

STORMWATER MANAGEMENT ORDINANCE

ORDINANCE NO. 2008-4

MUNICIPALITY OF EAST BRUNSWICK TOWNSHIP

SCHUYLKILL COUNTY, PENNSYLVANIA

Adopted at a Public Meeting Held on

November 6, 2008

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ARTICLE I -GENERAL PROVISIONS

Section 101. Short Title

This Ordinance shall be known and may be cited as the “East Brunswick Township Stormwater Management Ordinance.”

Section 102. Statement of Findings

The governing body of the Municipality finds that:

- A. Inadequate management of accelerated runoff of stormwater resulting from development throughout a watershed increases flows and velocities, contributes to erosion and sedimentation, overtaxes the carrying capacity of streams and storm sewers, greatly increases the cost of public facilities to carry and control stormwater, undermines flood plain management and flood control efforts in downstream communities, reduces groundwater recharge, threatens public health and safety, and increases non-point source pollution of water resources.
- B. A comprehensive program of stormwater management, including reasonable regulation of development and activities causing accelerated runoff, is fundamental to the public health, safety and welfare and the protection of people of the Commonwealth, their resources, and the environment.
- C. Stormwater is an important water resource, which provides groundwater recharge for water supplies and base flow of streams, which also protects and maintains surface water quality.
- D. 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).

Section 103. Purpose

The purpose of this Ordinance is to promote health, safety, and welfare within the Municipality and its watershed by minimizing the harms and maximizing the benefits described in Section 102 of this Ordinance, through provisions designed to:

- A. Meet legal water quality requirements under state law, including regulations at 25 Pa. Code Chapter 93 to protect, maintain, reclaim, and restore the existing and designated uses of the Waters of this Commonwealth.
- B. Preserve natural drainage systems as much as possible.

- C. Manage stormwater runoff close to the source.
- D. Provide procedures and performance standards for stormwater planning and management.
- E. Maintain groundwater recharge, to prevent degradation of surface and groundwater quality, and to otherwise protect water resources.
- F. Prevent scour and erosion of stream banks and streambeds.
- G. Provide proper operations and maintenance of all permanent Stormwater Management Best Management Practices (SWM BMPs) that are implemented within the Municipality.
- H. Provide standards to meet National Pollutant Discharge Elimination System (NPDES) permit requirements.

Section 104. Statutory Authority

A. Primary Authority:

The municipality is empowered to regulate these activities by the authority of the Act of October 4, 1978, P.L. 864 (Act 167), 32 P.S. Section 680.1, et seq., as amended, the "Stormwater Management Act" and the (appropriate municipal code).

B. Secondary Authority:

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

Section 105. Applicability

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

Section 106. Repealer

Any other ordinance provision(s) or regulation of the Municipality inconsistent with any of the provisions of this Ordinance is hereby repealed to the extent of the inconsistency only.

Section 107. 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.

Section 108. Compatibility with Other Requirements

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.

It is the intent for projects within the Township to be regulated under the guidelines and requirements of The East Brunswick Township Subdivision and Land Development Ordinance (SALDO) in its latest version. However, in the event the SALDO is not applicable to a project, the provisions and fees of this ordinance will apply to any earth disturbance area or increase in impervious area as defined in this ordinance. In a situation in which the governing ordinances are not clearly defined, the interpretation of the ordinance shall be at the discretion of the East Brunswick Township Supervisors.

ARTICLE II -DEFINITIONS

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

- A. Words used in the present tense include the future tense; the singular number includes the plural, and the plural number includes the singular; words of masculine gender include feminine gender; and words of feminine gender include masculine gender.
- B. The word "includes" or "including" shall not limit the term to the specific example but is intended to extend its meaning to all other instances of like kind and character.
- C. The words "shall" and "must" are mandatory; the words "may" and "should" are permissive.

Agricultural Activity - 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.

Applicant - A landowner, developer, or other person who has filed an application to the Municipality for approval to engage in any Regulated Earth Disturbance Activity at a project site in the Municipality.

Best Management Practice (BMP) - 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, low impact design, bioretention, wet ponds, permeable paving, grassed swales, riparian or forested buffers, sand filters, detention basins, and manufactured devices. Structural stormwater BMPs are permanent appurtenances to the project site.

Conservation District - A conservation district, as defined in section 3(c) of the Conservation District Law (3 P. S. § 851(c)), which has the authority under a delegation agreement executed with the Department to administer and enforce all or a portion of the erosion and sediment control program in this Commonwealth.

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.

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

DEP - The Pennsylvania Department of Environmental Protection.

Development Site (Site) - See Project Site.

Disconnected Impervious Area (DIA) – An impervious or impermeable surface which 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.

Disturbed Area – An un-stabilized land area where an Earth Disturbance Activity is occurring or has occurred.

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

Engineer - A registered Professional Engineer licensed as such in the Commonwealth of Pennsylvania.

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

Existing Condition – The dominant land cover during the five (5) year period immediately preceding a proposed Regulated Activity.

Floodplain - Any land area susceptible to inundation by water from any natural source or delineated by applicable Federal Emergency Management Agency (FEMA) maps and studies as being a special flood hazard area. Also included are areas that comprise Group 13 Soils, as listed in Appendix A of the Pennsylvania Department of Environmental Protection (PADEP) Technical Manual for Sewage Enforcement Officers (as amended or replaced from time to time by PADEP).

Floodway - The channel of the watercourse and those portions of the adjoining floodplains that are reasonably required to carry and discharge the 100-year flood. Unless otherwise specified, the boundary of the floodway is as indicated on maps and flood insurance studies provided by FEMA. In an area where no FEMA maps or studies have defined the boundary of the 100-year floodway, it is assumed - absent evidence to the contrary - that the floodway extends from the stream to 50 feet from the top of the bank of the stream.

Forest Management / Timber Operations - Planning and activities necessary for the management of forestland. 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.

Hydrologic Soil Group (HSG) - Infiltration rates of soils vary widely and are affected by subsurface permeability as well as surface intake rates. Soils are classified into four HSGs (A, B, C, and D) according to their minimum infiltration rate, which is obtained for bare soil after prolonged wetting. The Natural Resources Conservation Service (NRCS) of the US Department of Agriculture defines the four groups and provides a list of most of the soils in the United States and their group classification. The soils in the area of the development site may be identified from a soil survey report that can be obtained from local NRCS offices or conservation district offices. Soils become less pervious as the HSG varies from A to D.

Impervious Surface (Impervious Area) - A surface that prevents the infiltration of water into the ground. Impervious surfaces (or covers) shall include, but not be limited to, roofs, additional indoor living spaces, patios, garages, storage sheds and similar structures, and any new streets or sidewalks.

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 (Development) - Inclusive of any or all of the following meanings: (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 buildings, or (b) the division or allocation of land or space 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) any subdivision of land; (iii) development in accordance with Section 503(1.1) of the PA Municipalities Planning Code.

Mining Area - An area identified as Udifluents, coal overwash or Udorthents, strip mine by the Schuylkill County Soil survey, or as identified as a mining area by the Municipal engineer based upon a field visit.

Municipality - East Brunswick Township, Schuylkill County, Pennsylvania.

NRCS - Natural Resources Conservation Service (previously SCS).

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

Pervious Area - Any area not defined as impervious.

Project Site - The specific area of land where any Regulated Activities in the Municipality 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.

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. Including but not limited to new buildings, additions, driveways, grading, etc.

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

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

Return Period - The average interval, in years, within which a storm event of a given magnitude can be expected to occur one time. For example, the 25-year return period rainfall would be expected to occur on average once every twenty-five years.

Runoff - Any part of precipitation that flows over the land.

Sediment- Soils or other materials transported by surface water as a product of erosion.

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

Stormwater – Drainage runoff from the surface of the land resulting from precipitation or snow or ice melt.

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

Stormwater Management Plan - The plan for managing storm water runoff adopted by the County of Schuylkill for the Delaware River Watershed as required by the Act of October 4, 1978, P.L. 864, (Act 167), as amended, and known as the “Stormwater Management Act.”

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

Stormwater Management Site Plan - The plan prepared by the Developer or his representative indicating how stormwater runoff will be managed at the development site in accordance with

this Ordinance. **Stormwater Management Site Plan** will be designated as **SWM Site Plan** throughout this Ordinance.

