. The Borough shall notify the Applicant in writing whether the Stormwater Facility and BMP O&M Plan is approved.
- C. The Borough shall require a “Record Drawing” of all stormwater facilities and BMPs.

§26-438. Operation and Maintenance Agreement for Privately Owned Stormwater Facilities and BMPs

- A. The owner shall sign an O&M agreement with the Borough covering all stormwater facilities and BMPs that are to be privately owned. The O&M agreement shall be transferred with transfer of ownership. The agreement shall be subject to review and approval by the Borough.
- B. Other items may be included in the agreement where determined necessary to guarantee the satisfactory O&M of all stormwater facilities and BMPs. The O&M Agreement shall be subject to the review and approval of the Borough.
- C. The owner is responsible for O&M of the SWM BMPs. If the owner fails to adhere to the O&M Agreement, the Borough may perform the services required and charge the owner appropriate fees. Nonpayment of fees may result in a lien against the property.

§26-439. Stormwater Management Easements

- A. The owner must obtain all necessary real estate rights to install, operate, and maintain all stormwater facilities in the SWM Site Plan and the O&M Plan.
- B. The owner must provide the Borough easements, or other appropriate real estate rights, to perform inspections and maintenance for the preservation of stormwater runoff conveyance, infiltration, and detention areas.

SUBPART H. PROHIBITIONS

§26-440. Prohibited Discharges and Connections

- A. Any drain or conveyance, whether on the surface or subsurface, that allows any non-stormwater discharge, including sewage, process wastewater, or wash water to enter the waters

of the Commonwealth is prohibited. Any connections to the storm drain system from indoor drains and sinks also are prohibited.

- B. No person shall allow, or cause to allow, discharges into surface waters of the Commonwealth which are not composed entirely of stormwater, 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 the Commonwealth:
 - 1. Discharges from firefighting activities,
 - 2. Potable water sources including water line flushing,
 - 3. Irrigation drainage,
 - 4. Air conditioning condensate,
 - 5. Springs,
 - 6. Water from crawl space pumps,
 - 7. Flows from riparian habitats and wetlands,
 - 8. Uncontaminated water from foundations, or footing drains,
 - 9. Lawn watering,
 - 10. De-chlorinated swimming pool discharges (per PADEP requirements),
 - 11. Uncontaminated groundwater,
 - 12. Water from individual residential car washing, and/or
 - 13. Routine external building wash down (which does not use detergents or other compounds)
- D. In the event that the Borough or DEP determines that any of the discharges identified in Subsection C significantly contribute to pollution of the waters of the Commonwealth, the Borough or DEP will notify the responsible person(s) to cease the discharge.

§26-441. Roof Drains

- A. Roof Drains and sump pumps shall not be connected to sanitary sewers.
- B. Roof drains and sump pumps shall discharge to infiltration or vegetative BMPs to the maximum extent practicable.
- C. Roof drains and sump pumps may be connected to streets, storm sewers or roadside ditches only when permitted by the Borough.

§26-442. Alteration of Stormwater Management BMPs

- A. No person shall modify, remove, fill, landscape, or alter any existing Stormwater Management BMPs, facilities, areas or structures unless it is part of an approved maintenance program and written approval of the Borough has been obtained.

- B. No person shall place any structure, fill, landscaping, or vegetation into a stormwater facility or BMP or within a drainage easement which would limit or alter the functioning of the stormwater facility or BMP without the written approval of the Borough.

SUBPART I. ENFORCEMENT AND PENALTIES

§26-443. Right-of-Entry

- A. Upon presentation of proper credentials, duly authorized Borough representatives may enter at reasonable times upon any property within the Borough to inspect the implementation, condition, or operation and maintenance of the stormwater facilities or Best Management Practices (BMPs) in regard to any aspect governed by this Ordinance.
- B. Landowners with stormwater facilities and BMPs on their property shall allow persons working on behalf of the Borough ready access to all parts of the premises for the purposes of determining compliance with this Ordinance.
- C. Persons working on behalf of the Borough shall have the right to temporarily locate on any stormwater facility or BMP in the Borough such devices as are necessary to conduct monitoring and/or sampling of the discharges from such stormwater facilities or BMP.

§26-444. Inspection

Stormwater Management (SWM) Best Management Practices (BMPs) should be inspected for proper operation by the landowner, or the owner's designee (including the Borough for dedicated and owned facilities), according to the following list of minimum frequencies:

1. Annually for the first 5 years,
2. Once every 3 years thereafter,
3. During or immediately after the cessation of a 10-year, or greater storm event, and/or,
4. As specified in the Operations and Maintenance (O&M agreement).

§26-445. Enforcement

All inspections regarding compliance with the Stormwater Management (SWM) Site Plan and this Ordinance shall be the responsibility of the Borough.

- A. Public nuisance.
 1. The violation of any provision of this section is hereby deemed a public nuisance.
 2. Each day that a violation continues shall constitute a separate violation.
- B. Whenever the Borough finds that a person has violated a prohibition or failed to meet a requirement of this Ordinance, the Borough may order compliance by notifying the responsible person. Such notice may, without limitation, include the following remedies:
 1. Performance of monitoring, analyses, and reporting;
 2. Elimination of prohibited connections or discharges;
 3. Cessation of any violating discharges, practices, or operations;

4. Abatement or remediation of stormwater pollution or contamination hazards and the restoration of any affected property;
 5. Payment of a fine to reimburse administrative and remediation costs;
 6. Implementation of stormwater controls and BMPs; and
 7. Operation and Maintenance (O&M) of stormwater facilities and BMPs.
- C. Such notification shall set forth the nature of the violation(s) and establish a time limit for correction of those violations(s). Said notice may further advise that, if applicable, should the violator fail to take the required action within the established deadline, the work may be done by the Borough and the expenses may be charged to the violator.
- D. Failure to comply within the time specified may subject a violator to the penalty provisions of this Ordinance. All such penalties shall be deemed cumulative and shall not prevent the Borough from pursuing other remedies available in law or equity.

§26-446. Suspension and Revocation of Permits and Approvals

- A. Any building, land development or other permit or approval issued by the Borough may be suspended or revoked, in whole or in part, by the Borough for:
1. Non-compliance with or failure to implement any provision of the approved SWM Site Plan or O&M Agreement.
 2. A violation of any provision of this Ordinance; or
 3. The creation of any condition or the commission of any act during construction or development which constitutes or creates a hazard, nuisance, pollution, or endangers the life or property of others.
- B. A suspended permit may be reinstated by the Borough when:
1. The Borough has inspected and approved the corrections to the stormwater facilities and BMPs or the elimination of the hazard or nuisance, and;
 2. The Borough is satisfied that all applicable violations in this Ordinance have been corrected.
- C. Any permit or approval that has been revoked by the Borough cannot be reinstated. The Applicant may apply for a new permit under the procedures outlined in this Ordinance.

§26-447. Penalties

- A. Any person, firm or corporation who shall violate any provision of this Part shall, upon conviction thereof, be sentenced to pay a fine of not more than \$1,000 plus costs and, in default of payment of said fine and costs, to a term of imprisonment not to exceed 30 days. Each day of noncompliance constitutes a separate violation.
- B. In addition, the Borough may institute injunctive, mandamus or any other appropriate action or proceeding at law or in equity for the enforcement of this ordinance. Any court of competent jurisdiction shall have the right to issue restraining orders, temporary or permanent injunctions, mandamus, or other appropriate forms of remedy or relief.

§26-448. Appeals

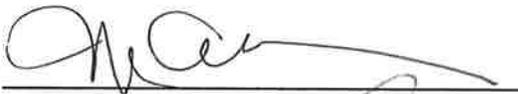
- A. Any person aggrieved by any action of the Borough or its designee, relevant to the provisions of this Ordinance, may appeal to the appropriate judicial or administrative body according to applicable Pennsylvania Law.
- B. Any person aggrieved by any decision of the Borough, relevant to the provisions of this Ordinance, may appeal to the County Court of Common Pleas in the county where the activity has taken place within 30 days of the Borough's decision.

This ordinance is effective on the earliest date provided for in section 3301.3(b) of the Pennsylvania Borough Code.

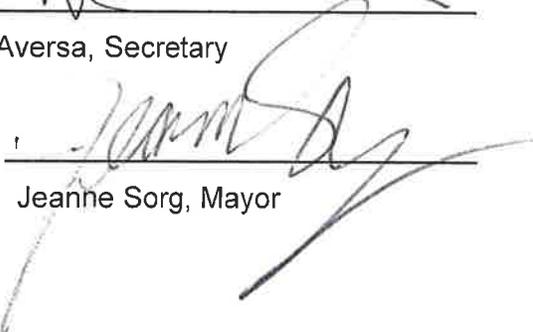
SO ORDAINED this 17th day of October, 2017.



