OFFICIAL

TOWNSHIP OF HARMAR
ORDINANCE NO. 373

AN ORDINANCE OF THE TOWNSHIP OF HARMAR, ALLEGHENY COUNTY, PENNSYLVANIA TO ADOPT A MODEL STORMWATER MANAGEMENT ORDINANCE, IN ACCORDANCE WITH THE PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION REQUIREMENTS

WHEREAS, the Municipalities Planning Code, 53 P.S. § 10101 *et seq.*, authorizes the Township of Harmar ("Township") to regulate land development activities in the Township; and

WHEREAS, Section 2704 of the Second Class Township Code, 53 P.S. § 67004, authorizes the Township to enact stormwater management ordinances; and

WHEREAS, Section 2704 of the Second Class Township Code, 53 P.S. § 67704, authorizes the Township to require persons conducting earthmoving activities to obtain approval from the Township Board of Supervisors for those activities; and

WHEREAS, a program of stormwater management, including reasonable regulation of land development and redevelopment causing loss of natural infiltration, is fundamental to the public health, safety, welfare, and the protection of the people of the Township, their resources and the environment; and

WHEREAS, federal and state regulations and the approved Act 167 Plan require the Township to implement a program of stormwater controls; and

WHEREAS, the Board of Supervisors of the Township adopted Township Ordinance No. 281, Stormwater Management, which amended Township Ordinance No. 215, Subdivision and Land Development; and

WHEREAS, the Board of Supervisors of the Township desires to adopt a new Stormwater Management Ordinance to comply with applicable stormwater management regulations and the Pennsylvania Stormwater Management Act; and the approved Act 167 Plan.

NOW, THEREFORE, the Board of Supervisors of the Township hereby ordains and enacts as follows:

Section 1. Section 2 of Ordinance 281, Stormwater Management, is repealed in its entirety.

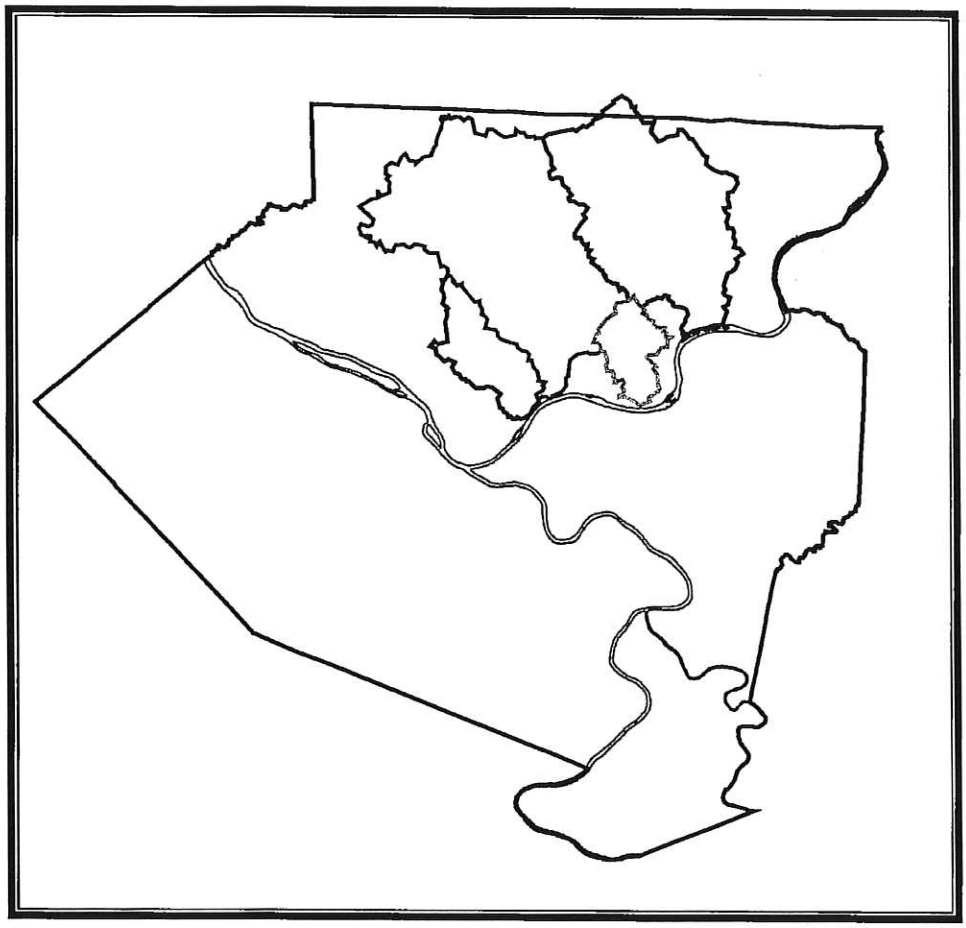
Section 2. The Board of Supervisors of the Township hereby ordains and enacts the following as the Township Stormwater Management Ordinance:

A. The Township hereby incorporates by reference the final model Stormwater Ordinance and Stormwater Ordinance Appendices, as set forth at the Ross Township Engineer's website, http://www.ross.pa.us/engineer/Act%20167/Act%20167%20Update.htm, as modified as set forth herein.

B. The entire text of the Stormwater Ordinance and Appendices is as follows:

Chapter 10

Stormwater Ordinance



Act 167 Stormwater Management Plan Update
Girtys Runs, Pine Creek, Squaw Run and Deer Creek Watersheds
Allegheny County, Pennsylvania

Revised
April 28, 2008

Art Gazdik, P.E.

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STORMWATER MANAGEMENT

Section 1.0 Purpose

In order to protect the health, safety, and general welfare of the residents of the Municipality, as well as to protect, sustain, and enhance the surface and ground water resources of the Municipality, drainage and stormwater management practices shall be utilized as directed herein to achieve the following goals and objectives:

1.1 Accommodate site development and redevelopment in a manner that protects public safety and that is consistent with (or re-establishes) the natural hydrologic characteristics of each watershed and sustains ground water recharge, stream baseflows, stable stream channel (geomorphology) conditions, the carrying capacity of streams and their floodplains, ground water and surface water quality, and aquatic living resources and their habitats.

1.2 Reduce and minimize the volume of stormwater generated.

1.3 Protect natural infiltration and ground water recharge rates in order to sustain ground water supplies and stream baseflows.

1.4 Maintain runoff characteristics of the site after completion of development that are consistent with the carrying capacity and stable channel conditions of the receiving streams.

1.5 Protect water quality by removing and/or treating pollutants prior to discharge to ground and surface waters throughout the Municipality, and to protect, restore, and maintain the chemical, physical, and biological quality of ground and surface waters.

1.6 Protect instream channels and geomorphology conditions of the receiving streams; protect their flood carrying capacity and aquatic habitats and to reduce instream erosion and sedimentation.

1.7 Reduce flooding impacts and prevent a significant increase in surface runoff rates and volumes, predevelopment to post-development, which could worsen flooding downstream in the watershed, enlarge floodplains, erode stream banks and create other flood-related health-welfare-property losses; in general, to preserve and restore the natural flood-carrying capacity of streams and their floodplains.

1.8 Protect adjacent lands from adverse impacts of direct stormwater discharges.

1.9 Ensure effective long-term operation and maintenance of all permanent stormwater management facilities.

1.10 Maintain natural drainage patterns and encourage the use of natural drainage systems.

1.11 Treat and release stormwater as close to the source of runoff as possible using a minimum of structures and maximizing reliance on natural processes.

1.12 Maintain the existing water balance in all watersheds, subwatersheds, and streams in the Municipality, and protect and/or restore natural hydrologic characteristics and habitats wherever possible throughout the watershed systems.

1.13 Address certain requirements of the Municipal Separate Storm Sewer System (MS4) National Pollution Discharge Elimination System (NPDES) Phase II Stormwater Regulations.

1.14 Reduce the impacts of runoff from existing developed sites undergoing redevelopment while encouraging development and redevelopment in urban areas and areas designated for growth.

1.15 Meet legal water quality requirements under State law, including regulations at 25 Pa. Code Chapter 93.4a to protect and maintain "existing uses" and maintain the level of water quality to support those uses in all streams, and to protect and maintain water quality in "special protection" streams.

Section 2.0 General Provisions

2.1 Statutory Authority

Primary Authority:

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

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.

2.2 Applicability

The standards contained herein shall apply to all Regulated Activities within the municipality. In addition, all local, county and State erosion and sedimentation control approvals must be in place to proceed with any Regulated Activity.

2.2.1 Activities regulated by this Ordinance include, but are not limited to, the following:

A. Land development and redevelopment.

B. Subdivision.

C. Construction of new or additional impervious or semi-pervious surfaces (driveways, parking lots, etc.).

D. Construction of new buildings or additions to existing buildings.

E. Diversion or piping of any natural or man-made stream channel.

F. Installation of stormwater management facilities or appurtenances thereto.

G. Any Earth Disturbances or any activities that involve the alteration or development of land or removal of tree and vegetation in a manner that may affect post construction stormwater runoff.

2.2.2 Redevelopments shall conform to the requirements contained in Section 4.1.3.C, when more than a two thousand (2,000) square feet area of an existing facility is reconstructed, following the demolition, or partially demolition of the existing facility. The area determination shall be made using the footprint of the area being reconstructed, including all impervious surfaces proposed in the reconstructed area and the area of the parking lot required to support the reconstructed facility. The area of the parking lot required to support the reconstructed facility shall be determined using the Municipal Zoning Ordinance requirements for parking.

2.3 Exemptions

2.3.1 With the approval of Municipality's governing body, the following activities may be exempted from on-site stormwater runoff control. An exemption shall apply only to the requirement for on-site stormwater facilities and the preparation of a Stormwater Management Plan. All other stormwater management design elements, such as a storm sewer system, road culverts, erosion and sedimentation control, and runoff quality, shall be required. All exemption requests must be filed with the Municipal zoning officer and approved by the Municipal Engineer.