Subdivision – As defined in The Pennsylvania Municipalities Planning Code, Act of July 31, 1968, P.L. 805, No. 247.

Waters of this 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 this Commonwealth.

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

Wetland - Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions, including swamps, marshes, bogs, fens, and similar areas. Areas defined during wetland observations in accordance with Army Corps of Engineers Wetlands Delineation Manual (COE 1987) in conjunction with COE 1992 clarification memorandum. According to this method, wetlands are identified by the presence of three essential parameters which are hydrophytic vegetation, hydric soils, and wetland hydrology.

ARTICLE III-STORMWATER MANAGEMENT STANDARDS

Section 301. General Requirements

- A. No Regulated Activities shall commence until the municipality issues written approval of a SWM Site Plan, which demonstrates compliance with the requirements of this Ordinance.
- B. SWM Site Plans approved by the Municipality, in accordance with Section 300, shall be on site throughout the duration of the Regulated Activity.
- C. The Municipality may, after consultation with 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 Activities, preparation and implementation of a SWM Site Plan is required unless specifically exempted in Section 302.
- E. For all Regulated Earth Disturbance Activities, erosion and sediment control BMPs shall be designed, implemented, operated, and maintained during the Regulated Earth Disturbance Activities (e.g., during construction), to meet the purposes and requirements of this Ordinance and to meet all requirements under Pennsylvania Code Title 25 and the Clean Streams Law. Various BMPs and their design standards are listed in the *Erosion and Sediment Pollution Control Program Manual* (E&S Manual), Commonwealth of Pennsylvania, Department of Environmental Protection, No. 363-2134-008 (2000), as amended and updated.
- F. For all Regulated Activities, implementation of the Volume Controls in Section 303 is required.
- G. Impervious Areas:
 - 1. 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.
 - 2. For development taking place in stages, the entire development plan must be used in determining conformance with this Ordinance.
 - 3. For projects that add impervious area to a parcel, the total impervious area on the parcel is subject to the requirements of this ordinance.

- H. Stormwater flows onto adjacent property shall not be created, increased, decreased, relocated, or otherwise altered without written permission of the adjacent property owner(s). Such stormwater flows shall be subject to the requirements of this Ordinance.
- I. All regulated activities shall include such measures as necessary to:
1. Protect health, safety, and property;
 2. Meet State Water Quality Requirements as defined in Article II;
 3. Meet the water quality goals of this ordinance by implementing measures to:
 - a. Minimize disturbance to floodplains, wetlands, natural slopes over 15%, and existing native vegetation.
 - b. Preserve and maintain trees and woodlands. Maintain or extend riparian buffers and protect existing forested buffer. Provide trees and woodlands adjacent to impervious areas whenever feasible.
 - c. Establish and maintain non-erosive flow conditions in natural flow pathways.
 - d. Minimize soil disturbance and soil compaction. Over disturbed areas, replace topsoil to a minimum depth equal to the original depth or 6 inches, whichever is greater. Use tracked equipment for grading when feasible. Provide seeding and soil supplements.
 - e. Disconnect impervious surfaces by directing runoff to pervious areas, wherever possible.
 4. To the maximum extent practicable, incorporate the techniques for Low Impact Development Practices described in *The Pennsylvania Stormwater Best Management Practices Manual* (SWM Manual)¹.
- J. The design of all facilities over Karst shall include an evaluation of measures to minimize adverse effects.
- K. Infiltration BMPs should be spread out, 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.
- L. Storage facilities should 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.

- M. The design storm volumes to be used in the analysis of peak rates of discharge should be obtained from the Precipitation-Frequency Atlas of the United States, Atlas 14, Volume 2, U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, Hydrometeorological Design Studies Center, Silver Spring, Maryland, 20910. NOAA's Atlas 14 can be accessed at Internet address: <http://hdsc.nws.noaa.gov/hdsc/pfds/>. The latest Point Precipitation Frequency Estimates at the time the ordinance was created is attached for the users convenience. However, the most current information should be used (See Appendix D).
- N. 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 Pennsylvania Code Title 25, the Clean Streams Law, and the Storm Water Management Act.
- O. Various BMPs and their design standards are listed in the SWM Manual¹.
- P. Stormwater controls should not conflict with on site sewage facilities and wells. See PA Code Title 25 Chapters 71, 72 and 73 for details.

Section 302. Exemptions

- A. Regulated Activities that create Impervious Areas smaller than 500 sq. ft. are exempt from this ordinance. However, the total footprint area is to include any improvements that are constructed within a (3) three year period.
- B. Non residential moveable structures (sheds) are excluded from requiring a plan or meeting the requirements of this ordinance.
- C. An accessory building or addition to an existing building which will increase the area, but is less than 1500 SF, are exempt from the Peak Rate Control and the SWM Site Plan preparation requirement of this Ordinance. However, the plan shall adhere to the volume control guidelines of this ordinance (example outlined in Appendix C). The area is to include all improved impervious areas including driveways, walkways, additional roofing, etc. In addition, the total area is to include any improvements that are constructed within a (3) three year period.
- D. An increase of areas to an existing driveway is excluded from requiring a plan and/or meeting the requirements of this ordinance if the requirements of the latest version of the Township Driveway Ordinance are satisfied. The Township Supervisors reserve the right to repeal this exemption on case by case basis due to site conditions which may cause adverse effects to the surrounding areas.
- E. Any and all exemptions are only applicable if stormwater management practices are utilized and direct an increase in flow to a pervious area. Flows shall be discharged to infiltration or vegetative BMPs unless otherwise approved by the Township Supervisors. No flow shall be directly diverted onto an impervious area such as a driveway or Township road.
- F. Agricultural plowing and tilling are exempt from the rate control and SWM Site Plan preparation requirements of this ordinance provided the activities are performed according to the requirements of 25 PA Code Chapter 102.
- G. Forest management and timber operations are exempt from the rate control and SWM Site Plan preparation requirements of this ordinance provided the activities are performed according to the requirements of 25 PA Code Chapter 102.
- H. Exemptions from any provisions of this Ordinance shall not relieve the applicant from the requirements in Sections 301.E through L.

Section 303. Volume Controls

The low impact development practices provided in the SWM Manual¹ shall be utilized for all Regulated Activities to the maximum extent practicable. See Appendix C for an example of volume control measures which can be calculated by a lot owner.

A. Areas Tributary to High Quality or Exceptional Value Waters

All Regulated Activities occurring in drainage areas tributary to waters designated High Quality or Exceptional Value pursuant to 25 Pa.Code, Chapter 93, or Exceptional Value Wetlands as described in Chapter 105.17 or on the Pennsylvania Fish and Boat Commission website /www.fish.state.pa.us/classa98 shall not change any biological, chemical, or physical characteristic, including volume, rate, velocity, course, current, cross-section, or temperature of the waters; unless the activity is specifically permitted in accordance with the environmental laws of this Commonwealth.

B. Areas Not Tributary to High Quality or Exceptional Value Waters

For Regulated Activities in drainage areas that are not tributary to special protection waters, water quality controls shall be implemented using the *Design Storm Method* in Subsection 1 or the *Simplified Method* in Subsection 2 below. For Regulated Activity areas equal or less than one (1) acre that do not require hydrologic routing to design the stormwater facilities, this Ordinance establishes no preference for either methodology.

1. *The Design Storm Method* (CG-1 in the SWM Manual¹) is applicable to any size of Regulated Activity. This method requires detailed modeling based on site conditions.
 - a. Do not increase the post-development total runoff volume for all storms equal to or less than the 2-year 24-hour duration rainfall.
 - b. For modeling purposes:
 - i. Existing (pre-development) non-forested pervious areas must be considered meadow or its equivalent.
 - ii. Twenty (20) percent of existing impervious area, when present, shall be considered meadow in the model for existing conditions.
2. *The Simplified Method* (CG-2 in the SWM Manual¹) 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:

- a. Stormwater facilities shall capture at least the first two inches (2") of runoff from all new impervious surfaces.
- b. At least the first one inch (1.0") of runoff from new impervious surfaces shall be permanently removed from the runoff flow — i.e., it shall not be released into the surface Waters of this Commonwealth. Removal options include reuse, evaporation, transpiration, and infiltration.
- c. Wherever possible, infiltration facilities should be designed to accommodate infiltration of the entire, permanently removed, runoff; however, in all cases at least the first one-half inch (0.5") of the permanently removed runoff should be infiltrated.
- d. This method is exempt from the requirements of Section 304, Rate Controls.