Salvatore Pasceri, Council President

ATTEST: 

Mary Aversa, Secretary

APPROVED: 

Jeanne Sorg, Mayor

APPENDICES

APPENDIX A: STORMWATER MANAGEMENT DESIGN CRITERIA

TABLE A-1

DESIGN STORM RAINFALL AMOUNT

Source: NOAA Atlas 14 website, Ambler, Pennsylvania, US, Latitude: 40° 9' 15.84"N, Longitude: 75° 13' 15.6"W
(40.1544,-75.2210) http://hdsc.nws.noaa.gov/hdsc/pfds/orb/pa_pfds.html

TABLE A-2

NATURAL RESOURCE PROTECTION STORMWATER MANAGEMENT CONTROLS

Source: PA BMP Manual Chapter 8, pg 33

TABLE A-3

GUIDANCE TO CALCULATE THE 2-YEAR, 24-HOUR VOLUME INCREASE FROM PRE-DEVELOPMENT TO POST-DEVELOPMENT CONDITIONS

Source: PA BMP Manual Chapter 8, pg 37

TABLE A-4

RUNOFF CURVE NUMBERS

Source: NRCS (SCS) TR-55

TABLE A-5

VOLUME CONTROL CALCULATION GUIDANCE FOR NONSTRUCTURAL BMPS

Source: PA BMP Manual Chapter 8, pg 34

TABLE A-6

VOLUME CONTROL CALCULATION GUIDANCE FOR STRUCTURAL BMPS

Source: PA BMP Manual Chapter 8, pg 38

TABLE A-7

RATIONAL RUNOFF COEFFICIENTS

Source: Rauls, W.J., S.L. Wong and R.H., McCuen, 1981, "Comparison of Urban Flood Frequency Procedures," Preliminary Draft, U.S. Department of Agriculture, Soil Conservation Service, Beltsville, MD

TABLE A-8

MANNING ROUGHNESS COEFFICIENTS

TABLE A-1

DESIGN STORM RAINFALL

DEPTH (INCHES)

Frequency		Rainfall Depth (P) (inch)
Return Period	Annual Exceedence Probability	
1	1.0	2.97
2	0.5	3.58
5	0.2	4.49
10	0.1	5.25
25	0.04	6.34
50	0.02	7.27
100	0.01	8.27

Reference: 90% Confidence Interval Precipitation Frequency Estimates – Partial Duration (inches), NOAA National Weather Service Hydrometeorological Design Studies Center Atlas 14 Precipitation Frequency Data Server (http://hdsc.nws.noaa.gov/hdsc/pfds/orb/pa_pfds.html) for Ambler, Pennsylvania, US, Latitude: 40° 9' 15.84"N, Longitude: 75° 13' 15.6"W (40.1544,-75.2210) . Last Revised December 1, 2015.

INTENSITY (IN/HR)

Duration	Average Recurrence Interval (years)						
	1	2	5	10	25	50	100
5-min	4.51	5.36	6.31	6.98	7.79	8.36	8.92
10-min	3.60	4.30	5.05	5.59	6.20	6.66	7.09
15-min	3.00	3.60	4.26	4.71	5.24	5.62	5.97
30-min	2.06	2.49	3.03	3.41	3.88	4.23	4.57
60-min	1.28	1.56	1.94	2.22	2.59	2.87	3.15
2-hr	0.77	0.93	1.17	1.35	1.59	1.78	1.97
3-hr	0.56	0.68	0.86	0.99	1.17	1.31	1.46
6-hr	0.35	0.43	0.54	0.62	0.74	0.84	0.95
12-hr	0.22	0.26	0.33	0.38	0.46	0.53	0.61
24-hr	0.12	0.15	0.19	0.22	0.26	0.30	0.35

Reference: 90% Confidence Interval Precipitation Frequency Estimates – Partial Duration (inches/hour), NOAA National Weather Service Hydrometeorological Design Studies Center Atlas 14 Precipitation Frequency Data Server (http://hdsc.nws.noaa.gov/hdsc/pfds/orb/pa_pfds.html) for Ambler, Pennsylvania, US, Latitude: 40° 9' 15.84"N, Longitude: 75° 13' 15.6"W (40.1544,-75.2210) Last Revised December 1, 2015.

**TABLE A-2: NATURAL RESOURCE PROTECTION
STORMWATER MANAGEMENT CONTROLS**

Existing Natural Sensitive Resource	Mapped in the ERSAM? Yes/No/n/a	Total Area (Ac.)	Area to be Protected (Ac.)
Waterbodies			
Floodplains			
Riparian Areas / Buffers			
Wetlands			
Vernal Pools			
Woodlands			
Natural Drainage Ways			
Steep Slopes, 15%-25%			
Steep Slopes, over 25%			
Other:			
Other:			
Total Existing:			

TABLE A-3: GUIDANCE TO CALCULATE THE 2-YEAR, 24-HOUR VOLUME INCREASE FROM PRE-DEVELOPMENT TO POST-DEVELOPMENT CONDITIONS

Existing Conditions: Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (ft3)
Woodland								
Meadow								
Impervious								
Total:								

Developed Conditions: Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (ft3)
Total:								

2-year Volume Increase (ft3):

TABLE A-4. Runoff Curve Numbers (from NRCS (SCS) TR-55)

LAND USE DESCRIPTION	Hydrologic Condition	HYDROLOGIC SOIL GROUP			
		A	B	C	D
Open Space					
Grass cover < 50%	Poor	68	79	86	89
Grass cover 50% to 75%	Fair	49	69	79	84
Grass cover > 75%	Good	39	61	74	80
Meadow		30	58	71	78
Agricultural					
Pasture, grassland, or range – Continuous forage for grazing	Poor	68	79	86	89
Pasture, grassland, or range – Continuous forage for grazing.	Fair	49	69	79	84
Pasture, grassland, or range – Continuous forage for grazing	Good	39	61	74	80
Brush-weed-grass mixture with brush the major element.	Poor	48	67	77	83
Brush-weed-grass mixture with brush the major element.	Fair	35	56	70	77
Brush-weed-grass mixture with brush the major element.	Good	30	48	65	73
Fallow Bare soil	-----	77	86	91	94
Crop residue cover (CR)	Poor	76	85	90	93
	Good	74	83	88	90
Woods – grass combination (orchard or tree farm)	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30	55	70	77
Commercial (85% Impervious)		92	94	95	
Industrial (72% Impervious)		88	91	93	
Institutional (50% Impervious)		82	88	90	
Residential districts by average lot size:					
	% Impervious				
1/8 acre or less * (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Farmstead		59	74	82	86
Smooth Surfaces (Concrete, Asphalt, Gravel or Bare Compacted Soil)	98	98	98	98	
Water	98	98	98	98	
Mining/Newly Graded Areas (Pervious Areas Only)	77	86	91	94	

* Includes Multi-Family Housing unless justified lower density can be provided.

Note: Existing site conditions of bare earth or fallow ground shall be considered as meadow when choosing a CN value.

TABLE A-5: VOLUME CONTROL CALCULATION GUIDANCE FOR NONSTRUCTURAL BMPs

Type of Nonstructural BMP

$$\text{AREA (sq ft)} * \text{Runoff Volume (in)} * 1/12 = \text{Volume Reduction(ft}^3\text{)}$$

Use of Natural Drainage Feature

Utilize natural flow pathways _____sq ft * 1/4" * 1/12 = _____cu ft

Minimum Soil Compaction

Lawn _____sq ft * 1/3" * 1/12 = _____cu ft

Meadow _____sq ft * 1/3" * 1/12 = _____cu ft

Protecting existing trees (not located in protected area)

For trees within 20 feet of impervious cover:

Tree Canopy _____sq ft * 1" * 1/12 = _____cu ft

For trees within 20-100 feet of impervious cover:

Tree Canopy _____sq ft * 1/2" * 1/12 = _____cu ft

Rooftop Disconnection

For runoff directed to pervious and/or vegetative areas where infiltration occurs

Roof Area _____sq ft * 1/4" * 1/12 = _____cu ft

Impervious Disconnection

For runoff from impervious surfaces such as streets and concrete directed to pervious and/or vegetative areas where infiltration occurs

Impervious Area _____sq ft * 1/4" * 1/12 = _____cu ft

Total Volume Reduction

_____cu ft

* represents multiply

TABLE A-6: VOLUME CONTROL CALCULATION GUIDANCE FOR STRUCTURAL BMPS

$$\text{Required Volume Control (ft}^3\text{)} - \text{Nonstructural Volume Control (ft}^3\text{)} = \text{Structural Volume Requirement (ft}^3\text{)}$$

Table A-3
Table A-5

Type	Proposed Structural BMP	Section in BMP Manual	Area (sq ft)	Storage Volume (cu ft)
Infiltration and / or Evapotranspiration	Porous Pavement	6.4.1		
	Infiltration Basin	6.4.2		
	Infiltration Bed	6.4.3		
	Infiltration Trench	6.4.4		
	Rain Garden/Bioretenion	6.4.5		
	Dry Well/Seepage Pit	6.4.6		
	Constructed Filter	6.4.7		
	Vegetative Swale	6.4.8		
	Vegetative Filter Strip	6.4.9		
	Infiltration Berm	6.4.10		
Evaporation and / or Reuse	Vegetative Roof	6.5.1		
	Capture and Re-use	6.5.2		
Runoff Quality	Constructed Wetlands	6.6.1		
	Wet Pond / Retention Basin	6.6.2		
	Dry Extended Detention Basin	6.6.3		
	Water Quality Filters	6.6.4		
Restoration	Riparian Buffer Restoration	6.7.1		
	Landscape Restoration / Reforestation	6.7.2		
	Soil Amendment	6.7.3		
Other	Level Spreader	6.8.1		
	Special Storage Areas	6.8.2		
	other			

Total Volume Control from Structural BMPs: _____

TABLE A-7: RATIONAL RUNOFF COEFFICIENTS
By Hydrologic Soil Group and Overland Slope

Storms less than 25-year

Land Use	HSG A			HSG B			HSG C			HSG D		
	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+
Residential												
1/8 acre lots	0.25	0.28	0.31	0.27	0.30	0.35	0.30	0.33	0.38	0.33	0.36	0.42
1/4 acre lots	0.22	0.26	0.29	0.24	0.29	0.33	0.27	0.31	0.36	0.30	0.34	0.40
1/3 acre lots	0.19	0.23	0.26	0.22	0.26	0.30	0.25	0.29	0.34	0.28	0.32	0.39
1/2 acre lots	0.16	0.20	0.24	0.19	0.23	0.28	0.22	0.27	0.32	0.26	0.30	0.37
1 acre lots	0.14	0.19	0.22	0.17	0.21	0.26	0.20	0.25	0.31	0.24	0.29	0.35
Industrial	0.67	0.68	0.68	0.68	0.68	0.69	0.68	0.69	0.69	0.69	0.69	0.70
Commercial	0.71	0.71	0.72	0.71	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Streets	0.85	0.86	0.87	0.85	0.86	0.87	0.85	0.86	0.87	0.85	0.86	0.87
Cultivated Land	0.08	0.13	0.16	0.11	0.15	0.21	0.14	0.19	0.26	0.18	0.23	0.31
Pasture	0.12	0.20	0.30	0.18	0.28	0.37	0.24	0.34	0.44	0.30	0.40	0.50
Meadow	0.10	0.16	0.25	0.14	0.22	0.30	0.20	0.28	0.36	0.24	0.30	0.40
Forest	0.05	0.08	0.11	0.08	0.11	0.14	0.10	0.13	0.16	0.12	0.16	0.20
Open space, lawns	0.05	0.10	0.14	0.08	0.13	0.19	0.12	0.17	0.24	0.16	0.21	0.28
Parking, impervious	0.85	0.86	0.87	0.85	0.86	0.87	0.85	0.86	0.87	0.85	0.86	0.87