A. Regulated Activities smaller than 400 sq. ft. are exempt from the requirements of this Ordinance to implement SWM BMPs, unless the activity is found to be a significant contributor to pollution of the Waters of this Commonwealth.

B. Small Project Exemption. Activities having a Disturbed Area of less than five thousand (5000) square feet are exempt from the Peak Rate Control requirements of this Ordinance. These projects shall comply with the Water Quality Volume standards contained in Section 4.1.3.A and the Extended Detention requirement contained in Section 4.3.1.A. The "Small Project Standardized SWM Guidance" document provided in Appendix F was prepared to assist Applicants in meeting this requirement **for individual lots only**. The reduced site plan requirements contained in the "Small Project Standardized SWM Guidance" document shall apply.

C. Emergency Exemption. Emergency maintenance work performed for the protection of public health, safety and welfare may be exempted from the requirements in this Ordinance to obtain approval for a Stormwater Management Plan before commencement of the activity; however, a written description of the scope and extent of any emergency work performed shall be submitted to the Municipality within two (2) calendar

days of the commencement of the activity. If the Municipality finds that the work is not an emergency, then the work shall cease immediately and may not resume until a written Stormwater Management Plan is submitted and approved.

D. Maintenance Exemption. Any maintenance to an existing stormwater management system made in accordance with plans and specifications approved by the Municipal Engineer or Municipality.

E. Gardening. Use of land for gardening for home consumption.

F. Agricultural Activities. Agriculture when operated in accordance with a conservation plan, nutrient management plan or erosion and sedimentation control plan approved by the Allegheny County Conservation District, including activities such as growing crops, rotating crops, tilling of soil and grazing animals. Installation of new or expansion of existing farmsteads, animal housing, waste storage and production areas having impervious surfaces that result in a net increase in impervious surface of less than one thousand (1,000) square feet are exempt from the requirement to submit a written Stormwater Management Plan.

G. Forest Management. Forest management operations, which are consistent with a sound forest management plan as filed with the Municipal zoning officer and which follow the Pennsylvania Department of Environmental Protection's management practices contained in its publication "Soil Erosion and Sedimentation Control Guidelines for Forestry." Such operations are required to have an erosion and sedimentation control plan.

2.3.2 Waivers

A. The provisions of this Ordinance are the minimum standards for the protection of the public health, safety, property, and welfare.

B. If an Applicant demonstrates to the satisfaction of the County or its designee that any mandatory provision of this Ordinance is unreasonable or causes unique or undue unreasonableness or hardship as it applies to the proposed Project, or that an alternate design may result in a superior result within the context of Section 1.0, 4.1.1 and 4.1.2 of this Ordinance, the County or its designee upon obtaining the comments and recommendations of the Municipality and the Allegheny County Conservation District may grant a waiver or relief so that substantial justice may be done and the public interest is secured; provided that such waiver will not have the effect of nullifying the intent and purpose of this Ordinance.

C. Applicants shall refer to the Pennsylvania Stormwater Best Management Practices Manual, Pennsylvania Department of Environmental Protection (DEP). No. 363-0300-002 (2006), as amended and updated, or the Erosion and Sediment Pollution Control Program Manual, Pennsylvania

Department of Environmental Protection (DEP). 363-2134-008 (2000), as amended and updated, or other appropriate references for guidance in the design of stormwater management facilities most appropriate to individual site conditions. References to the Maryland Manual, if not deleted, should be to specific sections of Maryland's manual in order to minimize NPDES permitting conflicts with the guidance provided by the Pennsylvania Stormwater BMP Manual. The Applicant shall state in full the facts of unreasonableness or hardship on which the request is based, the provision or provisions of the Ordinance that are involved, and the minimum waiver or relief that is necessary. The Applicant shall state how the requested waiver and how the Applicant's proposal shall result in an equal or better means of complying with the intent of Section 1.0 "Purpose", 4.1.1 "Design Goals" and 4.1.2 "General Principles" of this Ordinance.

D. The Applicant shall submit all waiver requests to Allegheny County or its designee for review and approval. Copies of the waiver request shall also be submitted to the Municipality.

E. The Governing Body shall keep a written record of all actions on waiver requests.

F. The Governing Body may charge a fee for each waiver request, which shall be used to offset the administrative costs of reviewing the waiver request. The Applicant shall also agree to reimburse the Municipality, the County and the Allegheny County Conservation District for reasonable and necessary fees that may be incurred in any review of a waiver request.

G. In granting waivers, the County or its designee may impose reasonable conditions that will, in its judgment, secure substantially the objectives of the standards or requirements that are to be modified.

H. The County or its designee may grant applications for waivers when the following findings are made:

1. That the waiver shall result in an equal or better means of complying with the intent of Section 1.0, 4.1.1 and 4.1.2 of this Ordinance.

2. That the waiver is the minimum necessary to provide relief.

3. That the Applicant is not requesting a waiver based solely on cost considerations.

4. That existing off-site stormwater problems will not be exacerbated.

5. That runoff is not being diverted to a different drainage area.

6. That increased flooding or ponding on off-site properties or roadways will not occur.

7. That potential icing conditions will not occur.

8. That increase of post-development peak flow from the site will not occur and will, in fact, be reduced by the appropriate amount if the site is in a subbasin having a release rate of less than 100%.

9. There will be no increase in the of the post-development total runoff volume for all storms equal to or less than the 2 year / 24 hour storm event.

10. That adverse impact to water quality will not result.

11. That increased 100-Year Floodplain levels will not result.

12. That increased or unusual municipal maintenance expenses will not result from the waiver.

13. That the amount of stormwater generated has been minimized to the greatest extent allowed.

14. That infiltration of runoff throughout the proposed site has been provided where practicable and pre-development ground water recharge protected at a minimum.

15. That peak flow attenuation of runoff has been provided.

16. That long term operation and maintenance activities are established.

17. That no receiving streams and/or water bodies within 2000 feet downstream will be adversely impacted in flood carrying capacity, aquatic habitat, channel stability or erosion and sedimentation.

2.4 General Requirements

2.4.1 The management of stormwater on site, both during and upon completion of the disturbances associated with activities permitted under Section 2.2, shall be accomplished in accordance with the standards and criteria of this Ordinance. The design of any temporary or permanent facilities and structures and the utilization of any natural drainage systems shall be in full compliance with this article.

The intent of these design standards is to encourage environmentally sound stormwater management practices that provide necessary drainage facilities while protecting the hydrologic characteristics and water quality of the site and watershed. Developments shall be required to incorporate stormwater

management controls. Stormwater management design shall blend into the natural environment and be aesthetically integrated into the site design.

2.4.2 Applicants shall refer to the Pennsylvania Storm Water Best Management Practices Manual, as amended, Pennsylvania Handbook of Best Management Practices for Developing Areas (PACD, 1998), the 2000 Maryland Stormwater Design Manual (MDE, 2000) or other appropriate references for guidance in the design of stormwater management facilities most appropriate to individual site conditions. Objectives for design are to reduce the volume of stormwater generated, infiltrate runoff at its source to the maximum extent possible, achieve water quality improvement at the source or during conveyance, and provide for peak flow attenuation. Applicants shall examine design alternatives by viewing them in a series. In addition, Applicants are strongly encouraged to use structural and nonstructural stormwater management practices that reduce or eliminate the need for detention basins.

2.4.3 All SWM design work must be completed by a Qualified Design Professional. All designs proposing the use of a SWM retention or detention facility with outlet structure(s) shall be completed by a professional engineer licensed in the state of Pennsylvania.

2.4.4 All development activity within a Special Flood Hazard Area designated by the Federal Emergency Management Agency (FEMA) shall comply with Chapter [*reference applicable local ordinance*] of the Zoning Ordinance [*i.e., local floodplain ordinance*] and this paragraph. All development shall be designed to maintain the flood carrying capacity of the floodway such that the base flood elevations are not increased, either upstream or downstream, unless an approval is received from PA DEP. The natural conveyance characteristics of the site and the receiving floodplain shall be incorporated into the stormwater management practices proposed for the site.

2.4.5 The stormwater management system shall not create an adverse impact on stormwater quantity or quality in either upstream or downstream areas. Offsite areas which discharge to or across a site proposed for development shall be addressed in the stormwater management plan prepared for the development. No stormwater management plan shall be approved until it is demonstrated that the runoff from the project shall not adversely impact downstream areas.

2.4.6 Wetlands shall not be used to meet the minimum design requirements for stormwater management or stormwater runoff quality treatment, except when used as part of a treatment train that incorporates a portion of the outer zone (filter strip) of the wetland's riparian buffer as a stormwater outfall.

2.4.7 All proposed stormwater management systems shall be designed to prevent the pollution of ground water resources by stormwater, promote safety, minimize health hazards, preserve natural features and provide infiltration and ground water recharge where appropriate. Neither submission of a plan under the provision herein nor compliance with the provisions of these Regulations shall relieve any person from responsibility for damage to any person or property otherwise imposed by law.

2.4.8 Where deemed necessary by the Municipal Engineer, or as addressed in an approved Act 167 stormwater management plan, the Applicant shall construct storm drains to handle on-site runoff; to the maximum extent permitted under the Municipalities Planning Code and Act 167, or any amendments thereto, provide on-site/off-site drainage easements; and provide for the conveyance of off-site runoff to an acceptable outlet in the same watershed.

2.4.9 Where watercourses traverse a development site, drainage easements shall be provided conforming to the line of such watercourses. The terms of the easements shall prohibit excavation, the placing of fill or structures, except as needed for roadways, driveways and walkways, or any alterations that may adversely affect the flow of stormwater within any portions of the easement, and require the establishment and protection of riparian buffers.