Section 304. Rate Controls

- A. Areas not covered by a Release Rate Map from an approved Act 167 Stormwater Management Plan:

Post-development discharge rates shall not exceed the predevelopment discharge rates for the 1-, 2-, 5-, 10-, 25-, 50-, and 100-year storms. If it is shown that the peak rates of discharge indicated by the post-development analysis are less than or equal to the peak rates of discharge indicated by the pre-development analysis for 1-, 2-, 5-, 10-, 25-, 50-, and 100-year, 24-hour storms, then the requirements of this section have been met. Otherwise, the applicant shall provide additional controls as necessary to satisfy the peak rate of discharge requirement.

- B. Areas covered by a Release Rate Map from an approved Act 167 Stormwater Management Plan:

For the 1-, 2-, 5-, 10-, 25-, 50-, and 100-year storms, the post-development peak discharge rates will follow the applicable approved release rate maps. For any areas not shown on the release rate maps, the post-development discharge rates shall not exceed the predevelopment discharge rates.

ARTICLE IV-STORMWATER MANAGEMENT (SWM) SITE PLAN REQUIREMENTS

Section 401. Plan Content

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

- A. Appropriate sections from the Municipal Subdivision and Land Development Ordinance shall be followed in preparing the SWM Site Plans. In instances where the Municipality lacks Subdivision and Land Development regulations, the content of SWM Site Plans shall follow the County's Subdivision and Land Development Ordinance.
- B. The Municipality shall not approve any SWM Site Plan that is deficient in meeting the requirements of this Ordinance. At its sole discretion and in accordance with this Article, when a SWM Site Plan is found to be deficient, the Municipality may disapprove the submission and require a resubmission, or in the case of minor deficiencies the Municipality may accept submission of modifications.
- C. Provide permanent access or maintenance easement for all physical SWM BMPs, such as ponds and infiltration structures, as necessary to implement the operation and maintenance plan discussed in item E.9 below.
- D. The following signature block for the Municipality:

"East Brunswick Township, on this date November (date of signature), has reviewed and hereby certifies that the SWM Site Plan meets all design standards and criteria of Municipal Ordinance No. 2008-4."
- E. The SWM Site Plan shall provide the following supplemental information:
 - 1. The overall stormwater management concept for the project.
 - 2. A determination of Site Conditions in accordance with the SWM Manual¹. A detailed site evaluation shall be completed for projects proposed in areas of carbonate geology, karst topography, or previously mined areas.
 - 3. Stormwater runoff design computations, and documentation as specified in this Ordinance, or as otherwise necessary to demonstrate that the maximum practicable measures have been taken to meet the requirements of this Ordinance, including the recommendations and general requirements in Section 301.
 - 4. Expected project time schedule.

5. A soil erosion and sediment control plan in accordance with 25 PA Code Chapter 102, when applicable, as prepared for and submitted to the approval authority. A copy of the adequacy letter from the Conservation District should be provided.
6. Soil Infiltration testing data.
7. The effect of the project (related to runoff volumes, water quality, and peak flows) on adjacent surrounding properties and aquatic features and on any existing stormwater conveyance system that may be affected by the project.
8. Plan and profile drawings of all SWM BMPs including open channel and swales. Drawings shall indicate location of all hydraulic facilities.
9. SWM Site Plan shall show the locations of existing and proposed septic tank infiltration areas and wells.
10. The SWM Site Plan shall include an operation and maintenance (O&M) plan for all existing and proposed physical stormwater management facilities. This plan shall address long-term ownership and responsibilities for operation and maintenance as well as schedules and costs for O&M activities.
11. The applicant is required to show previous mining areas based on PADEP District mining office, USGS, and DCNR geological unit maps; and old and current deep mine maps from the Office of Surface Mining to determine proximity to coal bed outcrops, generalized stratigraphic sections, coal seam, mine pool, and previous workings. The applicant is required to provide a minimum of 6 inches of topsoil over all disturbed areas. Soil testing will be required, and the necessary seeding and soil supplements are provided. The applicant is encouraged to convey runoff through vegetated swales, and as much as possible use bio - retention such as a rain garden, and wet or lined ponds to discharge directly to existing watercourses. If proximity to mine pool is close, we do not want to infiltrate or encourage additional volume of flow to the mine pool volume. Should rip-rap aprons or channels be required, they must be composed of non-acid bearing rock. Limestone is recommended to assist in achieving an acceptable pH at the receiving watercourse.
12. The SWM Site Plan shall be created by a Qualified Professional unless the plan being submitted for a project is only required to meet volume control measures per Section 302, in which, the volumes can be calculated by a lot owner (see Appendix C).

Section 402. Plan Submission

- A. Five copies of the SWM Site Plan shall be submitted as follows:

1. Two copies to the Municipality.
 2. One copy to the Municipal Engineer (when applicable)
 3. One copy to the County Conservation District (if required by the SCD rules and regulations for monitoring storm water).
 4. One copy to the Zoning Officer / Building Code Official
- B. Additional copies shall be submitted as requested by the Municipality or DEP.

Section 403. Plan Review

- A. The SWM Site Plan shall be reviewed by a Qualified Professional for the Municipality for consistency with the provisions of this ordinance. After review, the Qualified Professional shall provide a written recommendation for the municipality 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.
- B. The Municipality shall notify the applicant in writing within 45 calendar days whether the SWM Site Plan is approved or disapproved. If disapproved, the Municipality shall cite the reasons for disapproval.
- C. The Municipality's approval of a SWM Site Plan shall be valid for a period not to exceed two (2) years. This two year time period shall commence on the date that the Municipality signs the approved SWM Site Plan. If stormwater management facilities included in the approved SWM Site Plan have not been constructed, or if an as-built survey of these facilities has not been approved within this 2-year time period, then the Municipality may consider the SWM Site Plan disapproved and may revoke any and all permits. SWM Site Plans that are considered disapproved by the Municipality shall be resubmitted in accordance with Section 405 of this Ordinance.

Section 404. 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 re-design 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

Municipality, shall require a resubmission of the modified SWM Site Plan in accordance with this Article.

Section 405. Resubmission of Disapproved Stormwater Water Management Site Plans

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

Section 406. As-Built Surveys, Completion Certificate, and Final Inspection

- A. The Developer shall be responsible for completing an as-built survey of all SWM BMPs included in the approved SWM Site Plan. The as-built survey and an explanation of any discrepancies with the construction plans shall be submitted to the Municipality.
- B. The submission shall include a certification of completion signed by a Qualified Professional verifying that all permanent SWM BMPs have been constructed according to the approved plans and specifications. If any licensed Qualified Professionals contributed to the construction plans, then a licensed Qualified Professional must sign the completion certificate.
- C. After receipt of the completion certification by the Municipality, the Municipality may conduct a final inspection.
- D. The Municipality has the right to require additional inspections as required.

ARTICLE V- OPERATION AND MAINTENANCE

Section 501. Responsibilities

- A. The Municipality shall make the final determination on the continuing maintenance responsibilities prior to final approval of the SWM Site Plan. The Municipality may require a dedication of such facilities as part of the requirements for approval of the SWM Site Plan. Such a requirement is not an indication that the Municipality will accept the facilities. The Municipality reserves the right to accept the ownership and operating responsibility for any or the entire stormwater management controls.
- B. Facilities, areas, or structures used as Stormwater Management BMPs shall be enumerated as permanent real estate appurtenances and recorded as deed restrictions or conservation easements that run with the land.
- C. The Operation and Maintenance Plan shall be recorded as a restrictive deed covenant that runs with the land.
- D. The Municipality shall take enforcement actions against an owner for any failure to satisfy the provisions of this Article.

Section 502. Operation and Maintenance Agreements

The owner is responsible for Operation and Maintenance of the SWM BMPs. If the owner fails to adhere to the Operation and Maintenance Agreement, the Municipality may perform the services required and charge the owner appropriate fees. Non-payment of fees may result in a lien against the property.

ARTICLE VI-FEES AND EXPENSES

Section 601. General

The Municipality has established by resolution a schedule of fees and collection procedure for applications and other matters including inspections pertaining to this ordinance. Plans shall not be considered for review until fees are paid and the applications properly signed. The Municipality will require a bond in the amount of the estimated construction, including review fees, to be provided as part of the application.