Storms 25-year & over

Land Use	HSG A			HSG B			HSG C			HSG D		
	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+
Residential												
1/8 acre lots	0.33	0.37	0.40	0.35	0.39	0.44	0.38	0.42	0.49	0.41	0.45	0.54
1/4 acre lots	0.30	0.34	0.37	0.33	0.37	0.42	0.36	0.40	0.47	0.38	0.42	0.52
1/3 acre lots	0.28	0.32	0.35	0.30	0.35	0.39	0.33	0.38	0.45	0.36	0.40	0.50
1/2 acre lots	0.25	0.29	0.32	0.28	0.32	0.36	0.31	0.35	0.42	0.34	0.38	0.40
1 acre lots	0.22	0.26	0.29	0.24	0.28	0.34	0.28	0.32	0.40	0.31	0.35	0.46
Industrial	0.85	0.85	0.86	0.85	0.86	0.86	0.86	0.86	0.87	0.86	0.86	0.88
Commercial	0.88	0.88	0.89	0.89	0.89	0.89	0.89	0.89	0.90	0.89	0.89	0.90
Streets	0.95	0.96	0.97	0.95	0.96	0.97	0.95	0.96	0.97	0.95	0.96	0.97
Cultivated Land	0.14	0.18	0.22	0.16	0.21	0.28	0.2	0.25	0.34	0.24	0.29	0.41
Pasture	0.15	0.25	0.37	0.23	0.34	0.45	0.30	0.42	0.52	0.37	0.50	0.62
Meadow	0.14	0.22	0.30	0.20	0.28	0.37	0.26	0.35	0.44	0.30	0.40	0.50
Forest	0.08	0.11	0.14	0.10	0.14	0.18	0.12	0.16	0.20	0.15	0.20	0.25
Open space, lawns	0.11	0.18	0.20	0.14	0.19	0.26	0.18	0.23	0.32	0.22	0.27	0.39
Parking, impervious	0.95	0.96	0.97	0.95	0.96	0.97	0.95	0.96	0.97	0.95	0.96	0.97

Runoff Coefficients for general cover conditions (Residential, Industrial and Commercial) are applicable to drainage areas under 1 acre. For drainage areas 1 acre or more, a composite runoff coefficient shall be calculated.

Reference: Rauls, W.J., S.L. Wong and R.H., McCuen, 1981, "Comparison of Urban Flood Frequency Procedures," Preliminary Draft, U.S. Department of Agriculture, Soil Conservation Service, Beltsville, MD

TABLE A-8. MANNING'S ROUGHNESS COEFFICIENTS

DESCRIPTION	Manning's n-value
Smooth-wall Plastic Pipe	0.011
Concrete Pipe	0.012
Smooth-lined Corrugated Metal Pipe	0.012
Corrugated Plastic Pipe	0.024
Annular Corrugated Steel And Aluminum Alloy Pipe (Plain or polymer coated)	
68 mm × 13 mm (2 2/3 in × 1/2 in) Corrugations	0.024
75 mm × 25 mm (3 in × 1 in) Corrugations	0.027
125 mm × 25 mm (5 in × 1 in) Corrugations	0.025
150 mm × 50 mm (6 in × 2 in) Corrugations	0.033
Helically Corrugated Steel And Aluminum Alloy Pipe (Plain or polymer coated)	
75 mm × 25 mm (3 in × 1 in), 125 mm × 25 mm (5 in × 1 in), or 150 mm × 50 mm (6 in × 2 in) Corrugations	0.024
Helically Corrugated Steel And Aluminum Alloy Pipe (Plain or polymer coated)	
68 mm × 13 mm (2 2/3 in × 1/2 in) Corrugations	
a. Lower Coefficients*	
450 mm (18 in) Diameter	0.014
600 mm (24 in) Diameter	0.016
900 mm (36 in) Diameter	0.019
1200 mm (48 in) Diameter	0.020
1500 mm (60 in) Diameter or larger	0.021
b. Higher Coefficients**	0.024
Annular or Helically Corrugated Steel or Aluminum Alloy Pipe Arches or Other Non-Circular Metal Conduit (Plain or Polymer coated)	0.024
Vitrified Clay Pipe	0.012
Ductile Iron Pipe	0.013
Asphalt Pavement	0.015
Concrete Pavement	0.014
Grass Medians	0.050
Grass – Residential	0.30
Earth	0.020
Gravel	0.030
Rock	0.035
Cultivated Areas	0.030 - 0.050
Dense Brush	0.070 - 0.140
Heavy Timber (Little undergrowth)	0.100 - 0.150
Heavy Timber (w/underbrush)	0.40
Streams:	
a. Some Grass And Weeds (Little or no brush)	0.030 - 0.035
b. Dense Growth of Weeds	0.035 - 0.050
c. Some Weeds (Heavy brush on banks)	0.050 - 0.070

Notes:

* Use the lower coefficient if any one of the following conditions apply:

- a. A storm pipe longer than 20 diameters, which directly or indirectly connects to an inlet or manhole, located in swales adjacent to shoulders in cut areas or depressed medians.
- b. A storm pipe which is specially designed to perform under pressure.

**Use the higher coefficient if any one of the following conditions apply:

- a. A storm pipe which directly or indirectly connects to an inlet or manhole located in highway pavement sections or adjacent to curb or concrete median barrier.
- b. A storm pipe which is shorter than 20 diameters long.
- c. A storm pipe which is partly lined helically corrugated metal pipe.

APPENDIX B: LOW IMPACT DEVELOPMENT (LID) PRACTICES

ALTERNATIVE APPROACH FOR MANAGING STORMWATER RUNOFF

Natural hydrologic conditions can be altered radically by poorly planned development practices, such as introducing unnecessary impervious surfaces, destroying existing drainage swales, constructing unnecessary storm sewers, and changing local topography. A traditional drainage approach of development has been to remove runoff from a site as quickly as possible and capture it in a detention basin. This approach leads ultimately to the degradation of water quality as well as expenditure of additional resources for detaining and managing concentrated runoff at some downstream location.

The recommended alternative approach is to promote practices that will minimize post-development runoff rates and volumes and will minimize needs for artificial conveyance and storage facilities. To simulate predevelopment hydrologic conditions, infiltration is often necessary to offset the loss of infiltration by the creation of impervious surfaces. Preserving natural hydrologic conditions requires careful alternative site design considerations. Site design practices include preserving natural drainage features, minimizing impervious surface area, reducing the hydraulic connectivity of impervious surfaces, and protecting natural depression storage. A well-designed site will contain a mix of all those features.

Sometimes regulations create obstacles for an applicant interested in implementing low impact development techniques on their site. A municipality should consider examining their ordinances and amending the sections which limit LID techniques. For example, a municipality could remove parking space minimums and establish parking space maximums to reduce the area of impervious surface required. Other allowable regulations to promote LID includes permitting curb cuts or wheel stops instead of requiring curbs and allowing sumped landscaping where the runoff can drain instead of requiring raised beds. These small changes to ordinances can remove the barriers which prevent applicants from pursuing LID practices.

The following describes various LID techniques:

1. **Protect Sensitive and Special Value Resources:** See Section 5.4 of the *Pennsylvania Stormwater Best Management Practices Manual, Pennsylvania Department of Environmental Protection (PADEP) no. 363-0300-002 (2006)*.
 - a. **Preserving Natural Drainage Features.** Protecting natural drainage features, particularly vegetated drainage swales and channels, is desirable because of their ability to infiltrate and attenuate flows and to filter pollutants. However, this objective is often not accomplished in land development. In fact, commonly held drainage philosophy encourages just the opposite pattern—streets and adjacent storm sewers are typically located in the natural headwater valleys and swales, thereby replacing natural drainage functions with a completely impervious system. As a result, runoff and pollutants generated from impervious surfaces flow directly into storm sewers with no opportunity for attenuation, infiltration, or filtration. Developments designed to fit site topography also minimizes the amount of grading on site.
 - b. **Protecting Natural Depression Storage Areas.** Depressional storage areas either have no surface outlet or drain very slowly following a storm event. They can be commonly seen as

ponded areas in farm fields during the wet season or after large runoff events. Traditional development practices eliminate these depressions by filling or draining, thereby obliterating their ability to reduce surface runoff volumes and trap pollutants. The volume and release rate characteristics of depressions should be protected in the design of the development site. The depressions can be protected by simply avoiding the depression or by incorporating its storage as additional capacity in required detention facilities.

2. **Reduce Impervious Coverage:** See Section 5.7 of the *Pennsylvania Stormwater Best Management Practices Manual, Pennsylvania Department of Environmental Protection (PADEP) no. 363-0300-002 (2006)*.