2.4.10 For all Regulated Activities, stormwater management 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.

2.4.11 Any Regulated Activity that may affect the stormwater flows toward or onto a State or County highway right-of-way or facility shall be designed, implemented, operated, and maintained in accordance with the regulations of the Pennsylvania Department of Transportation (PennDOT) or Allegheny County, as the case may be.

2.4.12 At the time of application for a building permit for any approved lot created by a subdivision and/or improved as a land development project, issuance of the permit shall be conditioned upon adherence to the terms of this Ordinance.

2.4.13 Stormwater discharges to critical areas with sensitive resources (e.g., special protection waters, cold water fisheries, recharge areas, water supply reservoirs, etc.) may be subject to additional performance criteria or may need to utilize or restrict certain stormwater management practices.

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

2.4.15 No regulated earth disturbance activities within the Municipality shall commence until the requirements of this Ordinance are met.

2.4.16 Post-construction water quality protection shall be addressed as required by the Stormwater Management requirements contained in this Ordinance.

2.4.17 Operations and maintenance of permanent stormwater BMPs shall be addressed as required by Section 5.0.

2.4.18 All best management practices (BMPs) used to meet the requirements of this Ordinance shall conform to the State Water Quality Requirements, and any more stringent requirements as required by the Municipality.

2.4.19 Techniques described in Appendix B (Non-Structural Stormwater Management Practices) of this Ordinance are encouraged, because they reduce the costs of complying with the requirements of this Ordinance and the State Water Quality Requirements.

2.4.20 In selecting the appropriate BMPs or combinations thereof, the Applicant shall consider the following:

A. Total contributing area.
B. Permeability and infiltration rate of the site soils.
C. Slope and depth to bedrock.
D. Seasonal high water table.
E. Proximity to building foundations and wellheads.
F. Erodibility of soils.
G. Land availability and configuration of the topography.
H. Peak discharge and required volume control.
I. Stream bank erosion.
J. Efficiency of the BMPs to mitigate potential water quality problems.
K. The volume of runoff that will be effectively treated.
L. The nature of the pollutant being removed.
M. Maintenance requirements.
N. Creation/protection of aquatic and wildlife habitat.

2.4.21 Transference of runoff from one DEP designated Act 167 watershed to another shall be prohibited unless approved by the municipality.

2.5 Repealer

Any Ordinance or Ordinance provision of the Municipality inconsistent with any of the provisions of this Ordinance is hereby repealed to the extent of the inconsistency only; provided, however, that this repeal shall in no manner be construed as a waiver, release or relinquishment of the right to initiate, pursue or prosecute, as the case may be, any proceeding at law or in equity pertaining to any act done which would have constituted a violation of such prior ordinance or ordinance provision. All of said ordinance or ordinance provisions shall remain in full force and effect and are not repealed hereby as they pertain to such acts and to the processing of such plans filed prior to the effective date of this Ordinance, which are protected from the effect of intervening ordinances by Section 508(4) of the Pennsylvania Municipalities Planning Code.

2.6 Severability

Should any section or provision of this Ordinance be declared invalid by a court of competent jurisdiction, such determination of invalidity shall not affect the validity of the remaining provisions of this Ordinance.

2.7 Compatibility with Other Ordinance Requirements

Permits and approvals issued pursuant to this Ordinance shall not relieve the Applicant of the responsibility to comply with or to secure other required permits or approvals for activities regulated by any other applicable code, rule, act, statute or ordinance. This Ordinance shall not preclude the inclusion in such other permit of more stringent requirements concerning regulation of stormwater and erosion. Where a conflict exists between a provision within this Ordinance and that of the PADEP Phase II NPDES regulations, as amended, or any other ordinance of the Municipality, the more stringent requirements shall govern.

2.8 Permit Requirements by Other Government Entities

2.8.1 All regulated earth disturbance activities subject to permit requirements by DEP under regulations at 25 Pa. Code Chapter 102.

2.8.2 Work within natural drainage ways subject to permit by DEP under 25 Pa. Code Chapter 105.

2.8.3 Any stormwater management facility that would be located in or adjacent to surface waters of the Commonwealth, including wetlands, subject to permit by DEP under 25 Pa. Code Chapter 105.

2.8.4 Any stormwater management facility that would be located on a State highway right-of-way, or require access from a State highway, shall be subject to approval by the Pennsylvania Department of Transportation (PennDOT).

2.8.5 Culverts, bridges, storm sewers or any other facilities which must pass or convey flows from the tributary area and any facility which may constitute a dam subject to permit by DEP under 25 Pa. Code Chapter 105.

2.9 Erosion and Sediment Control During Regulated Earth Disturbance Activities

2.9.1 No Regulated Earth Disturbance activities within the Municipality shall commence until the Municipality receives a copy of any required approvals from the Conservation District or DEP for an Erosion and Sediment Control Plan.

2.9.2 EP has regulations that require an Erosion and Sediment Control Plan for any earth disturbance activity of 5,000 square feet or more, under 25 Pa. Code § 102.4(b).

2.9.3 In addition, under 25 Pa. Code Chapter 92, a DEP "NPDES Construction Activities" permit is required for Regulated Earth Disturbance activities.

2.9.4 Evidence of any necessary permit(s) for Regulated Earth Disturbance activities from the appropriate DEP regional office or County Conservation District must be provided to the Municipality.

2.9.5 A copy of the Erosion and Sediment Control plan and any required permits, as required by DEP regulations, shall be available at the project site at all times.

2.9.6 Additional erosion and sediment control design standards and criteria are recommended to be applied where infiltration BMPs are proposed and shall include the following:

A. Areas proposed for infiltration BMPs shall be protected from sedimentation and compaction during the construction phase to maintain maximum infiltration capacity.

B. Infiltration BMPs shall not be constructed nor receive runoff until the entire contributory drainage area to the infiltration BMP has achieved final stabilization.

2.10 Prohibited Discharges and Connections

2.10.1 No person in the Municipality shall allow, or cause to allow, stormwater discharges into the Municipality's separate storm sewer system and or Waters of this Commonwealth which are not composed entirely of stormwater, except (1) as provided in Subsection 2.10.2. below, and (2) discharges allowed under a State or Federal permit.

2.10.2 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
- Potable water sources including dechlorinated water line and fire hydrant flushings
- Irrigation drainage
- Routine external building washdown (which does not use detergents or other compounds)
- Air conditioning condensate
- Water from individual residential car washing
- Spring water from crawl space pumps
- Uncontaminated water from foundation or from footing drains
- Flows from riparian habitats and wetlands
- Lawn watering
- 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
- Dechlorinated swimming pool discharges
- Uncontaminated groundwater

2.10.3 In the event that the Municipality determines that any of the discharges identified in Section 2.10.2 significantly contribute to pollution of waters of the Commonwealth, or is so notified by DEP, the Municipality or PADEP will notify the responsible person to cease the discharge.

2.10.4 Nothing in this Section shall affect a discharger's responsibilities under State law.

2.10.5 Existing roof drain, underdrain and sump pump discharge should be directed to lawn area or other pervious areas. If required by the Municipality, the discharge shall be directed to a stone sump or infiltration BMP. If approved by the Municipality the discharge may also be directly connected to the storm sewer system.

2.11 Enforcement and Penalties

2.11.1 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.

2.11.2 Inspection

SWM BMPs should be inspected by the land owner/developer (including Municipality for dedicated facilities) according to the following list of frequencies:

A. Annually for the first 5 years.
B. Once every 3 years thereafter.
C. During or immediately after the cessation of a 10-year or greater storm.

2.11.3 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.

2.11.4 Suspension and Revocation

A. Any approval for a Regulated Activity issued may be suspended or revoked, in whole or in part, 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.

B. 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.

C. 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.

D. 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.

2.11.5 Penalties

A. Anyone violating the provisions of this Ordinance shall be guilty of a summary offense, and upon conviction shall be subject to a fine of not more than $1000.00 for each violation, recoverable with costs. Each day that the violation continues shall be a separate offense and penalties shall be cumulative.

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.

2.11.6 Appeals

A. Appeals to the Zoning Hearing Board. Any applicant or person aggrieved by any decision, notice or order issued under this Ordinance shall have the right to appeal to the Harmar Township Zoning Hearing Board insofar as the same relates to development not involving subdivision and land development applications under Township Ordinance No. 215, Subdivision and Land Development, or planned residential development applications under Township Ordinance No. 331, Zoning, provided that a written application for an appeal is filed within 30 days as required by Sections 914.1 of the Pennsylvania Municipalities Planning Code, 53 P.S. § 10914.1.

B. Appeals to Township Board of Supervisors. Any applicant or person aggrieved by a decision, notice or order issued under this Ordinance shall have the right to appeal to the Township Board of Supervisors insofar as the same relates to development involving subdivision and land development applications under Township Ordinance No. 215, Subdivision and Land Development, or planned residential development applications under Township Ordinance No. 331, zoning, provided that a written application for an appeal is filed within 30 days as required by Sections 914.1 of the Pennsylvania Municipalities Planning Code, 53 P.S. § 10914.1. The Board of Supervisors may hear and decide the appeal or may appoint a hearing tribunal or hearing officer to make a

hearing record and/or to decide the appeal, at the option of the Board of Supervisors.

C. Appeals to Court. Any applicant or person aggrieved by any decision of the Harmar Township Zoning Hearing Board referenced in Subsection A above or the Township Board of Supervisors referenced in Subsection B above may appeal therefrom within thirty (30) days after entry of the decision to the Court of Court of Common Pleas of Allegheny County.

D. Any appeal taken hereunder shall be subject to fees as follows:

1. Appeals to the Zoning Hearing Board or to the Board of Supervisors shall be subject to the fee schedule and cost reimbursement requirements generally applicable to Zoning Hearing Board appeals.