The review fee includes but not is limited to costs for the following:

- A. Administrative/clerical processing.
- B. Review of the SWM Site Plan by the Township and Township Engineer.
- C. Attendance at meetings.
- D. The inspection of stormwater management facilities and drainage improvements during construction.
- E. The final inspection upon completion of the stormwater management facilities and drainage improvements presented in the plan
- F. Any additional work or effort required to enforce any permit provisions regulated by this Ordinance, correct violations, and assure proper completion of stipulated remedial actions.

ARTICLE VII-PROHIBITIONS

Section 701. Prohibited Discharges and Connections

- A. Any drain or conveyance, whether on the surface or subsurface, which allows any non-stormwater discharge including sewage, process wastewater, and wash water to enter the Waters of this Commonwealth is prohibited.
- B. No person shall allow, or cause to allow, discharges into surface Waters of this 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 this Commonwealth:

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

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

Section 702. Roof Drains

Proposed roof drains and sump pumps shall discharge to infiltration or vegetative BMPs unless otherwise approved by the Township Supervisors.

Section 703. Alteration of BMPs

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

ARTICLE VIII-ENFORCEMENT AND PENALTIES

Section 801. Right-of-Entry

Upon presentation of proper credentials, the Municipality may enter at reasonable times upon any property within the Municipality to inspect the condition of the stormwater structures and facilities in regard to any aspect regulated by this Ordinance.

Section 802. Inspection

- A. SWM BMPs should be inspected by the land owner/developer according to the following list of frequencies:
 - 1. Annually and
 - 2. During or immediately after the cessation of a 2-year (3.0 inch) or greater storm.
- B. Any deficiencies shall be reported to the Municipality in writing within 15 days of occurrence and corrected in accordance with the ordinance.
- C. The Municipality or their designee shall inspect all phases of the installation of the permanent stormwater management facilities as deemed appropriate by the Municipality.
- D. During any stage of the work, if the Municipality or their designee determines that the permanent stormwater management facilities are not being installed in accordance with the approved Stormwater Management Plan, the Municipality shall revoke any existing building permits and issue a cease and desist order until a revised Stormwater Management Plan is submitted and approved except as directed by the Municipality or Conservation District, as specified in this Ordinance.
- E. A final inspection of all stormwater management facilities shall be conducted by the Municipality or their designee and to confirm compliance with the approved Stormwater Management Plan prior to the issuance of any Occupancy Permit.

Section 803. Enforcement

- A. It shall be unlawful for a person to undertake any Regulated Activity except as provided in an approved SWM Site Plan.
- B. It shall be unlawful to alter or remove any control structure required by the SWM Site Plan.

- C. Inspections regarding compliance with the SWM Site Plan are a responsibility of the Municipality.

Section 804. Suspension and Revocation

- A. Any approval for a Regulated Activity issued may be suspended or revoked by the Municipality for:
 - 1. Non-compliance with, or failure to implement, any provision of the approval.
 - 2. A violation of any provision of this Ordinance or any other applicable law, Ordinance, rule, or regulation relating to the Regulated Activity.
 - 3. The creation of any condition or the commission of any act during the Regulated Activity which constitutes or creates a hazard or nuisance, pollution, or which endangers the life or property of others.
- E. A suspended approval may be reinstated by the Municipality when:
 - 1. The Municipality has inspected and approved the corrections to the violations that caused the suspension.
 - 2. The Municipality is satisfied that the violation has been corrected.
- F. An approval that has been revoked by the Municipality cannot be reinstated. The Applicant may apply for a new approval under the provisions of this Ordinance.
- G. Prior to revocation or suspension of a permit, if there is no immediate danger to life, public health, or property, the Municipality may notify the land owner/ developer to discuss the non-compliance.

Section 805. Penalties

- A. Any person violating any of the requirements of this ordinance shall, upon conviction, pay a fine of \$1000.00, plus applicable costs. The owner(s) of any land on which such a violation occurs, as well as any person performing work on the land without complying with the terms of this ordinance, shall be deemed a violator. No citation for a violation of this ordinance may be filed unless the Township first gives written notice of the nature of the violation, and allows twenty (20) days from the receipt of such notice for the violation to be corrected or for appropriate action to be taken by the violator; the notice shall specify the action which must be taken to correct the violation. After the expiration of the said twenty (20) day period, or such additional time as may be agreed upon in writing by the Township, a citation may be filed by the Township with the appropriate District Justice. Each day thereafter during which the violation continues to exist shall be deemed a separate violation of this ordinance, and a separate citation

for each such violation may be filed without the need to provide additional notice or allow additional twenty day periods, as set forth above for the initial violation.

B. In addition, the Municipality, 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.

Section 806. Appeals

- A. Any person aggrieved by any action of the Municipality or its designee, relevant to the provisions of this Ordinance, may appeal to the Municipality within thirty (30) days of that action.
- B. Any person aggrieved by any decision of the Municipality, 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 thirty (30) days of the Municipality's decision.

ARTICLE IX - REFERENCES

1. Pennsylvania Department of Environmental Protection (DEP). No. 363-0300-002 (2006), as amended and updated. *Pennsylvania Stormwater Best Management Practices Manual*. Harrisburg, PA.
2. The Pennsylvania Department of Environmental Protection (DEP). 363-2134-008 (2000), as amended and updated. *Erosion and Sediment Pollution Control Program Manual*. Harrisburg, PA.
3. United States Department of Agriculture (USDA), National Resources Conservation Service (NRCS). *National Engineering Handbook*. Part 630: Hydrology, 1969-2001. Originally published as the *National Engineering Handbook*, Section 4: Hydrology. Available online at:
<http://www.wcc.nrcs.usda.gov/hydro/hydro-techref-neh-630.html>.
4. United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS). 1986. *Technical Release 55: Urban Hydrology for Small Watersheds*, 2nd Edition. Washington, D.C.
5. US Department of Commerce (USDC), National Oceanic and Atmospheric Administration (NOAA), National Weather Service (NWS), Hydrometeorological Design Studies Center. 2004-2006. *Precipitation-Frequency Atlas of the United States, Atlas 14, Volume 2*, Silver Spring, Maryland, 20910. Internet address:
<http://hdsc.nws.noaa.gov/hdsc/pfds/>.

ENACTED and ORDAINED at a regular meeting of the

East Brunswick Township Supervisors

on this 6th day of November, 2008.

This Ordinance shall take effect immediately.

Jeffrey A. Faurio *Chairman*
[Name] [Title]

Thomas A. Stone *Co-Chairman*
[Name] [Title]

J. Paul R. Rhee *Supervisor*
[Name] [Title]

ATTEST:

Fernando A. Noriega
Secretary

APPENDIX A

OPERATION AND MAINTENANCE AGREEMENT STORMWATER MANAGEMENT BEST MANAGEMENT PRACTICES (SWM BMP)

THIS AGREEMENT, made and entered into this _____ day of _____, 20____, by and between _____, (hereinafter the "Landowner"), and East Brunswick Township, Schuylkill County, Pennsylvania, (hereinafter "Municipality");

WITNESSETH

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

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

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

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

WHEREAS, the Municipality requires, through the implementation of the SWM Site Plan, that SWM BMPs as required by said Plan and the Municipal Stormwater Management Ordinance be constructed and adequately operated and maintained by the Landowner, his 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 accordance with the specific maintenance requirements noted on the approved SWM Site Plan.
3. The Landowner hereby grants permission to the Municipality, its authorized agents and employees, to enter upon the property, at reasonable times and upon presentation of proper credentials, to inspect the BMPs whenever necessary. Whenever possible, the Municipality shall notify the Landowner prior to entering the property.
4. In the event the Landowner fails to operate and maintain the BMPs per paragraph 2, the Municipality or its representatives may enter upon the Property and take whatever action is deemed necessary to maintain said BMP(s). This provision shall not be construed to allow the Municipality to erect any permanent structure on the land of the Landowner. It is expressly understood and agreed that the Municipality is under no obligation to maintain or repair said facilities, and in no event shall this Agreement be construed to impose any such obligation on the Municipality.
5. In the event the Municipality, pursuant to this Agreement, performs work of any nature, or expends any funds in performance of said work for labor, use of equipment, supplies, materials, and the like, the Landowner shall reimburse the Municipality for all expenses (direct and indirect) incurred within 10 days of receipt of invoice from the Municipality.
6. The intent and purpose of this Agreement is to ensure the proper maintenance of the onsite BMPs by the Landowner; provided, however, that this Agreement shall not be deemed to create or effect any additional liability of any party for damage alleged to result from or be caused by stormwater runoff.
7. The Landowner, its executors, administrators, assigns, and other successors in interests, shall release the Municipality from all damages, accidents, casualties, occurrences or claims which might arise or be asserted against said employees and representatives from the construction, presence, existence, or maintenance of the BMP(s) by the Landowner or Municipality.
8. The Landowner shall inspect the BMPs annually to ensure their continued functioning.