- a. **Avoiding Introduction of Impervious Areas.** Careful site planning should consider reducing impervious coverage to the maximum extent possible. Building footprints, sidewalks, driveways, and other features producing impervious surfaces should be evaluated to minimize impacts of runoff.
- b. **Disconnecting Impervious Surfaces (DIA's):** Impervious surfaces are significantly less of a problem if they are not directly connected to an impervious conveyance system (such as storm sewer). Two basic ways to reduce hydraulic connectivity are routing of roof runoff over lawns and reducing the use of storm sewers. Site grading should promote increasing travel time of stormwater runoff, and should help reduce concentration of runoff to a single point in the development. (See Appendix D for additional description)
- c. **Reducing Street Widths.** Street widths can be reduced by either eliminating on-street parking or by reducing roadway widths. Municipal planners and traffic designers should encourage narrower neighborhood streets which ultimately could lower maintenance.
- d. **Limiting Sidewalks to One Side of the Street.** A sidewalk on one side of the street may suffice in low-traffic neighborhoods. The lost sidewalk could be replaced with bicycle/recreational trails that follow back-of-lot lines. Where appropriate, backyard trails should be constructed using pervious materials.
- e. **Reducing Building Setbacks.** Reducing building setbacks reduces impervious cover associated with driveway and entry walks and is most readily accomplished along low-traffic streets where traffic noise is not a problem.

1. **Disconnect/Distribute/Decentralize:** See Section 5.8 of the *Pennsylvania Stormwater Best Management Practices Manual, Pennsylvania Department of Environmental Protection (PADEP) no. 363-0300-002 (2006)*.

- a. **Routing Roof Runoff Over Lawns.** Roof runoff can be easily routed over lawns in most site designs. The practice discourages direct connections of downspouts to storm sewers or parking lots. The practice also discourages sloping driveways and parking lots to the street. By routing roof drains and crowning the driveway to run off to the lawn, the lawn is essentially used as a filter strip.
- b. **Reducing the Use of Storm Sewers.** By reducing use of storm sewers for draining streets, parking lots, and back yards, the potential for accelerating runoff from the development can be

greatly reduced. The practice requires greater use of swales and may not be practical for some development sites, especially if there are concerns for areas that do not drain in a “reasonable” time. The practice requires educating local citizens and public works officials, who expect runoff to disappear shortly after a rainfall event.

2. **Cluster and Concentrate:** See Section 5.5 of the *Pennsylvania Stormwater Best Management Practices Manual, Pennsylvania Department of Environmental Protection (PADEP) no. 363-0300-002 (2006)*. Cluster developments can also reduce the amount of impervious area for a given number of lots. The biggest savings occurs with street length, which also will reduce costs of the development. Cluster development “clusters” the construction activity onto less sensitive areas without substantially affecting the gross density of development.

In summary, a careful consideration of the existing topography and implementation of a combination of the above mentioned techniques may avoid construction of costly stormwater control measures. Benefits include reduced potential of downstream flooding, water quality improvement of receiving streams/water bodies and enhancement of aesthetics and reduction of development costs. Other benefits include more stable baseflows in receiving streams, improved groundwater recharge, reduced flood flows, reduced pollutant loads, and reduced costs for conveyance and storage.

APPENDIX C - NONSTRUCTURAL PROJECT DESIGN CHECKLIST

The goal of this checklist is to minimize the increases in stormwater runoff and impacts to water quality resulting from the proposed regulated activity:

1. Prepare an Existing Resource and Site Analysis Map (ERSAM, see Section 301.B.)
2. Establish a stream buffer according to Section 407.
3. Prepare a draft project layout avoiding sensitive areas identified in Section 301.
4. Identify site-specific existing conditions drainage areas, discharge points, recharge areas, and hydrologic soil groups A and B (areas conducive to infiltration).
5. Evaluate nonstructural stormwater management alternatives (Section 404):
 - a) Minimize earth disturbance.
 - b) Minimize clearing operations (vegetation removal)
 - c) Minimize impervious surfaces.
 - d) Break up large impervious surfaces.
6. Satisfy the groundwater recharge (infiltration) objective (Section 405) and provide for stormwater pretreatment prior to infiltration.
7. Provide for water quality protection in accordance with Section 406 water volume control requirements.
8. Provide stream bank erosion protection in accordance with Section 407 stream bank erosion requirements.
9. Determine into what management district the site falls (Section 408) and conduct an existing conditions runoff analysis.
10. Prepare final project design to maintain existing conditions drainage areas and discharge points, to minimize earth disturbance and impervious surfaces, and, to the maximum extent possible, to ensure that the remaining site development has no surface or point discharge.
- 11.
12. Conduct a proposed conditions runoff analysis based on the final design that meets the management district requirements (Section 408).
- 13.
14. Manage any remaining runoff prior to discharge through detention, bioretention, direct discharge, or other structural control.

APPENDIX D: DISCONNECTED IMPERVIOUS AREA (DIA)

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 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 a 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 C.1.

Table C.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.

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.

APPENDIX E: HOT SPOTS

Hot spots are sites where the land use or activity produces a higher concentration of trace metals, hydrocarbons, or priority pollutants than normally found in urban runoff.

1. EXAMPLES OF STORMWATER HOT SPOTS

- vehicle salvage yards and recycling facilities
- vehicle fueling stations
- vehicle service and maintenance facilities
- vehicle and equipment cleaning facilities
- fleet storage areas (bus, truck, etc.)
- industrial sites (based on Standard Industrial Codes defined by the U.S. Department of Labor)
- marinas (service and maintenance)
- outdoor liquid container storage
- outdoor loading/unloading facilities
- public works storage areas
- facilities that generate or store hazardous materials
- commercial container nursery
- other land uses and activities as designated by an appropriate review authority

2. LAND USE AND ACTIVITIES NOT NORMALLY CONSIDERED HOT SPOTS

- residential streets and rural highways
- residential development
- institutional development
- office developments
- nonindustrial rooftops
- pervious areas, except golf courses and nurseries (which may need an Integrated Pest Management (IPM) Plan).

3. **LIST OF ACCEPTABLE BMPs for Hot Spot Treatment:** The following BMP's listed under the Best Management Practice column are BMPs appropriate for application on hot spot sites. BMPs which facilitate infiltration are prohibited by this ordinance. In many design manuals the BMPs with a * designation are designed with infiltration, however it is possible to design these without infiltration.

The numbers listed under the Design Reference Number column correlate with the Reference Table which lists materials that can be used for design guidance.

Best Management Practice	Design Reference Number
Bioretention*	4, 5, 11, 16
Capture/Reuse	4, 14
Constructed Wetlands	4, 5, 8, 10, 16
Dry Extended Detention Ponds	4, 5, 8, 12, 18

Minimum Disturbance/ Minimum Maintenance Practices	1, 9
Significant Reduction of Existing Impervious Cover	N/A
Stormwater Filters* (Sand, Peat, Compost, etc.)	4, 5, 10, 16
Vegetated Buffers/Filter Strips	2, 3, 5, 11, 16, 17
Vegetated Roofs	4, 13
Vegetated Swales*	2, 3, 5, 11, 16, 17
Water Quality Inlets (Oil/Water Separators, Sediment Traps/Catch Basin Sumps, and Trash/Debris Collectors in Catch Basins)	4, 7, 15, 16, 19
Wet Detention Ponds	4, 5, 6, 8

Reference Table

Number	Design Reference Title
1	“Conservation Design For Stormwater Management – A Design Approach to Reduce Stormwater Impacts From Land Development and Achieve Multiple Objectives Related to Land Use”, Delaware Department of Natural Resources and Environmental Control, The Environmental Management Center of the Brandywine Conservancy, September 1997
2	“A Current Assessment of Urban Best Management Practices: Techniques for Reducing Nonpoint Source Pollution in the Coastal Zone”, Schueler, T. R., Kumble, P. and Heraty, M., Metropolitan Washington Council of Governments, 1992.
3	“Design of Roadside Channels with Flexible Linings”, Federal Highway Administration, Chen, Y. H. and Cotton, G. K., Hydraulic Engineering Circular 15, FHWA-IP-87-7, McLean, Virginia, 1988.
4	“Draft Stormwater Best Management Practices Manual”, Pennsylvania Department of Environmental Protection, January 2005.
5	“Evaluation and Management of Highway Runoff Water Quality”, Federal Highway Administration, FHWA-PD-96-032, Washington, D.C., 1996.
6	“Evaporation Maps of the United States”, U.S. Weather Bureau (now NOAA/National Weather Service) Technical Paper 37, Published by Department of Commerce, Washington D.C., 1959.
7	“Georgia Stormwater Manual”, AMEC Earth and Environmental, Center for Watershed Protection, Debo and Associates, Jordan Jones and Goulding, Atlanta Regional Commission, Atlanta, Georgia, 2001.
8	“Hydraulic Design of Highway Culverts”, Federal Highway Administration, FHWA HDS 5, Washington, D.C., 1985 (revised May 2005).
9	“Low Impact Development Design Strategies <i>An Integrated Design Approach</i> , Prince Georges County, Maryland Department of Environmental Resources, June 1999.
10	“Maryland Stormwater Design Manual”, Maryland Department of the Environment, Baltimore, Maryland, 2000.
11	“Pennsylvania Handbook of Best Management Practices for Developing Areas”, Pennsylvania Department of Environmental Protection, 1998.
12	“Recommended Procedures for Act 167 Drainage Plan Design”, LVPC, Revised 1997.
13	“Roof Gardens History, Design, and Construction”, Osmundson, Theodore. New York: W.W. Norton & Company, 1999.
14	“The Texas Manual on Rainwater Harvesting”, Texas Water Development

	Board, Austin, Texas, Third Edition, 2005.
15	“VDOT Manual of Practice for Stormwater Management”, Virginia Transportation Research Council, Charlottesville, Virginia, 2004.
16	“Virginia Stormwater Management Handbook”, Virginia Department of Conservation and Recreation, Richmond, Virginia, 1999.
17	“Water Resources Engineering”, Mays, L. W., John Wiley & Sons, Inc., 2005.
18	“Urban Hydrology for Small Watersheds”, Technical Report 55, US Department of Agriculture, Natural Resources Conservation Service, 1986.
19	US EPA, Region 1 New England web site (as of August 2005) http://www.epa.gov/NE/assistance/ceitts/stormwater/techs/html .