Section 3.0 Stormwater Management Plan

For all Regulated Activities not eligible for exemptions pursuant to Section 2.3 of this Ordinance the Applicant shall submit a stormwater management plan and report prepared by a Professional Engineer licensed in the Commonwealth of Pennsylvania, which shall contain, but not be limited to, the following. Final copies of all plans, specifications and reports shall also be submitted to the municipality in Adobe PDF format.

3.1 A suitable map of the watershed for any and all named streams within which the project is proposed (a United States Geological Survey quadrangle map is usually sufficient) with existing and proposed development areas presented on the map.

3.2 Suitable maps and drawings showing all existing natural and constructed drainage facilities affecting the subject property.

3.3 Hydrologic (watershed) and water feature boundaries, including all areas flowing to the proposed project, existing streams (including first order and intermittent streams), springs, lakes, ponds, or other bodies of water within the project area.

3.4 Sufficient topographical information with elevations to verify the location of all ridges, streams, etc. (two-foot contour intervals within the project's boundaries and for proposed offsite improvements; for slopes greater than fifteen percent (15%), five (5)-foot contours are acceptable).

3.5 Notes pertaining to and locations of existing standing water, areas of heavy seepage, springs, wetlands, streams, and hydrologically sensitive areas. The Chapter 93 Water Quality Standards use designation must also be provided on the plan.

3.6 General type of soils with Hydrologic Soil Group noted, estimated permeabilities in inches per hour, and location and results of all soil tests and borings (if needed).

3.7 100-year flood elevations for any Special Flood Hazard Areas on or within one hundred (100) feet of the property. For redevelopment sites, also show the ten (10) and twenty-five (25)–year flood elevations for any Special Flood Hazard Areas on or within one

hundred (100) feet of the property. The source of these elevations shall also be shown on the plans.

3.8 Description of current and proposed ground cover and land use. The total area and percent impervious cover shall be noted.

3.9 A wetland delineation report for the project site with a location map identifying wetland areas if any were found.

3.10 A plan of the proposed stormwater drainage system attributable to the activity proposed, including runoff calculations, stormwater management practices to be applied both during and after development, and the expected project time schedule.

3.11 The design computations for all proposed stormwater drainage systems, including storm-drain pipes, inlets, runoff control measures and culverts, drainage channels, and other features, facilities, and stormwater management practices.

3.12 A grading plan, including all areas of disturbance of the subject activity. The total area of disturbance shall be noted in square feet and acres. Topographic contours showing the existing and proposed final contours at an interval of two (2') feet; in areas having slope of greater than 15% a five (5') contour interval may be used.

3.13 A plan of the erosion and sedimentation procedures to be utilized as required by local ordinance and State Regulations.

3.14 The effect of the project (in terms of runoff volumes and peak flows) on adjacent properties and on any other stormwater collection system that may receive runoff from the project site and specifics of how erosion and flooding impacts to adjacent properties will be avoided or otherwise mitigated.

3.15 An operation and maintenance plan consistent with the requirements of Section 5.0. Such a plan should clearly explain how the proposed facilities operate and the functions they serve.

3.16 The name of the development, the name and address of the property owner and Applicant, and the name and address of the individual or firm preparing the plan.

3.17 A north arrow, submission date, graphic scale and revision dates as applicable shall be included on each page of all plans submitted.

3.18 Complete delineation of the flow paths used for calculating the time of concentration for the pre-developed and post-developed conditions.

3.19 Construction details sufficient to completely express the intended stormwater design components consistent with this Ordinance.

3.20 A listing of all permits required for the site providing the status of the permit application(s) and approval(s).

Section 4.0 Permanent Stormwater Management Design Standards

4.1 Design Goals, Principles and Standards

4.1.1 Design Goals

Applicants shall adhere to a holistic design process incorporating the goals listed below. The objective is to achieve post-development hydrologic conditions that are consistent with the predevelopment ground cover assumption for new development (refer to Section 4.2.2) and improve the runoff conditions for redevelopment (refer to Section 4.1.3.C). The design goals are:

A. Minimize the volume of runoff that must be collected, conveyed, treated and released by stormwater management facilities;

Note: Minimization of runoff generated by a proposed site is directly related to the various land use and design standards for site improvements required under the municipal zoning, and subdivision and land development ordinances. The affect that these requirements have on generating stormwater should be taken into consideration. Site design should implement runoff reduction techniques such as those described in Appendix B.

B. Maintain the natural infiltration process and rate, and infiltrate runoff at its source when appropriate;

C. Remove and/or treat pollutants at the source or during conveyance;

D. Provide for peak flow attenuation, as needed; and

E. Attenuate runoff to protect the instream channel of the receiving stream.

4.1.2 General Principles

The following general principles apply to all applicable activities pursuant to Section 2.2:

A. Incorporate Conservation Design practices to minimize the amount of stormwater generated on a site, encourage the disconnection of impervious land cover, and maximize the use of pervious areas for stormwater treatment and on-site rainfall infiltration.

B. Infiltration of surface water runoff at its source is to be a mechanism for stormwater management based on hydrologic soil group (or infiltration testing). Infiltration practices include, but are not limited to, those referenced in Section 4.3.2.A and as outlined in the publications listed in Section 4.3. Infiltration practices shall adhere to the following criteria:

1. In choosing methods of infiltration, preference shall be given to a combination of surface and subsurface infiltration methods.

2. Applicants shall first consider minimum disturbance/minimum maintenance techniques combined with site grading that distributes runoff to reduce concentration. Next, Applicants shall consider depression areas combined with subsurface infiltration practices followed by other subsurface measures, including, but not limited to, porous paving and perforated pipe storage.

3. The use of multiple infiltration features and facilities that provide for the following is encouraged:

   a. Discourage concentration of flows,
   b. Encourage disconnection of flows,
   c. Infiltrate as close to the source of runoff as possible, and
   d. Reduce visual impact.

   Note: An example of promoting the concepts listed in 4.1.2.B.3 is choosing a design method to address runoff collected from rooftops and conveyed to the surface by downspouts. The "disconnection of flows" can be accomplished by directing the downspouts over pervious surfaces rather than impervious surfaces. This can be taken one step further by directing the downspouts into infiltration facilities close to the source of the runoff. This promotes the idea of infiltrating as close to the source of runoff as possible and discourages the concentration of flows.

4. Where high water tables, subsurface contamination, slope stability concerns, or other site constraints preclude achieving the required infiltration volume, additional Conservation Design practices and alternative stormwater management practices should be implemented to reduce to the maximum extent practicable the total volume of stormwater released to streams. Applicant shall follow the stormwater runoff hierarchy of Section 4.3.1.A.

5. Infiltration areas should be designed to maintain any broad and even infiltration pattern which existed prior to development. Such facilities should use the natural topography and vegetation in order to blend in with the site. Infiltration designs, which do not provide this may be used if the Applicant demonstrates to the Municipality's satisfaction that alternative approaches would be more effective, more harmonious with their existing environment and as easily maintained.

6. Aboveground stormwater infiltration facilities should be as shallow as possible while still achieving the requirements of this Ordinance.

C. Water quality improvement shall be achieved in conjunction with or as part of infiltration practices. Water quality improvements shall also be provided for drainage areas not otherwise addressed by infiltration

practices either at the source of runoff and/or during conveyance away from the source of runoff.

D. To reduce the need for large retention and/or detention basins designed to satisfy the peak flow attenuation and extended detention requirements, other innovative stormwater management practices located close to the source of runoff generation shall be considered, including a combination of practices (e.g., rooftop storage, open vegetated channels, bioretention, pervious pavement systems and infiltration trenches).

E. When designing stormwater management facilities to satisfy the peak flow attenuation and extended detention requirements (refer to Section 4.1.3.B.2), the effect of structural and non-structural stormwater management practices implemented as part of the overall site design may be taken into consideration when calculating total storage volume and release rates.

F. Site hydrology and natural infiltration patterns shall guide site design, construction and vegetation decisions. All channels, drainage ways, swales, natural streams and other surface water concentrations shall be considered and where possible incorporated into design decisions.

4.1.3 Minimum Performance Criteria

A. The following minimum performance standards shall apply to all applicable activities, **whether they are new development or redevelopment**, pursuant to Section 2.2.1.

1. Water quality treatment of stormwater runoff shall be provided for all discharges prior to release to a receiving water body. If a stormwater management practice does not provide water quality treatment, then water quality best management practices shall be utilized prior to the runoff entering the stormwater management practice.

2. Water quality management shall be provided through the use of structural and/or non-structural stormwater management practices. Water quality stormwater management practices shall be designed to reduce or eliminate solids, sediment, nutrients, and other potential pollutants from the site. It is presumed that a stormwater management practice complies with this requirement if it is:

a. Designed according to the specific performance criteria outlined in Section 2.4.2;

b. Constructed in accordance with all permits and approved plans and specifications; and

c. Maintained per an approved operation and maintenance plan or agreement or, in lieu of that, in accordance with customary practices.

3. Stormwater discharges from land uses or activities with higher potential for pollutant loadings (hotspots) may require the use of specific structural stormwater management practices and pollution prevention practices. In addition, stormwater from a hotspot land use shall be provided with proper pretreatment prior to infiltration. For the purpose of this Ordinance, the sites/facilities listed in Section 4.1.3.A.4, below, are considered hotspots.

4. Certain industrial sites may be required to prepare and implement a stormwater pollution prevention plan and file notice of intent as required under the provision of the EPA Industrial Stormwater NPDES Permit Requirements. Other industrial sites storing significant quantities of chemicals/wastes should also prepare a prevention plan. Sites that are required by EPA to prepare a plan include, but are not limited to:

   a. Vehicle salvage yards and recycling facilities;
   b. Vehicle and equipment cleaning facilities;
   c. Fleet storage areas for buses, trucks etc.;
   d. Marinas (service and maintenance);
   e. Facilities that generate or store hazardous materials.