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

ATTEST:

WITNESS the following signatures and seals:

(SEAL)

For the Municipality:

(SEAL)

For the Landowner:

ATTEST:

_____ (City, Borough, Township)

County of Schuylkill, 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)

APPENDIX B

STORMWATER MANAGEMENT APPLICATION

This application is to be submitted to the East Brunswick Township when any project involves earth disturbance or an increase of impervious area as defined by this Ordinance. This application is hereby made for review of the Stormwater Management Plan as submitted herewith in accordance with the East Brunswick Township Stormwater Management Ordinance.

Date of Submission _____ Submission No. _____ (Original = 1)

1. Name of subdivision or development _____

2. Name of Applicant _____ Telephone No. _____

(if corporation, list the corporation's name and the names of two officers of the corporation)

_____ Officer 1

_____ Officer 2

Address _____

Zip _____

Applicants interest in subdivision or development

(if other than property owner give owners name and address)

3. Name of property owner _____ Telephone No. _____

Address _____

Zip _____

4. Name of engineer or surveyor _____ Telephone No. _____

Address _____

Zip _____

5. Type of subdivision or development proposed:

_____ Single-Family Lots	_____ Townhouses	_____ Commercial(Multi-Lot)
_____ Two Family Lots	_____ Garden Apartments	_____ Commercial (One-Lot)
_____ Multi-Family Lots	_____ Mobile-Home Park	_____ Industrial (Multi-Lot)
_____ Cluster Type Lots	_____ Campground	_____ Industrial (One-Lot)
_____ Planned Residential	_____ Other (_____)	
Development		

6. Lineal feet of new road proposed _____ L.F.

7. Area of proposed and existing impervious area on entire tract.

- a. Existing (to remain) _____ S.F. _____ % of Property
- b. Proposed _____ S.F. _____ % of Property
- c. Project exempt: _____ (Yes or No per Ordinance – Section 302)

8. Stormwater

a. Does the peak rate of runoff from proposed conditions exceed that flow which occurred for existing conditions for the designated design storm? _____

b. Type of proposed runoff control _____

c. Does the plan meet the requirements of Article III of the Stormwater Ordinances? _____

If not, what variances/waivers are requested? _____

Reasons Why _____

d. Is a recommended maintenance program attached? _____

9. Erosion and Sediment Pollution Control (E&S):

a. Has the stormwater management and E&S plan, supporting documentation and narrative been submitted to the Schuylkill County Conservation District? _____

b. Total area of earth disturbance _____ S.F.

10. Wetlands

a. Have the wetlands been delineated by someone trained in wetland delineation? _____

b. Have the wetland lines been verified by a state or federal permitting authority? _____

c. Have the wetland lines been surveyed? _____

d. Total acreage of wetland within the property _____

e. Total acreage of wetland disturbed _____

f. Supporting documentation _____

Information.

APPENDIX C

**STORMWATER MANAGEMENT PRACTICES
FOR PROJECTS WHICH ARE EXEMPT UNDER SECTION 302 OF THIS
ORDINANCE**

STORMWATER MANAGEMENT PROCEDURES FOR PROJECTS EXEMPT UNDER SECTION 302

What are the Act 167 Stormwater Management Requirements?

Pennsylvania Act 167 was authorized on October 4, 1978 (32 P.S., P.L. 864) and gave Pennsylvania Municipalities the power to regulate activities that affect stormwater runoff, surface and groundwater quantity and quality.

Who is affected by these requirements?

The East Brunswick Township Stormwater Management Ordinance affects all NEW development in East Brunswick Township. Projects exempt from this ordinance are listed under Section 302 of this Ordinance.

Do I require professional services to meet these requirements?

This Appendix has been developed to assist the individual lot owners in meeting the requirement of this Stormwater Management Ordinance. If the guidelines presented in this Appendix are followed, smaller projects may not require professional services to submit the application and relative information (see Section 302).

Determination of Recharge Volume

The amount of recharge volume to be provided can be determined by following the simple steps below. Impervious area calculations should include all areas on the individual lots that are covered by roof area or pavement which would prevent rain from naturally percolating into the ground, including sidewalks, driveways or parking areas. Sidewalks, driveways or patios that are constructed with gravel or turf pavers and will not be blacktopped in the future, need not be included in this calculation.

Example Recharge Volume:

STEP 1 - Determine Total Impervious Surfaces:

House Roof (Front)	12 ft. x 48 ft.	=	576 sq. ft.
House Roof (Rear)	12 ft. x 48 ft.	=	576 sq. ft.
Driveway	12 ft. x 50 ft.	=	600 sq. ft.
Parking Pad	12 ft. x 12 ft.	=	144 sq. ft.
Walkway	6 ft. x 20 ft.	=	120 sq. ft.

			2,016 sq. ft.

STEP 2 - Determine Required Infiltration Volume (Rv) Using the Following Equation

$R_v = 0.50 \text{ inches} \times (\text{total impervious area in square feet}) = \text{cubic feet of recharge}$

$$R_v = \frac{0.50 \text{ in.} \times 2,016 \text{ sq. ft.}}{12} = 84.0 \text{ cu.ft.}$$

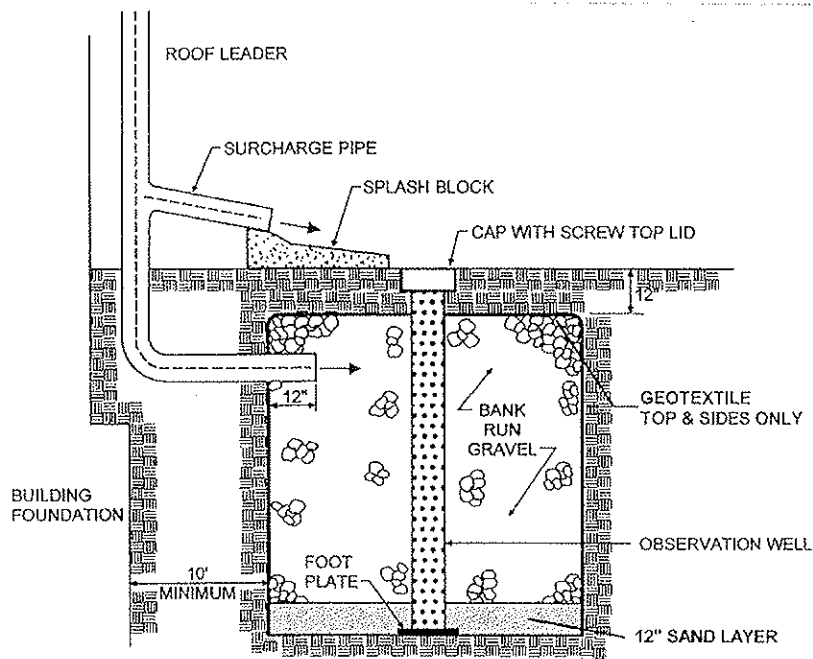
STEP 3 - Sizing of Selected Infiltration Method

The following pages show several methods of infiltrating stormwater runoff from residential areas. Their appropriateness depends on the amount of infiltration volume required and the amount of land available. More than one method can be implemented on a site, depending on site constraints. Dry wells should be used only for receiving runoff from roof drains. Infiltration trenches are appropriate for receiving runoff from driveways, sidewalk or parking areas. Other methods may be appropriate, but these should be discussed with the municipal engineer prior to installation.