4. RECOMMENDED PRE-TREATMENT METHODS FOR “HOT SPOT” LAND USES: The following table recommends what is considered the best pre-treatment option for the listed land use. These methods are either a BMP or can be applied in conjunction with BMPs.

Hot Spot Land Use	Pre-treatment Method(s)
Vehicle Maintenance and Repair Facilities including Auto Parts Stores	-Water Quality Inlets -Use of Drip Pans and/or Dry Sweep Material Under Vehicles/Equipment -Use of Absorbent Devices to Reduce Liquid Releases -Spill Prevention and Response Program
Vehicle Fueling Stations	-Water Quality Inlets -Spill Prevention and Response Program
Storage Areas for Public Works	-Water Quality Inlets -Use of Drip Pans and/or Dry Sweep Material Under Vehicles/Equipment -Use of Absorbent Devices to Reduce Liquid Releases -Spill Prevention and Response Program -Diversion of Stormwater away from Potential Contamination Areas
Outdoor Storage of Liquids	-Spill Prevention and Response Program
Commercial Nursery Operations	-Vegetated Swales/Filter Strips -Constructed Wetlands -Stormwater Collection and Reuse
Salvage Yards and Recycling Facilities*	-BMPs that are a part of a Stormwater Pollution Prevention Plan under an NPDES Permit
Fleet Storage Yards and Vehicle Cleaning Facilities*	-BMPs that are a part of a Stormwater Pollution Prevention Plan under an NPDES Permit
Facilities that Store or Generate Regulated Substances*	-BMPs that are a part of a Stormwater Pollution Prevention Plan under an NPDES Permit
Marinas*	-BMPs that are a part of a Stormwater Pollution Prevention Plan under an NPDES Permit
Certain Industrial Uses (listed under NPDES)*	-BMPs that are a part of a Stormwater Pollution Prevention Plan under an NPDES Permit

*Regulated under the NPDES Stormwater Program

APPENDIX F: WEST NILE VIRUS GUIDANCE

(This source is from the Monroe County, PA Conservation District, who researched the potential of West Nile Virus problems from BMPs due to a number of calls they were receiving.)

Monroe County Conservation District Guidance: Stormwater Management and West Nile Virus

Source: **Brodhead McMichaels Creeks Watershed Act 167 Stormwater Management Ordinance Final Draft
2/23/04**

The Monroe County Conservation District recognizes the need to address the problem of nonpoint source pollution impacts caused by runoff from impervious surfaces. The new stormwater policy being integrated into Act 167 Stormwater Management regulations by the PA Department of Environmental Protection (PADEP) will make nonpoint pollution controls an important component of all future plans and updates to existing plans. In addition, to meet post-construction anti-degradation standards under the state National Pollution Discharge Elimination System (NPDES) permitting program, applicants will be required to employ Best Management Practices (BMPs) to address non-point pollution concerns.

Studies conducted throughout the United States have shown that wet basins and in particular constructed wetlands are effective in traditional stormwater management areas such as channel stability and flood control, and are one of the most effective ways to remove stormwater pollutants (United States Environmental Protection Agency 1991, Center for Watershed Protection 2000). From Maryland to Oregon, studies have shown that as urbanization and impervious surface increase in a watershed, the streams in those watersheds become degraded (CWP 2000). Although there is debate over the threshold of impervious cover when degradation becomes apparent (some studies show as little as 6% while others show closer to 20%), there is agreement that impervious surfaces cause non-point pollution in urban and urbanizing watersheds, and that degradation is ensured if stormwater BMPs are not implemented.

Although constructed wetlands and ponds are desirable from a water quality perspective there may be concerns about the possibility of these stormwater management structures becoming breeding grounds for mosquitoes. The Conservation District feels that although it may be a valid concern, **municipalities should not adopt ordinance provisions prohibiting wet basins for stormwater management.**

Mosquitoes

The questions surrounding mosquito production in wetlands and ponds have intensified in recent years by the outbreak of the mosquito-borne West Nile Virus. As is the case with all vector-borne maladies, the life cycle of West Nile Virus is complicated, traveling from mosquito to bird, back to mosquito and then to other animals including humans. *Culex pipiens* was identified as the vector species in the first documented cases from New York in 1999. This species is still considered the primary transmitter of the disease across its range. Today there are some 60 species of mosquitoes that inhabit Pennsylvania. Along with *C. pipiens*, three other species have been identified as vectors of West Nile Virus while four more have been identified as potential vectors.

The four known vectors in NE Pennsylvania are *Culex pipiens*, *C. restuans*, *C. salinarius* and *Ochlerotatus japonicus*. All four of these species prefer, and almost exclusively use, artificial containers (old tires, rain gutters, birdbaths, etc.) as larval habitats. In the case of *C. pipiens*, the most notorious of the vector mosquitoes, the dirtier the water the better they like it. The important factor is that these species do not thrive in functioning wetlands where competition for resources and predation by larger aquatic and terrestrial organisms is high.

The remaining four species, *Aedes vexans*, *Ochlerotatus Canadensis*, *O. triseriatus* and *O. trivittatus* are currently considered potential vectors due to laboratory tests (except the *O. trivittatus*, which did have one confirmed vector pool for West Nile Virus in PA during 2002). All four of these species prefer vernal habitats and ponded woodland areas following heavy summer rains. These species may be the greatest threat of disease transmission around

stormwater basins that pond water for more than four days. This can be mitigated however by establishing ecologically functioning wetlands.

Stormwater Facilities

If a stormwater wetland or pond is constructed properly and a diverse ecological community develops, mosquitoes should not become a problem. Wet basins and wetlands constructed as stormwater management facilities, should be designed to attract a diverse wildlife community. If a wetland is planned, proper hydrologic soil conditions and the establishment of hydrophytic vegetation will promote the population of the wetland by amphibians and other mosquito predators. In natural wetlands, predatory insects and amphibians are effective at keeping mosquito populations in check during the larval stage of development while birds and bats prey on adult mosquitoes.

The design of a stormwater wetland must include the selection of hydrophytic plant species for their pollutant uptake capabilities and for not contributing to the potential for vector mosquito breeding. In particular, species of emergent vegetation with little submerged growth are preferable. By limiting the vegetation growing below the water surface, larvae lose protective cover and there is less chance of anaerobic conditions occurring in the water.

Stormwater ponds can be designed for multiple purposes. When incorporated into an open space design a pond can serve as a stormwater management facility and a community amenity. Aeration fountains and stocked fish should be added to keep larval mosquito populations in check.

Publications from the PA Department of Health and the Penn State Cooperative Extension concerning West Nile Virus identify aggressive public education about the risks posed by standing water in artificial containers (tires, trash cans, rain gutters, bird baths) as the most effective method to control vector mosquitoes.

Conclusion

The Conservation District understands the pressure faced by municipalities when dealing with multifaceted issues such as stormwater management and encourages the incorporation of water quality management techniques into stormwater designs. As Bucks and Montgomery Counties continue to grow, conservation design, groundwater recharge and constructed wetlands and ponds should be among the preferred design options to reduce the impacts of increases in impervious surfaces. When designed and constructed appropriately, the runoff mitigation benefits to the community from these design options will far out-weigh their potential to become breeding grounds for mosquitoes.

APPENDIX G: SMALL PROJECT STORMWATER MANAGEMENT SITE PLAN

This small project stormwater site plan has been developed to assist those proposing residential projects to meet the requirements of the Stormwater Management Ordinance without having to hire professional services to draft a formal stormwater management plan. This small project site plan is only permitted for residential projects proposing less than or equal to 2,000 square feet of impervious surface and less than 5,000 square feet of earth disturbance.

A. What is an applicant required to submit?

A brief description of the proposed stormwater facilities, including types of materials to be used, total square footage of proposed impervious areas, volume calculations, and a simple sketch plan showing the following information:

- Location of proposed structures, driveways, or other paved areas with approximate surface area in square feet.
- Location of any existing or proposed onsite septic system and/or potable water wells showing proximity to infiltration facilities.
- Montgomery County Conservation District erosion and sediment control “Adequacy” letter as required by Borough, County or State regulations.

B. Determination of Required Volume Control and Sizing Stormwater Facilities

By following the simple steps outlined below in the provided example, an applicant can determine the runoff volume that is required to be controlled and how to choose the appropriate stormwater facility to permanently remove the runoff volume from the site. Impervious area calculations must include all areas on the lot proposed to be covered by roof area or pavement which would prevent rain from naturally percolating into the ground, including impervious surfaces such as sidewalks, driveways, parking areas, patios or swimming pools. Sidewalks, driveways or patios that are designed and constructed to allow for infiltration are not included in this calculation.