5. Conveyance structures/channels shall be designed and adequately sized so as to protect the properties receiving runoff from impacts of flooding and erosion. Where necessary, and to the maximum extent permitted under the Municipalities Planning Code and Act 167, or any amendments thereto drainage easement from adjoining properties shall be obtained to ensure the drainage way and the property and shall also establish the operation and maintenance requirements for the drainage way.

6. All stormwater management practices shall have an Operation and Maintenance Plan pursuant to Section 5.3 of this Ordinance, and if to be privately owned, an enforceable Operation and Maintenance Agreement per Section 5.4 of this Ordinance to ensure the system functions as designed and to provide remedies for system failure.

7. Stormwater runoff generated from development and discharged directly into a jurisdictional wetland or waters of the United States and their adjacent wetlands shall be treated by an approved stormwater management practice prior to release into a natural wetlands and shall not be used to meet the minimum design requirements for stormwater management or stormwater runoff quality treatment, except when used as part of a treatment train that incorporates a portion of the outer zone (filter strip) of

the wetland's riparian buffer as a stormwater outfall. In such instances, the discharge velocity from the terminal end of a pipe or associated energy dissipation practice shall not exceed two feet per second for the two-year frequency storm event. Where such a management strategy is used, all feasible methods shall be used to convert concentrated flow to uniform, shallow sheet flow before entering the outer zone of the wetland's riparian buffer. In addition, it shall be demonstrated that such an approach will not cause erosion.

B. The following minimum performance standards shall apply to all applicable **new development** activities, pursuant to Section 2.2.1:

1. Water quality improvement shall be achieved in conjunction with or as part of infiltration practices (if used). Water quality improvements shall also be provided for drainage areas not otherwise addressed by infiltration practices either at the source of runoff and/or during conveyance away from the source of runoff. Stormwater quality management practices shall be designed to capture and treat stormwater runoff generated by the one-inch rainfall event. Refer to Section 4.3.1.B for Water Quality Volume design standards and assumptions. Stormwater quality management practice selection, design and implementation shall be based upon appropriate reference materials, as provided in Section 2.4.2.

2. The post development peak discharge rate shall not exceed the predevelopment peak discharge rate multiplied by the "subbasin release rate percentage" (where determined in Act 167 watersheds) for the 2-year, 10-year, 25-year, and 100-year 24-hour storm events pursuant to the predevelopment cover assumption described in Section 4.2.2. Refer to Appendix A for release rate percentages information.

3. Facilities capable of attenuating rainfall runoff shall be provided and be designed to attenuate the runoff volume from the 1-year 24-hour storm event for at least 24 hours.

4. Stormwater shall be infiltrated and/or discharged within the same drainage area of the stream receiving the runoff from the development site prior to development.

5. Structural and non-structural stormwater management practices that make best possible use of infiltration on-site shall be considered in all site designs, when appropriate.

C. The following minimum performance standards shall apply to all applicable **redevelopment** activities, pursuant to Section 2.2.2. The intent of Section 4.1.3.C is to accommodate redevelopment that is designed to provide improved stormwater management while recognizing that redevelopment sites have inherent physical constraints,

which may make the application of the new development stormwater design parameters difficult to achieve.

1. One of the following minimum performance standards shall be accomplished. Selection of the performance standard shall be whichever is most appropriate for the given site conditions:

   a. Reduce the total impervious cover on the site (e.g., by using pervious pavement, replacement of pavement with pervious planting areas or green roof systems) by at least twenty five percent (25%), based on a comparison of existing impervious cover to proposed impervious cover, **or**

   b. Provide facilities designed to attenuate the runoff volume from the one (1) year 24-hour post development storm event for at least 24 hours, or

   c. Provide facilities to insure that the post development peak discharge rate shall not exceed the predevelopment peak discharge rate multiplied by the "subbasin release rate percentage" (where determined in Act 167 watersheds) for the 2-year and 10-year 24-hour storm events. A predevelopment cover CN of 71 shall be assumed.

2. In addition to the minimum performance standards for redevelopment areas in Section 4.1.3.C above, water quality improvements shall be provided for drainage areas not otherwise addressed by infiltration practices either at the source of runoff and/or during conveyance away from the source of runoff. Stormwater quality management facilities shall be designed to capture and treat one quarter of one inch (0.25") of runoff from all pavement areas (i.e. parking lots, pavements and non-covered sidewalks). Roof area may be excluded from this calculation.

4.2 Stormwater Runoff Calculation Criteria

In addition to the infiltration and water quality requirements of this Ordinance, peak flow from those activities resulting in increases in impervious surface and/or regrading and compaction shall be attenuated consistent with the following stormwater calculation methods:

4.2.1 The following design storms shall be used for analysis of the pre and post development conditions. These values are applicable to the Soil-Cover-Complex Method:

Return Period (years)	24 Hour Storm (inches)
1	2.00
2	2.35
10	3.30
25	3.91
100	4.92

The precipitation values for each frequency storm listed above were abstracted from the precipitation frequency estimates developed by the National Oceanic and Atmospheric Administration as set forth in NOAA Atlas 14, Volume 2 (NOAA June 2004). The NOAA data are available from the Hydrometeorological Design Studies Center of the National Weather Service.

The NOAA Atlas 14, volume 2 report can be accessed from the NOAA website at http://hdsc.nws.noaa.gov/hdsc/pfds/.

4.2.2 The following assumptions shall be used for runoff calculations:

A. For new development sites, the ground cover used as the **predevelopment** assumption for runoff calculations shall be as follows:

1. Wooded sites shall use a ground cover of woodland in good condition. Portions of a site having more than one viable tree of a DBH (Diameter at breast height (**DBH**) is the diameter of the tree stem 4 1/2 feet above the ground) of six (6) inches or greater per fifteen-hundred (1,500) square feet shall be considered wooded where such trees existed within ten (10) years of application. If there is evidence of logging within the ten (10) year period logged area shall be consider as woodland in good condition.

Note: The intent of Section 4.2.2.A.1 is to recognize woodland conditions and not inadvertently encourage tree harvesting.

2. Agricultural sites shall use a ground cover of pasture in good condition.

3. All other portions of a site shall use a ground cover of meadow in good condition.

4. All watershed area(s) contributing to the point of interest including off-site area shall be considered.

5. For redevelopment sites, see Section 4.1.3.C.

B. The runoff curve numbers listed in the table below shall be used in developing the runoff calculations for the ground covers noted in Section 4.2.2.A. These values are referenced from the Urban Hydrology for

Small Watersheds Technical Release No. 55 (USDA, 1986). Coefficients for equivalent ground cover conditions shall be used if a runoff method other than the Soil Cover Complex Method is used.

Ground Cover	Hydrologic Soil Group Curve Numbers			
	A	B	C	D
Woodland	30	55	70	77
Meadow	30	58	71	78
Grass	39	61	74	80

C. Impervious cover shall have a curve number of 98.

D. Gravel pavement shall have a curve number of 89.

E. Average antecedent moisture conditions, or AMC II, shall be used (for the Soil Cover Complex Method only for example, TR-55, TR-20).

F. A type II distribution storm (for the Soil Cover Complex Method only for example, TR-55, TR-20).

G. For time of concentration calculations, sheet flow lengths shall not exceed 100 feet and shallow concentrated flow lengths shall not exceed 1000 feet.

H. The kinematic "n" value in the sheet flow equation should be applied as per the following table. (Values taken from TR-55)

Impervious Surfaces	0.011
Agricultural Lands	0.17
Grass, Lawn, or Open Space	0.24
Wooded Areas	0.40

4.2.3 In all plans and designs for stormwater management systems and facilities submitted to the Municipal Engineer for approval, stormwater peak discharge and runoff shall be determined through the use of the NRCS Soil Cover Complex Method as set forth in Urban Hydrology for Small Watersheds, Technical Release No. 55 (USDA, 1986), with specific attention given to antecedent moisture conditions, flood routing, time of concentration, and peak discharge specifications included therein and in Hydrology National Engineering Handbook, Section 4, (USDA, 1985) both by the U.S. Department of Agriculture, Natural Resources Conservation Service. Note that when TR-55 is used for natural system-based approaches and practices encouraged herein, calculations must be performed on a detailed small sub-area basis. Use of Technical Release No. 20 and other methods listed in Table 1 are also acceptable. The design professional's selection of a specific method shall be based on the suitability of the method for the given project site conditions with due consideration to the limitations of the method chosen. Table 1 herein summarizes the computational methods available.

Table 1
ACCEPTABLE COMPUTATION METHODOLOGIES FOR STORMWATER MANAGEMENT PLANS

METHOD	SOURCE	APPLICABILITY
TR-20 or commercial Package Based on TR-20	USDA – NRCS	When use of full model is desirable or necessary
TR-55 or Commercial Package Based on TR-55	USDA – NRCS	Applicable for plans within the model's limitations
HEC – HMS	U.S. Army Corps of Engineers	When full model is desirable or necessary
PSRM	Penn State University	When full model is desirable or necessary
VT/PSUHM	Virginia Polytechnic Institute & Penn State University	When full model is desirable or necessary
Modified Rational Method or Commercial package based on this Method	Emil Kuiching (1889)	For sites less than 20 acres
SWMM or commercial package based on SWMM	U.S. EPA	Most applicable in urban areas
Small Storm Hydrology Method (as included in SLAMM)	PV & Associates, or the website www.winslamm.com	Calculation of runoff volume from urban and suburban areas

4.2.4 A Modified Rational Method analysis may be used for drainage areas smaller than two (2) acres when permitted by the Municipal Engineer. The term "Modified Rational Method" used herein refers to a procedure for manipulation of the basic rational method techniques to reflect the fact that storms with a duration greater than the normal time of concentration for a basin will result in a larger volume of runoff even though the peak discharge is reduced. The methodology and model chosen for use shall be well documented as being appropriate for use in this region, and all relevant assumptions, methodologies, calculations and data used shall be provided to the Municipal Engineer for review. Information on the Modified Rational Method is presented in the Recommended Hydrologic Procedures for Computing Urban Runoff from Small Watersheds in Pennsylvania (PADEP, 1982).