Dry Wells

Dry wells are effective methods of infiltrating runoff from roof leaders. These facilities should be located a minimum of 10 feet from the building foundation to avoid seepage problems. A dry well can be either a structural prefabricated chamber or an excavated pit filled with aggregate (wrapped with geotextile). Construction of a dry well should be performed after all other areas of the site are stabilized, to avoid clogging. During construction, compaction of the subgrade soil should be avoided and construction should be performed with only light machinery. Depth of dry wells in excess of 3 1/2 feet should be avoided. Gravel fill should be an average 1.5 - 3.0 inches in diameter (AASHTO #1). Dry wells should be inspected at least four times annually as well as after large storm events.

FIGURE 1
TYPICAL DRY WELL CONFIGURATION



Source: Maryland Stormwater Design Manual, 2000

Example Sizing:

STEP 1 - Determine Total Impervious Surfaces

House Roof Area: 12 ft. x 48 ft. - 576 sq. feet

STEP 2 - Determine Required Infiltration Volume using Equation

$$\frac{0.50 \text{ in.} \times 576 \text{ sq. ft.}}{12} = 24.0 \text{ cu. ft.}$$

$$\frac{24.0 \text{ cu. ft.}}{0.4} = 60.0 \text{ cu. ft.} \text{ (* assume 40\% void ratio in gravel bed)}$$

STEP 3 - Sizing of Select Infiltration Method

Volume of facility - Depth x Width x Length

Set D = 3.5 ft; Set W = L for a square chamber

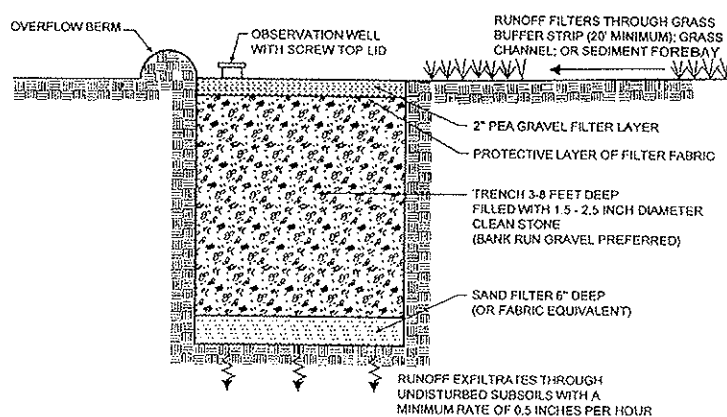
$$60.0 \text{ cu. ft.} = 3.5 \times L \times L ; L = 4.2 \text{ ft.}$$

Final Facility Dimensions: 3.5 ft. (D) x 4.2 ft. (W) x 4.2 ft. (L)

Infiltration Trenches

An infiltration trench is a long, narrow, rock filled trench with no outlet that receives stormwater runoff. Runoff is stored in the void space between the stones and infiltrates through the bottom and into the soil matrix. Infiltration trenches perform well for removal of fine sediment and associated pollutants. Pretreatment using buffer strips, swales, or detention basins is important for limiting amounts of coarse sediment entering the trench which can clog and render the trench ineffective.

FIGURE 2
TYPICAL INFILTRATION TRENCH CONFIGURATION



Source: Maryland Stormwater Design Manual, 2000

Example Sizing:

STEP 1 - Determine Total Impervious Surfaces

Driveway	12 ft. x 50 ft.	=	600 sq. ft.
Parking Pad	12 ft. x 12 ft.	=	144 sq. ft.
Walkway	6 ft. x 20 ft.	=	120 sq. ft.

			864 sq. ft.

STEP 2 - Determine Require Infiltration Volume using Equation

$$\frac{0.50 \text{ in.} \times 864 \text{ sq. ft.}}{12} = 36.0 \text{ cu. ft.}$$

$$\frac{36.0 \text{ cu. ft.}}{0.4} = 90.0 \text{ cu. ft. (* assume 40\% void ration in gravel bed)}$$

STEP 3 - Sizing of Select Infiltration Method

Volume of facility = Depth x Width x Length

Set D = 3.0 ft; Determine Required Surface Area of Trench

$$90.0 \text{ cu. ft.} / 3.0 \text{ ft.} = 30.0 \text{ sq. ft.}$$

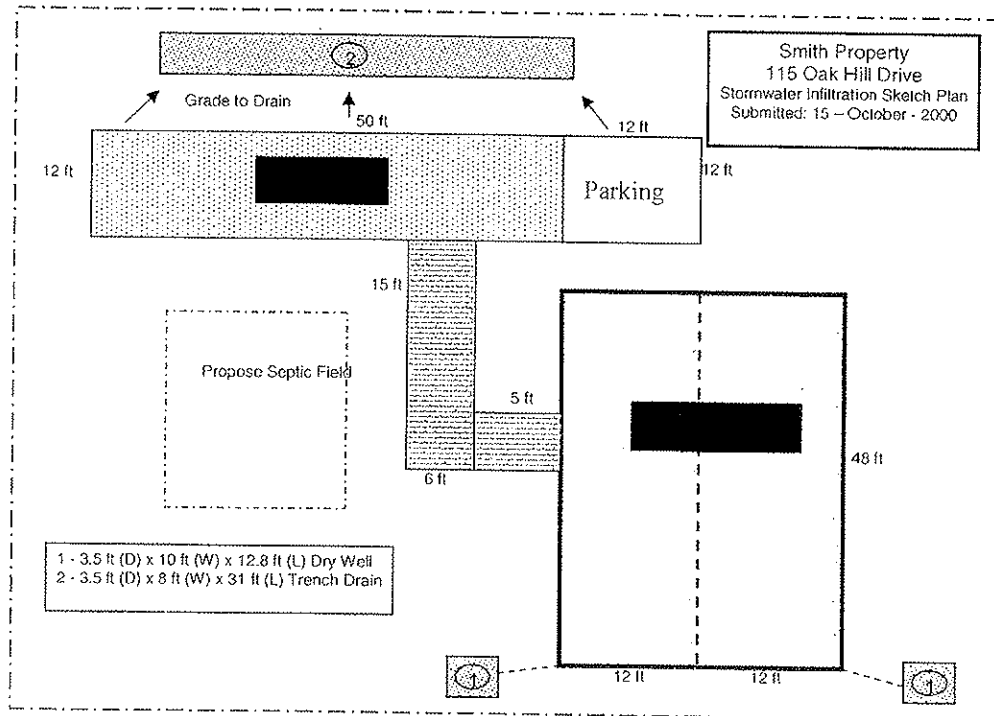
The width of the trench should be greater than 2 times its depth (2 x D); therefore in this example a trench width of 6 feet is selected;

Determine trench length: $L = 30.0 \text{ sq. ft.} / 6 \text{ ft.} = 5.0 \text{ ft.}$

Final Trench Dimensions: 3.0 ft. (D) x 6 ft. (W) x 5.0 ft. (L)

FIGURE 3

SAMPLE SKETCH PLAN



APPENDIX D

POINT PRECIPITATION FREQUENCY ESTIMATES FROM NOAA ATLAS 14



POINT PRECIPITATION FREQUENCY ESTIMATES FROM NOAA ATLAS 14



Pennsylvania 40.655 N 76.008 W 597 feet

from "Precipitation-Frequency Atlas of the United States" NOAA Atlas 14, Volume 2, Version 3
G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M. Yekta, and D. Riley
NOAA, National Weather Service, Silver Spring, Maryland, 2004

Extracted: Thu Oct 2 2008

Confidence Limits	Seasonality	Location Maps	Other Info.	GIS data	Maps	Docs	Return to Sta
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Precipitation Intensity Estimates (in/hr)

ARI* (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	4.40	3.45	2.83	1.89	1.16	0.70	0.51	0.32	0.20	0.12	0.07	0.04	0.03	0.02	0.01	0.01	0.01	0.01
2	5.24	4.12	3.38	2.28	1.41	0.85	0.62	0.38	0.24	0.14	0.08	0.05	0.03	0.02	0.02	0.01	0.01	0.01
5	6.12	4.79	3.96	2.73	1.72	1.05	0.77	0.47	0.30	0.17	0.10	0.06	0.04	0.03	0.02	0.02	0.01	0.01
10	6.79	5.29	4.37	3.06	1.96	1.21	0.89	0.55	0.34	0.21	0.12	0.06	0.04	0.03	0.02	0.02	0.01	0.01
25	7.61	5.87	4.87	3.48	2.27	1.45	1.08	0.67	0.42	0.25	0.15	0.08	0.05	0.04	0.03	0.02	0.02	0.01
50	8.26	6.32	5.25	3.80	2.52	1.66	1.24	0.77	0.49	0.30	0.17	0.09	0.06	0.05	0.03	0.02	0.02	0.02
100	8.92	6.78	5.64	4.13	2.78	1.90	1.43	0.89	0.57	0.35	0.20	0.11	0.07	0.05	0.03	0.02	0.02	0.02
200	9.59	7.25	6.04	4.48	3.06	2.17	1.64	1.02	0.66	0.40	0.23	0.12	0.08	0.06	0.04	0.03	0.02	0.02
500	10.54	7.88	6.56	4.95	3.46	2.58	1.97	1.23	0.80	0.50	0.29	0.15	0.10	0.07	0.04	0.03	0.02	0.02
1000	11.29	8.37	6.98	5.33	3.78	2.95	2.27	1.42	0.94	0.58	0.33	0.17	0.11	0.08	0.05	0.03	0.03	0.02

* These precipitation frequency estimates are based on a partial duration series. ARI is the Average Recurrence Interval.
Please refer to NOAA Atlas 14 Document for more information. NOTE: Formatting forces estimates near zero to appear as zero.