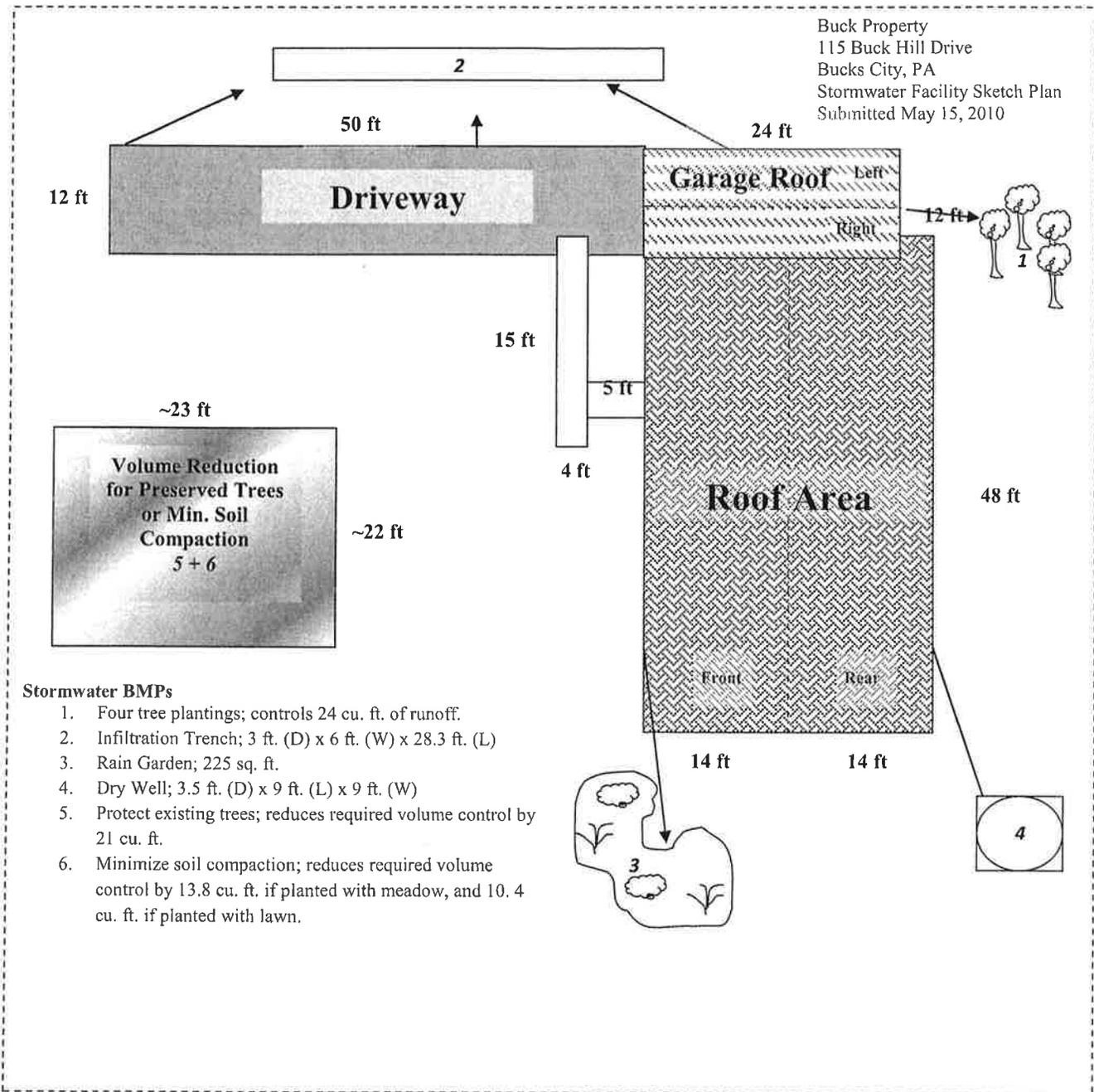
Site Plan Example: Controlling runoff volume from a proposed home site

Step 1: Determine Total Impervious Surfaces

Impervious Surface			Area (sq. ft.)
House Roof (Front)	14 ft. x 48 ft.	=	672 sq. ft.
House Roof (Rear)	14 ft. x 48 ft.	=	672 sq. ft.
Garage Roof (Left)	6ft. x 24 ft.	=	144 sq. ft.
Garage Roof (Right)	6 ft. x 24 ft.	=	144 sq. ft.
Driveway	12 ft. x 50 ft.	=	1000 sq. ft.
Walkway	4 ft. x 20 ft.	=	80 sq. ft.

	Total Impervious		3000 sq ft

Figure 1: Sample Site Sketch Plan



Stormwater BMPs

1. Four tree plantings; controls 24 cu. ft. of runoff.
2. Infiltration Trench; 3 ft. (D) x 6 ft. (W) x 28.3 ft. (L)
3. Rain Garden; 225 sq. ft.
4. Dry Well; 3.5 ft. (D) x 9 ft. (L) x 9 ft. (W)
5. Protect existing trees; reduces required volume control by 21 cu. ft.
6. Minimize soil compaction; reduces required volume control by 13.8 cu. ft. if planted with meadow, and 10.4 cu. ft. if planted with lawn.

Step 2: Determine Required Volume Control (cubic feet) using the following equation:

$$\text{Volume (cu. ft.)} = (\text{Total impervious area in square feet} \times 2 \text{ inches of runoff}) / 12 \text{ inches}$$

$$(3,000 \text{ sq. ft.} \times 2 \text{ inches of runoff}) / 12 \text{ inches} = 500 \text{ cu. ft.}$$

Step 3: Sizing the Selected Volume Control BMP

Several Best Management Practices (BMPs), as described below, are suitable for small stormwater management projects. However, their application depends on the volume required to be controlled, how much land is available, and the site constraints. Proposed residential development activities can apply both non-structural and structural BMPs to control the volume of runoff from the site. A number of different volume control BMPs are described below. Note that Figure 1 is an example of how these BMPs can be utilized in conjunction to control the total required volume on one site.

Structural BMPs

1. Infiltration Trench

An Infiltration Trench is a linear stormwater BMP consisting of a continuously perforated pipe at a minimum slope in a stone-filled trench. During small storm events, infiltration trenches can significantly reduce volume and serve in the removal of fine sediments and pollutants. Runoff is stored between the stones and infiltrates through the bottom of the facility and into the soil matrix. Runoff should be pretreated using vegetative buffer strips or swales to limit the amount of coarse sediment entering the trench which can clog and render the trench ineffective. In all cases, an infiltration trench should be designed with a positive overflow.

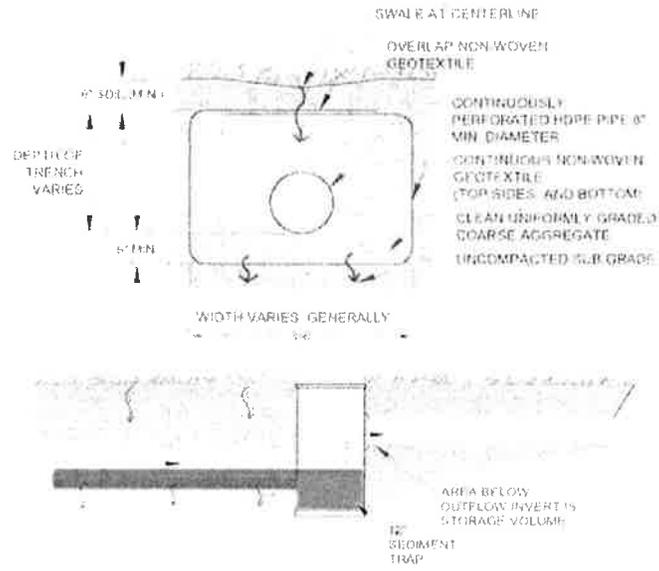
Design Considerations:

- Although the width and depth can vary, it is recommended that Infiltration Trenches be limited in depth to not more than six (6) feet of stone.
- Trench is wrapped in nonwoven geotextile (top, sides, and bottom).
- Trench needs to be placed on uncompacted soils.
- Slope of the Trench bottom should be level or with a slope no greater than 1%.
- A minimum of 6" of topsoil is placed over trench and vegetated.
- The discharge or overflow from the Infiltration Trench should be properly designed for anticipated flows.
- Cleanouts or inlets should be installed at both ends of the Infiltration Trench and at appropriate intervals to allow access to the perforated pipe.
- Volume of facility = Depth x Width x Length x Void Space of the gravel bed (assume 40%).

Maintenance:

- Catch basins and inlets should be inspected and cleaned at least two times a year.
- The vegetation along the surface of the infiltration trench should be maintained in good condition and any bare spots should be re-vegetated as soon as possible.
- Vehicles should not be parked or driven on the trench and care should be taken to avoid soil compaction by lawn mowers.

Figure 3: Infiltration Trench Diagram



Source: PA BMP Guidance Manual, Chapter 6, page 42.

Figure 4: Example of Infiltration Trench Installation



Source: PA BMP Guidance Manual, Chapter 6, Page 46.

Sizing Example for Infiltration Trench

1. Determine Total Impervious Surface to drain to Infiltration Trench:

Garage Roof (Left)	6 ft. x 24 ft.	=	144 sq ft
Driveway	12 ft. x 50 ft.	=	1000 sq ft
Walkway	4 ft. x 20 ft.	=	80 sq ft

2. Determine the required infiltration volume:

$$(1224 \text{ sq. ft.} \times 2 \text{ inches of runoff}) / 12 \text{ ft.} = 204 \text{ cu. ft.} / 0.4^* = 510 \text{ cu. ft.} \quad (*0.4 \text{ assumes } 40\% \text{ void ratio in gravel bed})$$

3. Sizing the infiltration trench facility:

$$\text{Volume of Facility} = \text{Depth} \times \text{Width} \times \text{Length}$$

Set Depth to 3 feet and determine required surface area of trench.

$$510 \text{ cu. ft.} / 3 \text{ ft} = 170 \text{ sq ft.}$$

The width of the trench should be greater than 2 times its depth ($2 \times D$), therefore in this example the trench width of 6 feet selected.

$$\text{Determine trench length: } L = 170 \text{ sq. ft.} / 6 \text{ ft.} = 28.3 \text{ ft.}$$

Final infiltration trench dimensions: 3 ft. (D) x 6 ft. (W) x 28.3 ft. (L)

2. Rain Garden

A Rain Garden is a planted shallow depression designed to catch and filter rainfall runoff. The garden captures rain from a downspout or a paved surface. The water sinks into the ground, aided by deep rooted plants that like both wet and dry conditions. The ideal location for a rain garden is between the source of runoff (roofs and driveways) and the runoff destination (drains, stream, low spots, etc).