4.2.5 Rainfall intensities used for the Modified Rational Method shall be based on the precipitation frequency estimates developed by the National Oceanic and Atmospheric Administration as set forth in NOAA Atlas 14.

4.2.6 The Rational Method (that is, Q = CIA) shall be used for calculations of the peak rate of runoff for the design of storm sewers and drainage swales but **not** for the design of stormwater management facilities where a full hydrograph is needed. The equation representing the Rational Method is comprised of the following (in English units):

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.

4.2.7 Runoff characteristics of off-site areas that drain through a proposed development shall be considered and be based on the existing conditions in the off-site area.

4.3 Standards for Stormwater Management Practices

The Pennsylvania Stormwater Best Management Practices Manual shall serve as a guide for the design of stormwater management practices. Additional design guidance may also be obtained from other related sources, including the 2000 Maryland Stormwater Design Manual, Volumes I and II (MDE, 2000), Design of Stormwater Filtering Systems (CWP, 1996), and the American Society of Civil Engineers Manual and Report on Engineering Practice, No. 87, Urban Runoff Quality Management (ASCE, 1998) for the design of stormwater runoff quality control features for site development. A list of references is provided with this Ordinance. The Water Quality Volume design measures used herein are partially based on the methodology expressed in the Maryland manual referenced above.

Pursuant to the design options recommended in the above documents, the following standards shall be adhered to:

4.3.1 Extended Detention, Water Quality Volume, Infiltration & Nonstructural BMP Credits Criteria.

The following sizing criteria shall be followed at all sites required to meet the standards of this Ordinance.

A. Extended Detention

1. Detain the 1-year, 24-hour design storm using the SCS Type II distribution. Provisions shall be made so that the 1-year storm takes a minimum of 24 hours to drain from the facility from a point where the maximum volume of water from the 1-year storm 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 quality orifice is at the invert of the facility). The design of the facility shall consider and minimize the chances of clogging and sedimentation potential.

2. Detention ponds shall detain the 1-year storm event and allow it to naturally infiltrate and recharge the groundwater table. All subsequent orifices for the 2, 10, 25, and 100-year storm events shall be placed above the maximum water surface elevation of the 1-year storm.

3. Flow from off-site areas must be considered as pass-through flow if it is conveyed through the BMP and should be modeled as "present condition" for the one year storm event.

4. The length of overland flow used in time of concentration (t_c) calculations is limited to no more than 100 feet for post development conditions.

5. The models TR-55 and TR-20 (or approved equivalent) can be used for determining peak discharge rates.

B. Water Quality Volume

1. Treatment of the Water Quality Volume (WQv) of stormwater prior to its release to receiving waters or water bodies shall be provided at all developments where stormwater management is required. The WQv equals the storage volume needed to capture and treat the runoff from storms of one (1) inch or less. Runoff from the first one (1) inch of rainfall transports most of the total pollutant load.

The WQv is based on the following equation:

$$WQv = [(P)(Rv)(A)]/12 \text{ (acre-feet)}$$

Where:

P = rainfall depth in inches (set to 1 inch)

Rv = volumetric runoff coefficient, 0.05 + 0.009(I) where I is percent impervious cover

A = site area (acres).

2. The formula assumes approximately five percent (5%) runoff from pervious surfaces, and ninety percent (90%) runoff from impervious surfaces. A minimum of 0.2 inches per acre of runoff volume shall be met at sites or in drainage areas that have less than fifteen percent (15%) impervious cover.

3. Drainage areas having no impervious cover and no proposed disturbance during development may be excluded from the WQv calculations. However, designers are encouraged to incorporate water quality treatment practices for these areas.

4. Stormwater Quality Treatment: The final WQv shall be treated by an acceptable stormwater management practice(s) from those described in this Section or as approved by the Municipality.

5. For new developments and redevelopments, infiltration is considered an acceptable method of satisfying part or all of the Water Quality Volume.

6. For new developments, the WQv requirements of this section shall be sized and designed in conjunction with the standards under Section 4.3.1.A.

7. As a basis for design, the following assumptions may be made:

   a. Multiple Drainage Areas: When a project contains or is divided by multiple drainage areas, the WQv volume shall be addressed for each drainage area.

   b. Offsite Drainage Areas: The WQv shall be based on the impervious cover of the proposed site. Offsite existing impervious areas may be excluded from the calculation of the water quality volume requirements.

C. Infiltration Volume

Where possible, all of the Water Quality Volume should be treated using infiltration BMPs. The following calculation shall be used to determine the minimum recharge goal for the site.

Recharge Volume (Re_v), (acre-feet) Fraction of WQ_v, depending on soil hydrologic group. $Re_v = (S)(A_i)$ Where; S = soil specific recharge factor in inches A_i = the measured impervious cover	
Hydrologic Soil Group	Soil Specific Recharge Factor (*S*)
A B C D	*0.40 inches*

1. Infiltrated volume may be subtracted from the total site WQ_v

2. Infiltration should not be considered for sites or areas of sites that have activities that may allow pollution to be infiltrated. For example the use of infiltration for the runoff of a service stations paved lot would not be appropriate, although roof water from the service station may be infiltrated.

3. Infiltration should only be used when in the opinion of a professional engineer it will not contribute to slope instability or cause seepage problems into basements or developed down-gradient areas.

4. If more than one hydrologic soil group is present at a site, a composite recharge volume shall be computed based upon the proportion of total site area within each hydrologic soil group.

5. All infiltration facilities shall be set back at least fifteen (15) feet from all structures with sub-grade elements (e.g., basements, foundation walls).

D. Credits for Use of Nonstructural BMPs

The developer may obtain credits for the use of nonstructural BMPs using the procedures outlined below. Examples of nonstructural credit calculations are provided in Appendix E.

Volume Reduction Method #1: Natural Area Conservation

A water quality volume reduction can be taken when undisturbed natural areas are conserved on a site, thereby retaining their pre-development hydrologic and water quality characteristics. Under this method, a designer would be able to subtract the conservation areas from the total

site area when computing the water quality protection volume. An added benefit is that the post-development peak discharges will be smaller, and hence, water quantity control volumes will be reduced due to lower post-development curve numbers or rational formula "C" values.

Rule: Subtract conservation areas from total site area when computing water quality protection volume requirements.

Criteria:

- Conservation area cannot be disturbed during project construction and must be protected from sediment deposition. The conservation area shall be protected with a safety fence until construction has been completed. After construction the area shall be posted with signage indicating that it is a conservation area.

- Shall be protected by limits of disturbance clearly shown on all construction drawings

- Shall be located within an acceptable conservation easement instrument that ensures perpetual protection of the proposed area. The easement must clearly specify how the natural area vegetation shall be managed and boundaries will be marked [Note: managed turf (e.g., playgrounds, regularly maintained open areas) is not an acceptable form of vegetation management]

- Shall have a minimum contiguous area requirement of 10,000 square feet

- R_v is kept constant when calculating WQ_v

- Must be forested or have a stable, natural ground cover.

Volume Reduction Method #2: Stream Buffers

This reduction can be taken when a stream buffer effectively treats storm water runoff. Effective treatment constitutes treating runoff through overland flow in a naturally vegetated or forested buffer. Under the proposed method, a designer would be able to subtract areas draining via overland flow to the buffer from total site area when computing water quality protection volume requirements. The design of the stream buffer treatment system must use appropriate methods for conveying flows above the annual recurrence (1-yr storm) event.

Rule: Subtract areas draining via overland flow to the buffer from total site area when computing water quality protection volume requirements.

Criteria:

- The minimum undisturbed buffer width shall be 50 feet from top of bank

- The maximum contributing length shall be 150 feet for pervious surfaces and 75 feet for impervious surfaces
- The average contributing slope shall be 3% maximum unless a flow spreader is used. In no case shall the average contributing slope be greater than 10%.

- Runoff shall enter the buffer as overland sheet flow. A flow spreader can be installed to ensure this

- Buffers shall remain as naturally vegetated or forested areas and will require only routine debris removal or erosion repairs
- R_v is kept constant when calculating WQ_v

- Not applicable if overland flow filtration/groundwater recharge reduction is already being taken

Volume Reduction Method #3: Enhanced Swales

This reduction may be taken when enhanced swales are used for water quality protection. Under the proposed method, a designer would be able to subtract the areas draining to an enhanced swale from total site area when computing water quality protection volume requirements. An enhanced swale can fully meet the water quality protection volume requirements for certain kinds of low-density residential development (see Volume Reduction Method #5). An added benefit is the post-development peak discharges will likely be lower due to a longer time of concentration for the site.

Rule: Subtract the areas draining to an enhanced swale from total site area when computing water quality protection volume requirements.

Criteria:

- This method is typically only applicable to moderate or low density residential land uses (3 dwelling units per acre maximum)

- The maximum flow velocity for water quality design storm shall be less than or equal to 1.0 feet per second

- The minimum residence time for the water quality storm shall be 5 minutes

- The bottom width shall be a maximum of 6 feet. If a larger channel is needed use of a compound cross section is required

- The side slopes shall be 3:1 (horizontal:vertical) or flatter

- The channel slope shall be 3 percent or less

- R_v is kept constant when calculating WQ_v

Volume Reduction Method #4: Overland Flow Filtration/Groundwater Recharge Zones

This reduction can be taken when "overland flow filtration/infiltration zones" are incorporated into the site design to receive runoff from rooftops or other small impervious areas (e.g., driveways, small parking lots, etc). This can be achieved by grading the site to promote overland vegetative filtering or by providing infiltration or "rain garden" areas. If impervious areas are adequately disconnected, they can be deducted from total site area when computing the water quality protection volume requirements. An added benefit will be that the post-development peak discharges will likely be lower due to a longer time of concentration for the site.