* Upper bound of the 90% confidence interval Precipitation Intensity Estimates (in/hr)

ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	4.88	3.82	3.13	2.09	1.28	0.78	0.58	0.36	0.22	0.13	0.07	0.04	0.03	0.02	0.02	0.01	0.01	0.01
2	5.81	4.55	3.74	2.52	1.56	0.94	0.70	0.43	0.27	0.15	0.09	0.05	0.03	0.03	0.02	0.01	0.01	0.01
5	6.77	5.30	4.37	3.02	1.91	1.17	0.87	0.53	0.33	0.19	0.11	0.06	0.04	0.03	0.02	0.02	0.01	0.01
10	7.51	5.85	4.82	3.38	2.17	1.35	1.00	0.62	0.38	0.22	0.13	0.07	0.05	0.04	0.02	0.02	0.02	0.01
25	8.39	6.49	5.38	3.84	2.51	1.62	1.21	0.75	0.47	0.27	0.16	0.08	0.06	0.04	0.03	0.02	0.02	0.01
50	9.12	6.98	5.80	4.20	2.78	1.85	1.39	0.86	0.54	0.32	0.19	0.10	0.07	0.05	0.03	0.02	0.02	0.02
100	9.85	7.49	6.24	4.56	3.08	2.12	1.60	0.99	0.63	0.37	0.22	0.11	0.08	0.06	0.03	0.03	0.02	0.02
200	10.62	8.03	6.69	4.96	3.39	2.42	1.85	1.15	0.73	0.43	0.25	0.13	0.09	0.06	0.04	0.03	0.02	0.02
500	11.71	8.76	7.30	5.50	3.84	2.90	2.23	1.39	0.90	0.53	0.31	0.16	0.10	0.08	0.04	0.03	0.02	0.02
1000	12.61	9.34	7.80	5.95	4.22	3.33	2.58	1.61	1.05	0.62	0.36	0.19	0.12	0.09	0.05	0.04	0.03	0.02

* The upper bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are greater than.

** These precipitation frequency estimates are based on a partial duration series. ARI is the Average Recurrence Interval.

Please refer to NOAA Atlas 14 Document for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

* Lower bound of the 90% confidence interval Precipitation Intensity Estimates (in/hr)

ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	3.96	3.10	2.54	1.70	1.04	0.63	0.46	0.29	0.18	0.11	0.06	0.04	0.02	0.02	0.01	0.01	0.01	0.01
2	4.72	3.70	3.04	2.05	1.26	0.76	0.56	0.34	0.21	0.13	0.08	0.04	0.03	0.02	0.02	0.01	0.01	0.01
5	5.51	4.31	3.56	2.46	1.55	0.94	0.69	0.42	0.27	0.16	0.10	0.05	0.03	0.03	0.02	0.01	0.01	0.01
10	6.12	4.76	3.93	2.76	1.76	1.09	0.79	0.49	0.31	0.19	0.11	0.06	0.04	0.03	0.02	0.02	0.01	0.01

25	6.80	5.26	4.36	3.11	2.03	1.29	0.95	0.59	0.37	0.23	0.14	0.07	0.05	0.04	0.02	0.02	0.02	0.01
50	7.36	5.63	4.68	3.38	2.24	1.47	1.09	0.68	0.43	0.27	0.16	0.08	0.06	0.04	0.03	0.02	0.02	0.01
100	7.91	6.02	5.01	3.67	2.47	1.67	1.24	0.77	0.49	0.31	0.18	0.10	0.06	0.05	0.03	0.02	0.02	0.02
200	8.46	6.40	5.33	3.95	2.70	1.89	1.41	0.88	0.57	0.36	0.21	0.11	0.07	0.05	0.03	0.03	0.02	0.02
500	9.20	6.89	5.74	4.33	3.02	2.22	1.68	1.05	0.68	0.43	0.25	0.13	0.09	0.06	0.04	0.03	0.02	0.02
1000	9.80	7.26	6.06	4.62	3.28	2.51	1.91	1.19	0.78	0.50	0.29	0.15	0.10	0.07	0.04	0.03	0.02	0.02

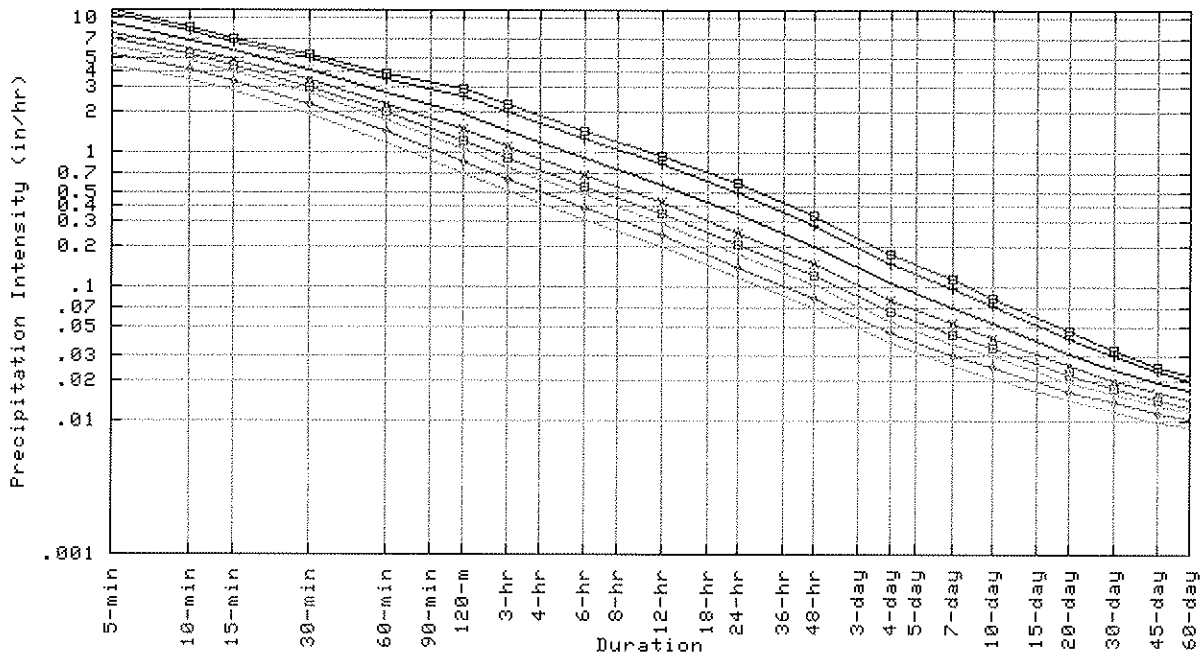
* The lower bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are less than.

** These precipitation frequency estimates are based on a partial duration maxima series. ARI is the Average Recurrence Interval.