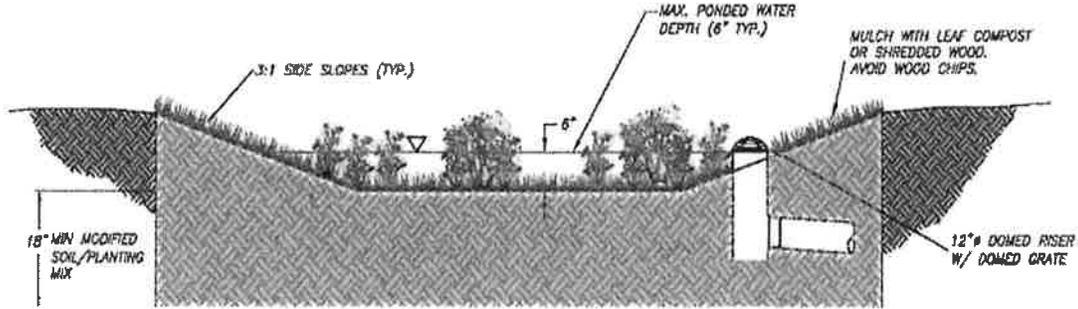
Design Considerations:

- A maximum of 3:1 side slope is recommended.
- The depth of a rain garden can range from 6 - 8 inches. Pondered water should not exceed 6 inches.
- The rain garden should drain within 72 hours.
- The garden should be at least 10-20 feet from a building's foundation and 25 feet from septic system drainfields and wellheads.
- If the site has clay soils, soil should be amended with compost or organic material.
- Choose native plants. See http://pa.audubon.org/habitat/PDFs/RGBrochure_complete.pdf for a native plant list. To find native plant sources go to www.pawildflower.org.
- At the rain garden location, the water table should be at least 2' below the soil level. If water stands in an area for more than one day after a heavy rain you can assume it has a higher water table and is not a good choice for a rain garden.

Maintenance:

- Water plants regularly until they become established.
- Inspect twice a year for sediment buildup, erosion and vegetative conditions.
- Mulch with hardwood when erosion is evident and replenish annually.
- Prune and remove dead vegetation in the spring season.
- Weed as you would any garden.
- Move plants around if some plants would grow better in the drier or wetter parts of the garden.

Figure 5: Rain Garden Diagram



Source: PA BMP Guidance Manual, Chapter 6 Page 50

Sizing Example for Rain Garden

1. Pick a site for the rain garden between the source of runoff and between a low lying area, a.k.a., a drainage area.
2. Perform an infiltration test to determine the depth of the rain garden:
 - Dig a hole 8" x 8"
 - Fill with water and put a popsicle stick at the top of the water level.
 - Measure how far it drains down after a few hours (ideally 4).
 - Calculate the depth of water that will drain out over 24 hours.
3. Determine total impervious surface area to drain to rain garden:

House Roof (Front)	14 ft. x 48 ft.	=	672 sq ft
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4. Sizing the rain garden:

For this example the infiltration test determined 6" of water drained out of a hole in 24 hours. The depth of the rain garden should be set to the results of the infiltration test so 6" is the depth of the rain garden. The sizing calculation below is based on controlling 1" of runoff. First divide the impervious surface by the depth of the rain garden.

$$(672 \text{ sq ft} / 6 \text{ ft.}) = 112 \text{ sq. ft.}$$

In order to control 2" of runoff volume, the rain garden area needs to be multiplied by 2.

$$112 \text{ sq. ft.} * 2 = 224 \text{ sq. ft.}$$

The rain garden should be about 225 sq. ft. in size and 6" deep.

3. Dry Well (a.k.a., Seepage Pit)

A Dry Well, sometimes called a Seepage Pit, is a subsurface storage facility that temporarily stores and infiltrates stormwater runoff from the roofs of structures. By capturing runoff at the source, Dry Wells can dramatically reduce the increased volume of stormwater generated by the roofs of structures. Roof leaders connect directly into the Dry Well, which may be either an excavated pit filled with uniformly graded aggregate wrapped in geotextile, or a prefabricated storage chamber or pipe segment. Dry Wells discharge the stored runoff via infiltration into the

surrounding soils. In the event that the Dry Well is overwhelmed in an intense storm event, an overflow mechanism (surcharge pipe, connection to a larger infiltration area, etc.) will ensure that additional runoff is safely conveyed downstream.

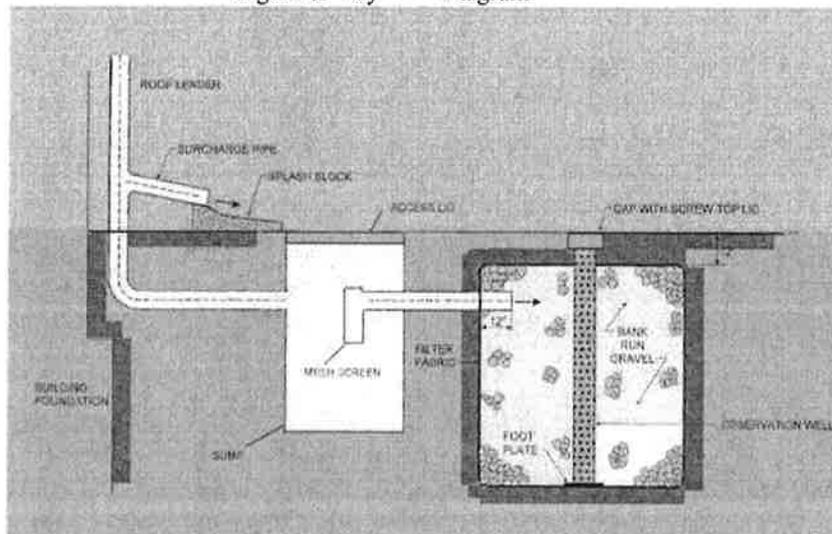
Design Considerations:

- Dry Wells typically consist of 18 to 48 inches of clean washed, uniformly graded aggregate with 40% void capacity (AASHTO No. 3, or similar). “Clean” gravel fill should average one and one-half to three (1.5 – 3.0) inches in diameter.
- Dry Wells are not recommended when their installation would create a significant risk for basement seepage or flooding. In general, 10 - 20 feet of separation is recommended between Dry Wells and building foundations.
- The facility may be either a structural prefabricated chamber or an excavated pit filled with aggregate.
- Depth of dry wells in excess of three-and-a-half (3.5) feet should be avoided unless warranted by soil conditions.
- Stormwater dry wells must never be combined with existing, rehabilitated, or new septic system seepage pits. Discharge of sewage to stormwater dry wells is strictly prohibited.

Maintenance:

- Dry wells should be inspected at least four (4) times annually as well as after large storm events.
- Remove sediment, debris/trash, and any other waste material from a dry well.
- Regularly clean out gutters and ensure proper connections to the dry well.
- Replace the filter screen that intercepts the roof runoff as necessary.

Figure 6: Dry Well Diagram



Source: PA BMP Guidance Manual, Chapter 6, Page 65.

Sizing Example for Dry Wells:

1. Determine contributing impervious surface area:

House Roof (Rear)	14 ft. x 48 ft.	=	672 sq. ft.
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2. Determine required volume control:

$$(672 \text{ sq. ft.} * 2 \text{ inches of runoff}) / 12 \text{ inches} = 112 \text{ cu. ft.}$$

$$112 \text{ cu. ft.} / 0.4 = 280 \text{ cu. ft. (assuming the 40% void ratio in the gravel bed)}$$

3. Sizing the dry well:

Set depth to 3.5 ft; Set width equal to length for a square chamber.

$$280 \text{ cu. ft.} = 3.5 \text{ ft.} * L * L; L = 9 \text{ ft.}$$

$$\text{Dimensions} = 3.5 \text{ ft. (D)} * 9 \text{ ft. (L)} * 9 \text{ ft. (W)}$$

Non-Structural BMPs

1. Tree Plantings and Preservation

Trees and forests reduce stormwater runoff by capturing and storing rainfall in the canopy and releasing water into the atmosphere through evapotranspiration. Tree roots and leaf litter also create soil conditions that promote the infiltration of rainwater into the soil. In addition, trees and forests reduce pollutants by taking up nutrients and other pollutants from soils and water through their root systems. A development site can reduce runoff volume by planting new trees or by preserving trees which existed on the site prior to development. The volume reduction calculations either determine the cubic feet to be directed to the area under the tree canopy for infiltration or determine a volume reduction credit which can be used to reduce the size of any one of the planned structural BMPs on the site.

Tree Considerations:

- Existing trees must have at least a 4" trunk caliper or larger.
- Existing tree canopy must be within 100 ft. of impervious surfaces.
- A tree canopy is classified as the continuous cover of branches and foliage formed by a single tree or collectively by the crowns of adjacent trees.
- New tree plantings must be at least 6 ft. in height and have a 2" trunk caliper.
- All existing and newly planted trees must be native to Pennsylvania. See <http://www.dcnr.state.pa.us/forestry/commontr/commontrees.pdf> for a guide book titled *Common Trees of Pennsylvania* for a native tree list.
- When using trees as volume control BMPs, runoff from impervious areas should be directed to drain under the tree canopy.