Rule: If impervious areas are adequately disconnected, they can be deducted from total site area when computing the water quality protection volume requirements.

Criteria:

- Relatively permeable soils (hydrologic soil groups A and B) should be present

- Runoff shall not come from a designated hotspot

- The maximum contributing impervious flow path length shall be 75 feet

- Downspouts shall be at least 10 feet away from the nearest impervious surface to discourage "re-connections"

- The disconnection shall drain continuously through a vegetated channel, swale, or filter strip to the property line or structural storm water control

- The length of the "disconnection" shall be equal to or greater than the contributing length

- The entire vegetative "disconnection" shall be on a slope less than or equal to 3 percent

- The surface impervious area tributary to any one discharge location shall not exceed 5,000 square feet

• For those areas draining directly to a buffer, reduction can be obtained from either overland flow filtration -*or*- stream buffers (See Method #2)

• R_v is kept constant when calculating WQ_v

Volume Reduction Method #5: Environmentally Sensitive Large Lot Subdivisions

This reduction can be taken when a group of environmental site design techniques are applied to low and very low density residential development (e.g., 1 dwelling unit per 2 acres [du/ac] or lower). The use of this method can eliminate the need for structural storm water controls to treat water quality protection volume requirements. This method is targeted towards large lot subdivisions and will likely have limited application.

Rule: Targeted towards large lot subdivisions (e.g. 2 acre lots and greater). The requirement for structural facilities to treat the water quality protection volume may be waived.

Criteria:

For Single Lot Development:

• Total site impervious cover is less than 15%

• Lot size shall be at least two acres

• Rooftop runoff is disconnected in accordance with the criteria in Method #4

• Grass channels are used to convey runoff versus curb and gutter

For Multiple Lots:

• Total impervious cover footprint shall be less than 15% of the area

• Lot areas should be at least 2 acres, unless clustering is implemented. Open space developments should have a minimum of 25% of the site protected as natural conservation areas and shall be at least a half-acre average individual lot size

• Grass channels should be used to convey runoff versus curb and gutter (see Method #3)

• Overland flow filtration/infiltration zones should be established (see Method #4)

Note: The following sections provide minimum design standards for Stormwater Management Facilities.

4.3.2 Stormwater Infiltration Practices

A. In selecting the appropriate infiltration BMPs, the Applicant shall consider the following:

1. Permeability and infiltration rate of the site soils.
2. Slope and depth to bedrock.
3. Seasonal high water table.
4. Proximity to building foundations and well heads.
5. Erodibility of soils.
6. Land availability and topography.
7. Slope stability.
8. Effects on nearby properties and structures.

B. A detailed soils evaluation of the project site shall be performed to determine the suitability of infiltration BMPs. The evaluation shall be performed by a qualified professional, and at a minimum, address soil permeability, depth to bedrock and slope stability. The general process for designing the infiltration BMP shall be:

1. Analyze hydrologic soil groups as well as natural and man-made features within the watershed to determine general areas of suitability for infiltration BMPs.

2. Provide field testing data to determine appropriate percolation rate and/or hydraulic connectivity.

3. Design infiltration BMPs for required stormwater volume based on field-determined capacity at the level of the proposed infiltration surface.

C. Soil characteristics, as subject to the specific considerations below:

1. Infiltration BMPs are particularly appropriate in hydrologic soil groups A and B, as described in the Natural Resources Conservation Manual TR-55.

2. Low-erodibility factors ("K" factors) are preferred for the construction of basins.

3. There must be a minimum depth of 48 inches between the bottom of any facility and the seasonal high water table and/or bedrock (limiting zones), except for infiltration BMPs receiving only roof runoff which shall be placed in soils having a minimum depth of 24 inches between the bottom of the facility and the limiting zone.

4. There must be an infiltration and/or percolation rate sufficient to accept the additional stormwater load, and to drain completely as determined by field tests.

5. The infiltration system shall have positive overflow controls to prevent storage within 1 foot of the finished surface or grade.

6. Infiltration rates shall not be used the computing the storage volume of the infiltration system.

7. Surface inflows shall be designed to prevent direct discharge of sediment into the infiltration system.

D. The recharge volume provided at the site shall be directed to the most permeable hydrologic soil group available, except where other considerations apply such as in limestone geology.

E. Any infiltration BMP shall be capable of completely infiltrating the impounded water within 48 hours. The 48 hour period is to be measured from the end of the 24 hour design storm.

F. The Municipality may require additional analyses for stormwater management facilities proposed for susceptible areas such as:

1. Strip mines.

2. Storage areas for salt, chloride, other materials for winter deicing.

3. Unstable Slopes.

G. During the period of land disturbance, runoff shall be controlled prior to entering any proposed infiltration area. Areas proposed for infiltration BMP's shall be protected from sedimentation and compaction during the construction phase, so as to maintain their maximum infiltration capacity.

H. Infiltration BMP's shall not be constructed nor receive runoff until the entire contributory drainage area to the infiltration BMP has received final stabilization.

I. Infiltration facilities shall be selected based on suitability of soils and site conditions. Acceptable infiltration facilities include, but are not limited to: filter strips or stormwater filtering systems (for example bioretention facilities, sand filters), open vegetated channels (that is, dry swales and wet swales), infiltration trenches, dry wells, infiltration basins, porous paving systems, retention basins, wet extended detention ponds, riparian corridor management, riparian forested buffers, rooftop runoff management systems, and sand filters (closed or open).

J. Where sediment transport in the stormwater runoff is anticipated to reach the infiltration system, appropriate permanent measures to prevent or collect sediment shall be installed prior to discharge to the infiltration system.

K. All infiltration facilities shall be set back at least fifteen (15) feet from all structures with sub-grade elements (e.g., basements, foundation walls).

L. All infiltration facilities that serve more than one (1) lot and are considered a common facility shall have a drainage easement. The easement shall provide to the Municipality the right of access.

M. If detailed infiltration study is required, the following guidance shall be followed:

Soil evaluations shall be performed to determine the feasibility and extent to which infiltration systems can be used. The evaluation shall be performed by a qualified, licensed geologist, geotechnical/civil engineer or soil scientist and, at a minimum, address soil types, soil permeability, depth to bedrock, limitations of soils, presence/absence of carbonate geology susceptibility to subsidence and/or sinkhole formation and subgrade stability. The testing and evaluation should be completed at the preliminary design stage.

Infiltration requirements shall be based on the portions of the site that are permeable prior to disturbance and the degree to which development will reduce the permeability of the site. Permeability of the site shall be determined based on the detailed evaluations described herein. Use of stormwater management facilities to retain stormwater for infiltration should be applied to all areas where the soils evaluation indicates favorable conditions. Areas generally not favorable for infiltration shall still be provided with an appropriate water quality practice.

Soil infiltration tests shall be performed to an equivalent depth or elevation of the bottom of the proposed infiltration areas. These tests shall follow the procedures of percolation test holes as established by the Allegheny County Health Department (ACHD) for on-lot septic systems. The testing shall include a test pit and percolation test holes. The test hole shall be excavated to a depth so that the presence or absence of bedrock and/or seasonal high water table can be determined. A soil log describing the soils present in each test pit shall be performed. All test holes used for evaluating the percolation rate shall be pre-soaked in accordance with the procedures established by the ACHD. The location and number of test pits and percolation holes shall be determined based on the type(s) of stormwater management facilities being designed. Acceptability of infiltration rates shall be based on sound engineering judgment and recommended design considerations described in the design manuals listed in the references or other source material acceptable to the Municipal Engineer.

N. The following design and construction standards shall be followed when planning and constructing infiltration BMPs.

1. The lowest elevation of the infiltration area shall be at least two (2) feet above the Seasonal High Water Table and bedrock.

2. Where roof drains are designed to discharge to infiltration facilities, they shall have appropriate measures to prevent clogging by unwanted debris (for example, silt, leaves and vegetation). Such measures shall include, but are not limited to, leaf traps, gutter guards and cleanouts.

3. All infiltration facilities shall have appropriate positive overflow controls to prevent storage within one (1) foot of the finished surface or grade, unless a specific amount of surface storage away from pedestrian and vehicular traffic is provided and such areas infiltrate the stored volume within 48 hours after the end of the 24-hour design storm.

4. All infiltration facilities shall be designed to infiltrate the stored volume within 48 hours after the end of the 24-hour design storm.

5. All surface inflows shall be treated to prevent the direct discharge of sediment into the infiltration practice; accumulated sediment reduces stormwater storage capacity and ultimately clogs the infiltration mechanism. No sand, salt or other particulate matter may be applied to a porous (pervious) surface for winter ice conditions.

6. During site construction, all infiltration practice components shall be protected from compaction due to heavy equipment operation or storage of fill or construction material. Infiltration areas shall also be protected from sedimentation. Areas that are accidentally compacted or graded shall be remediated to restore soil composition and porosity. Adequate documentation to this effect shall be submitted for review by the Municipal Engineer. All areas designated for infiltration shall not receive runoff until the contributory drainage area has achieved final stabilization.

7. The following procedures and materials shall be required during the construction of all subsurface facilities:

    a. Excavation for the infiltration facility shall be performed with equipment that will not compact the bottom of the seepage bed/trench or like facility.

    b. The bottom of the bed and/or trench shall be scarified prior to the placement of aggregate.

    c. Only clean aggregate with documented porosity, free of fines, shall be allowed.

    d. The tops and sides of all seepage beds, trenches, or like facilities shall be covered with drainage fabric. Fabric shall meet the specifications of PennDOT Publication 408, Section 735, Construction Class 1.

e. Perforated distribution pipes connected to centralized catch basins and/or manholes with the provision for the collection of debris shall be provided in all facilities. Where perforated pipes are used to distribute stormwater to the infiltration practice, stormwater shall be distributed uniformly throughout the entire seepage bed/trench or like facility.