Please refer to NOAA Atlas 14 Document for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

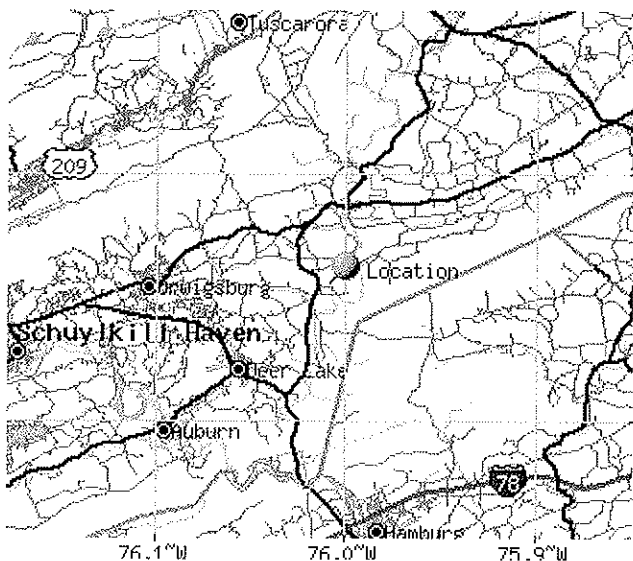
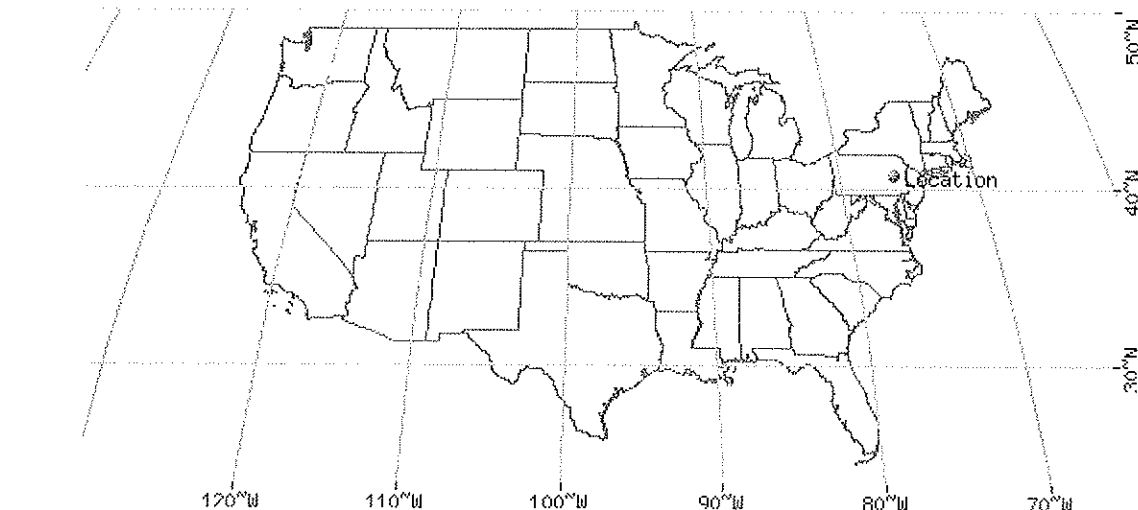
Text version of tables

Partial duration based Point IDF Curves - Version: 3
40.655 N 76.008 W 597 ft



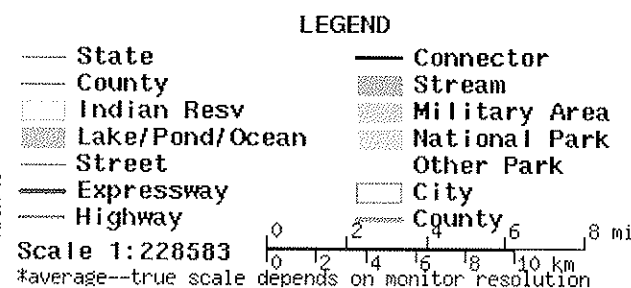
Average Recurrence Interval (years)	
1-year	—
2-year	—•—
5-year	—+—
10-year	—•—
25-year	—x—
100-year	—
500-year	—+—
1000-year	—•—

Maps -



These maps were produced using a direct map request from the U.S. Census Bureau Mapping and Cartographic Resources Tiger Map Server.

Please read disclaimer for more information.



Other Maps/Photographs -

View **USGS digital orthophoto quadrangle (DOQ)** covering this location from TerraServer; **USGS Aerial Photograph** may also be available from this site. A DOQ is a computer-generated image of an aerial photograph in which image displacement caused by terrain relief and camera tilts has been removed. It combines the image characteristics of a photograph with the geometric qualities of a map. Visit the [USGS](#) for more information.

Watershed/Stream Flow Information -

Find the Watershed for this location using the U.S. Environmental Protection Agency's site.

Climate Data Sources -

Precipitation frequency results are based on data from a variety of sources, but largely NCDC. The following links provide general information about observing sites in the area, regardless of if their data was used in this study. For detailed information about the stations used in this study, please refer to NOAA Atlas 14 Document.

Using the National Climatic Data Center's (NCDC) station search engine, locate other climate stations within:

...OR... of this location (40.655/-76.008). Digital ASCII data can be obtained directly from NCDC.

<http://hdsc.nws.noaa.gov/cgi-bin/hdsc/buildout.perl?type=idf&units=us&series=pd&statename=PENNSY...> 10/2/2008

Hydrometeorological Design Studies Center
DOC/NOAA/National Weather Service
1325 East-West Highway
Silver Spring, MD 20910

(301) 713-1669

Questions?: HDSC.Questions@noaa.gov

Disclaimer

RESOLUTION 2008 – 11 - 2

STORMWATER MANAGEMENT SCHEDULE OF FEES Attachment to the EAST BRUNSWICK TOWNSHIP STORMWATER MANAGEMENT ORDINANCE

Adopted November 6, 2008

The following Schedule of Fees is included and approved as part of the East Brunswick Township Stormwater Ordinance. If a lot has been created as part of a larger previous subdivision, the applicant should obtain a copy of the approved Subdivision and Land Development plan from the developer or courthouse. The owner is responsible for the implementation of the items included in that plan and is also required to pay the application fee, review and inspection fee and post the necessary security. If a lot owner is developing a lot that is part of a subdivision in which a stormwater management plan was not created, a plan must be created as per the requirements of the Stormwater Management Ordinance.

To ensure compliance with the requirements of the ordinance, the Township has adopted the following fee schedule and procedure.

APPLICATION FEE – ALL PROJECTS - \$50

REVIEW and INSPECTION FEES:

Exempt or less than 500 SF of increased impervious area	\$50.00
Increase of Impervious area is 500 SF to 1500 SF	\$300.00
Greater than 1500 SF of increased impervious area	\$800.00

SECURITY: All applicants must establish a financial assurance for the installation of stormwater control prior to the issuance of a building or zoning permit. The guarantee must be in the form of an **Irrevocable Letter of Credit, bond, or certified check. The following guarantees must be provided at the time of the application:**

Exempt or less than 500 SF of increased impervious area	N/A
Increase of Impervious area 500 SF to 1500 SF	\$500.00
Greater than 1500 SF of increased impervious area	\$1500.00

The guarantee will be released after the necessary controls are installed, inspected, and inspection fees are paid by the applicant.

PLAN REVIEW/INSPECTIONS

The Municipal Engineer will conduct a plan/application review and usually a minimum of three inspections. Applications should be submitted to the Township Secretary.

The plan review will take approximately 2 weeks.

It shall be the responsibility of the applicant to notify the Municipal Engineer seventy-two (72) hours in advance of the completion of each identified phase of development.

Initial Inspection – To be conducted after application is approved and after construction has started, when clearing of the lot is complete, and temporary erosion and sediment control measures are in place. This inspection will ensure the erosion controls are being implemented and allow discussion of permanent stormwater controls to be constructed. BMP areas should not be disturbed.

Second Inspection – This inspection will be conducted during construction, at the discretion of the Municipality. It is intended to ensure that the permanent stormwater controls are being constructed according to the plan. (For more complex projects, added inspections in this phase of construction may be required.)

Final Inspections – To be conducted upon completion of construction, to determine if the proposed work has been completed.

Within forty-eight (48) hours after completion of work, the applicant shall notify the Municipal Engineer so he/she may conduct a final inspection.

If necessary, the Municipality may schedule other inspections to ensure that work is being constructed according to the approved plan.

The inspection fee will be performed on a time and material basis in accordance with Municipal Engineer retainer agreement. Any unused fees will be returned to the applicant. Any additional fees will be charged and payment required prior to final inspection. Should an additional reviews be required, an additional \$200.00 fee will be required prior to inspection being completed and the bond released.

The applicant is responsible for all maintenance.