Determining the required number of planted trees to reduce the runoff volume:

1. Determine contributing impervious surface area:

Garage Roof (Right)	6 ft. x 24 ft.	=	144 Sq ft
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2. Calculate the required control volume:

$$(144 \text{ sq. ft.} \times 2 \text{ inches of runoff}) / 12 \text{ inches} = 24 \text{ cu. ft.}$$

3. Determine the number of tree plantings:

- A newly planted deciduous tree can reduce runoff volume by 6 cu. ft.
- A newly planted evergreen tree can reduce runoff volume by 10 cu. ft.

$$24 \text{ cu. ft.} / 6 \text{ cu. ft.} = 4 \text{ Deciduous Trees}$$

Determining the volume reduction for preserving existing trees:

1. Calculate approximate area of the existing tree canopy:

$$\sim 22 \text{ sq. ft.} \times \sim 23 \text{ sq. ft.} = 500 \text{ sq. ft.}$$

2. Measure distance from impervious surface to tree canopy: 35 ft.

3. Calculate the volume reduction credit by preserving existing trees:

- For Trees within 20 feet of impervious cover:
Volume Reduction cu. ft. = (Existing Tree Canopy sq. ft. x 1 inch) / 12

- For Trees beyond 20 feet but not farther than 100 feet from impervious cover:
Volume Reduction cu. ft. = (Existing Tree Canopy sq. ft. x 0.5 inch) / 12

$$(500 \text{ sq. ft.} \times 0.5 \text{ inches}) / 12 = 21 \text{ cu. ft.}$$

This volume credit can be utilized in reducing the size of any one of the structural BMPs planned on the site. For example, the 21 cu. ft. could be subtracted from the required infiltration volume when sizing the infiltration trench;

$$510 \text{ cu. ft.} - 21 \text{ cu. ft.} = 489 \text{ cu. ft.}$$

$$489 \text{ cu. ft.} / 3 \text{ ft (Depth)} = 163 / 6 \text{ ft. (Width)} = 27.1 \text{ ft (Length)}$$

Using the existing trees for a volume credit would decrease the length of the infiltration trench to 27.1 ft. instead of 28.3 ft.

2. Minimize Soil Compaction and Replant with Lawn or Meadow

When soil is overly compacted during construction it can cause a drastic reduction in the permeability of the soil and rarely is the soil profile completely restored. Runoff from vegetative areas with highly compacted soils similarly resembles runoff from an impervious surface. Minimizing soil compaction and re-planting with a vegetative cover like meadow or lawn, not only increases the infiltration on the site, but also creates a friendly habitat for a variety of wildlife species.

Design Considerations:

- Area shall not be stripped of topsoil.
- Vehicle movement, storage, or equipment/material lay down shall not be permitted in areas preserved for minimum soil compaction.
- The use of soil amendments and additional topsoil is permitted.
- Meadow should be planted with native grasses. Refer to *Meadows and Prairies: Wildlife-Friendly Alternatives to Lawn* at <http://pubs.cas.psu.edu/FreePubs/pdfs/UH128.pdf> for reference on how to properly plant the meadow and for a list of native species.

Determining the volume reduction by minimizing soil compaction and planting a meadow:

1. Calculate approximate area of preserved meadow:

$$\sim 22 \text{ sq. ft.} \times \sim 23 \text{ sq. ft.} = 500 \text{ sq. ft.}$$

2. Calculate the volume reduction credit by minimizing the soil compaction and planting a lawn/meadow:

- For Meadow Areas: Volume Reduction (cu. ft.) = (Area of Min. Soil Compaction (sq. ft.) x 1/3 inch of runoff) / 12

$$(500 \text{ sq. ft.} \times 1/3 \text{ inch of runoff}) / 12 = 13.8 \text{ cu. ft.}$$

- For Lawn Areas: Volume Reduction (cu. ft.) = (Area of Min. Soil Compaction (sq. ft.) x 1/4 inch of runoff) / 12

$$(500 \text{ sq. ft.} \times 1/4 \text{ inch of runoff}) / 12 = 10.4 \text{ cu. ft.}$$

This volume credit can be used to reduce the size of any one of the structural BMPs on the site. See explanation under the volume credit for preserving existing trees for details.

Alternative BMP to Capture and Reuse Stormwater

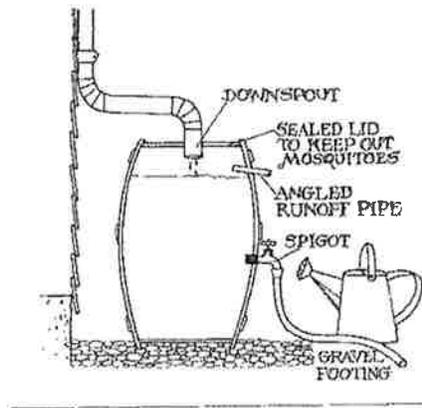
Rain Barrels

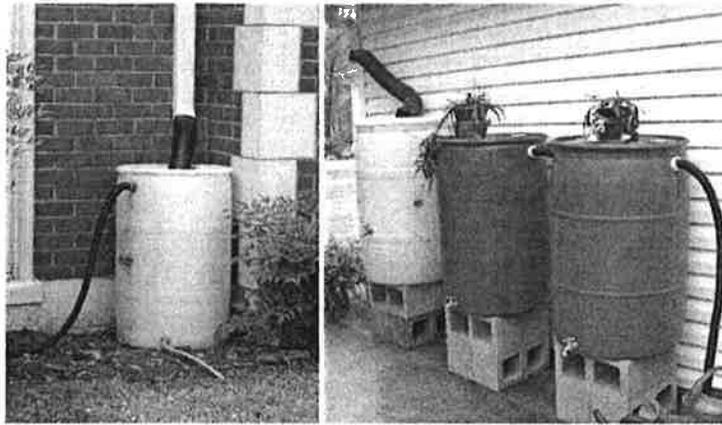
Rain barrels are large containers that collect drainage from roof leaders and temporarily store water to be released to lawns, gardens, and other landscaped areas after the rainfall has ended. Rain barrels are typically between 50 and 200 gallons in size. It is not recommended for rain barrels to be used as a volume control BMP because infiltration is not guaranteed after each storm event. For this reason, a rain barrel is not utilized in the site plan example. However, the information is included to provide an alternative for a homeowner to utilize when considering capture and reuse stormwater methods.

Design Considerations:

- Rain barrels should be directly connected to the roof gutter/spout.
- There must be a means to release the water stored between storm events to provide the necessary storage volume for the next storm.
- When calculating rain barrel size, rain barrels are typically assumed to be 25% full because they are not always emptied before the next storm.
- Use screens to filter debris and cover lids to prevent mosquitoes.
- An overflow outlet should be placed a few inches below the top with an overflow pipe to divert flow away from structures.
- It is possible to use a number of rain barrels jointly for an area.

Figure 2: Rain Barrel Diagram and Examples





Sources: (top picture) <http://www.citywindsor.ca/DisplayAttach.asp?AttachID=12348>
 (bottom picture on left) <http://repurposinglife.blogspot.com/2009/05/rainwater-harvesting.html>
 (bottom picture on right) <http://www.floridata.com/tracks/transplantedgardener/Rainbarrels.cfm>

Sizing Example for a Rain Barrel

1. Determine contributing impervious surface area:

Garage Roof (Right)	6 ft. x 24 ft.	=	144 sq ft
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2. Determine the amount of rainfall to be captured by the Rain Barrel. A smaller storm, no more than 2", is recommended to calculate the runoff to be captured. This example chose the 1" storm event.

3. Calculate the volume to be captured and reused:

$$(144 \text{ sq. ft.} \times 1 \text{ inch of runoff}) / 12 \text{ inches} = 12 \text{ cu. ft.}$$

4. Size the rain barrel:

$$1 \text{ cu. ft.} = 7.48 \text{ gallons}$$

$$12 \text{ cu. ft.} \times 7.48 = 90 \text{ gallons}$$

$$90 \text{ gallons} \times (0.25^*) = 22.5 \text{ gallons} \text{ (*assuming that the rain barrel is always at least 25\% full)}$$

$$90 \text{ gallons} + 22.5 \text{ gallons} = 112 \text{ gallons}$$

The rain barrel or barrels should be large enough hold at least 112 gallons of water.

REFERENCES:

Center for Watershed Protection and US Forest Service. (2008). *Watershed Forestry Resource Guide*. Retrieved on May 26, 2010 from <http://www.forestsforwatersheds.org/reduce-stormwater/>.

Department of Environmental Protection. (2006). *Pennsylvania Stormwater Best Management Practices Manual*.

Wissahickon Watershed Partnership. *Pennsylvania Rain Garden Guide*. Retrieved on May 4, 2010 from http://pa.audubon.org/habitat/PDFs/RGBrochure_complete.pdf.

Building a Backyard Rain Garden. North Carolina Cooperative Extension. Retrieved on May 4, 2010 from <http://www.bae.ncsu.edu/topic/raingarden/Building.htm>

Delaware County Planning Commission. (2010). *Draft Crum Creek Watershed Act 167 Stormwater Management Plan. Ordinance Appendix B. Simplified Approach to Stormwater Management for Small Projects*.

Solebury Township. (2008). *Solebury Township Stormwater Management Ordinance*. "Appendix J Simplified Stormwater Management Procedures for Existing Single Family Dwelling Lots"

**APPENDIX H: OPERATION AND MAINTENANCE (O&M) AGREEMENT FOR
STORMWATER MANAGEMENT BEST MANAGEMENT
PRACTICES (SWM BMPs)**

THIS AGREEMENT, made and entered into this _____ day of _____, 20____, by and between _____, (hereinafter the “Landowner”), and _____, _____ County, Pennsylvania, (hereinafter “Borough”);

WITNESSETH

WHEREAS, the Landowner is the owner of certain real property as recorded by deed in the land records of _____ County, Pennsylvania, Deed Book _____ at page _____, (hereinafter “Property”).

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

WHEREAS, the SWM Site Plan approved by the Borough (hereinafter referred to as the “Plan”) for the property identified herein, which is attached hereto as Appendix E and made part hereof, as approved by the Borough, provides for management of stormwater within the confines of the Property through the use of BMPs; and

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

WHEREAS, the Borough requires, through the implementation of the SWM Site Plan, that stormwater BMPs as required by said Plan and the Borough 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 Borough, 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 Borough 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 Borough 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 Borough 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 Borough.
5. In the event the Borough, 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 Borough for all expenses (direct and indirect) incurred within 10 days of receipt of invoice from the Borough.

- 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 affect 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 Borough 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 Borough.
- 8. The Borough shall inspect the BMPs at a minimum of once every three years to ensure their continued functioning.

This agreement shall be recorded at the Office of the Recorder of Deeds of _____ 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 Borough:

For the Landowner:

ATTEST:

Borough of Ambler, Montgomery County, 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)