4.3.3 Open Vegetated Channels

A. Open Vegetated Channels are conveyance systems that are engineered to also perform as water quality and infiltration facilities. Such systems can be used for the conveyance, retention, infiltration and filtration of stormwater runoff.

B. Open Vegetated Channels primarily serve a water quality function (WQv), they also have the potential to augment infiltration. Examples of such systems include, but are not limited to: dry swales, wet swales, grass channels, and biofilters. Open Vegetated Channels are primarily applicable for land uses such as roads, highways, residential developments (dry swales only) and pervious areas.

C. Open Vegetated Channels shall be designed to meet the following minimum standards:

1. The channel shall be designed to safely convey the **ten-year** frequency storm event with a freeboard of at least twelve (12) inches. Freeboard is the difference between the elevation of the design flow in the channel and the top elevation of the channel.

2. The peak velocity of the runoff from the **ten-year storm** shall be non-erosive for the soil and ground cover provided in the channel.

3. The longitudinal slope shall be no greater than four percent (4%).

4. Channels shall be trapezoidal in cross section.

5. Channels shall be designed with moderate side slopes of four (4) horizontal to one (1) vertical. Flatter side slopes may be necessary under certain circumstances.

6. The maximum allowable ponding time in the channel shall be less than 48 hours.

7. Channels (for example, dry swales) may require an underdrain in order to function and dewater.

8. Channels shall be designed to temporarily store the WQv within the system for a maximum period of 48 hours and a minimum period of one (1) hour.

9. Landscape specifications shall address the grass species, wetland plantings (if applicable), soil amendment and hydric conditions present along the channel.

10. Accumulated sediment within the channel bottom shall be removed when twenty-five (25%) of the original WQv volume has been exceeded. The channel shall be provided with a permanent concrete cleanout marker that indicates the 25% loss level.

11. Check dams along the channel length may be warranted.

12. The bottom of dry swales shall be situated at least two (2) feet above the seasonal high water table.

D. Additional design information for Open Vegetated Channels is available in Design of Roadside Channels with Flexible Linings, HEC 15, FHWA, September 2005.

4.3.4 Retention Basins

A. Retention basins shall be designed to create a healthy ecological community with sufficient circulation of water to prevent the growth of unwanted vegetation and mosquitoes or other vectors. If circulation cannot be provided via natural means, then artificial aeration and circulation shall be provided. Care shall be taken to landscape retention basins in accordance with Section 4.4.

B. The retention basin shall be of sufficient size to allow the appropriate aquatic community needed to maintain healthy pond ecology and avoid mosquitoes capable of carrying West Nile Virus and other diseases. The Allegheny County Health Department, Pennsylvania Fish and Boat Commission, the Natural Resource Conservation Service, the Pennsylvania Extension Service, or other qualified professional consultant shall be consulted during the design of these facilities in order to ensure the health of aquatic communities and minimize the risk of creating mosquito breeding areas.

C. An outlet structure shall be designed to allow complete drainage of the pond for maintenance.

D. The design of a retention basin shall include the determination of the proposed site's ability to support a viable permanent pool. The design shall take into account such factors as the available and required rate and quality of dry weather inflow, the stormwater inflow, seasonal and longer-term variations in ground water table, and impacts of potential pollutant loadings.

E. Sediment storage volume equal to at least twenty percent (20%) of the volume of the permanent pool shall be provided.

F. A sediment forebay with a hardened bottom shall be provided at each inlet into the retention basin. The forebay storage capacity shall at minimum be ten percent (10%) of the permanent pool storage. The forebay shall be designed to allow for access by maintenance equipment for periodic cleaning. A permanent concrete cleanout maker shall be installed in the forebay to indicate the level where 25% for the forebay storage has been used.

G. Emergency spillways shall be sized and located to permit the safe passage of stormwater flows from an unattenuated 100-year post-development storm with 1 foot of freeboard. The maximum velocities in vegetated spillways excavated in otherwise undisturbed soil shall be analyzed based upon the velocity of peak flow in the emergency spillway during an assumed clogged primary outlet condition. Where maximum velocities exceed design standards contained in the Engineering Field Manual for Conservation Practices (USDA, SCS, July 1984) suitable lining shall be provided. All emergency spillways placed on fill materials shall be lined. Lining for emergency spillways shall incorporate native colors and materials where possible including mono slab revetments, grass pavers, rip rap and native stone.

H. Basin and pond embankments must be designed by a professional engineer registered in the State of Pennsylvania. The design must include an investigation of the subsurface conditions at the proposed embankment location to evaluate settlement potential, groundwater impacts, and the need for seepage controls. The submittal of a geotechnical report from a geotechnical engineer for any embankment over 10 feet in effective height or posing a significant hazard to downstream property or life is required. The selection of fill materials must be subject to approval of the design engineer. Fill must be free of frozen soil, rocks over six inches, sod, brush, stumps, tree roots, wood, or other perishable materials. Embankment fills less than 10 feet in fill height must be compacted using compaction methods that would reasonably guarantee that the fill density is at least 90% of the maximum density as determined by standard proctor (ASTM-698). All embankment fills more than 10 feet in fill height must be compacted to at least 90% of the maximum density as determined by standard proctor (ASTM-698) and must have their density verified by field density testing. A PADEP Dam permit is required for embankments having; a maximum depth of water, measured from the upstream toe of the dam to the top of the dam at maximum storage elevation, of greater than 15 feet; and or for ponds having contributory drainage area of greater than 100 acres; and or for impoundments of greater than 50 acre-feet.

I. The embankment's interior slope may not be steeper than 3:1 (3 horizontal to 1 vertical). The exterior slope of the embankment may not exceed 2:1 (2 horizontal to 1 vertical).

J. The minimum embankment width shall be 4' for embankments less than 6' in height, 6' if the embankment is between 6.1' and 9.9' in height and 8' if the embankment is between 10' and 15' in height.

K. Existing ponds or permanent pool basins can be used for stormwater management provided that it can be demonstrated that the ponds are structurally sound and meet the design requirements herein.

L. Inlet structures and outlet structures shall be separated to the greatest extent possible in order to maximize the flow path through the retention basin.

M. Retention basins shall be designed to provide a length-to-width ratio of at least 3L:1W as measured in plan view (for example, a ratio of 4L:1W is too narrow).

N. The retention basin depth shall average three (3) to six (6) feet.

O. Fencing of the facility is not required if the interior slope of the pond is 4H:1V or flatter and the design also includes a five (5') wide bench around the pond perimeter at an elevation 1' below the permanent water surface elevation.

P. Any side slopes below the permanent water surface level shall not exceed 3H:1V. Interior side slopes above the permanent water surface level shall not exceed 3H:1V.

Q. Stabilization. Proper stabilization structures, including stilling basins, energy dissipators, and channel lining shall be constructed at the outlets of all retention basins and emergency spillways. The stabilization structures shall control water to: avoid erosion; reduce velocities of released water and direct water so that it does not interfere with downstream activities.

R. Energy dissipators and/or level spreaders shall be installed to prevent erosion and/or initiate sheet flow at points where pipes or drainage ways discharge to or from basins. Level Spreaders shall be used only where the maximum slope between the discharge point and the waterway does not exceed five (5%) percent. Energy dissipators shall comply with criteria in Hydraulic Design of Energy Dissipators for Culverts and Channels, HEC 14, FHWA, July, 2006.. Such facilities shall be both functional and harmonious with the surrounding environment; for example, native rock shall be used in constructing dissipators where practical.

S. Discharge Points. The minimum distance between a proposed basin discharge point (including the energy dissipator, etc.) and a downstream property boundary shall in no case be less than fifteen (15) feet. Where there is discharge onto or through adjacent properties prior to release to a stream, designers shall demonstrate how downstream properties are to be protected. The Municipal Engineer may require that the setback distance

be increased based upon factors such as topography, soil conditions, the size of structures, the location of structures, and discharge rates. A drainage easement may also be required.

T. Outlet Structures. Outlet structures shall meet the following specifications:

1. To minimize clogging and to facilitate cleaning and inspecting, outlet pipes shall have an internal diameter of at least fifteen (15) inches and a minimum grade of one percent (1%).

2. Bentonite plugs shall be provided on all outlet pipes within a constructed berm.

3. All principal outlet structures shall be built using reinforced concrete with watertight construction joints.

4. The use of architecturally treated concrete, stucco, painted surface or stone facade treatment shall be considered for enhancing the outlet structure. Such facilities shall be both functional and harmonious in design with the surrounding environment.

5. Outlet pipes shall be constructed of reinforced concrete with rubber gaskets in conformance with AASHTO M170, M198 and M207, or smooth interior HDPE pipe in conformance with AASHTO M252 or M294.

6. Basin outlet structures shall have childproof non-clogging trash racks over all design openings exceeding twelve (12) inches in diameter except those openings designed to carry perennial stream flows. Periodic cleaning of debris from trash racks shall be included in the operation and maintenance plan.

7. Anti-vortex devices, consisting of a thin vertical plate normal to the basin berm, shall be provided at the top of all circular risers or standpipes.

4.3.5 Detention Basins

A. The landscape standards of Section 4.4 shall apply.

B. The maximum inside side slopes shall not exceed three (3) horizontal to one (1) vertical (3H:1V). The minimum required slope for the basin bottom is two percent (2%). A level bottom is acceptable, provided the designer demonstrates to the *Municipality's* satisfaction that the basin bottom will be landscaped with appropriate wetland vegetation pursuant to Section 4.4. In addition, Detention Basins of sufficient size and slope may serve other functions as well, including recreational uses which do not hinder or conflict with the function of the detention basin.

C. Inlet Structures. The inlet pipe invert into a basin shall be six (6) inches above the basin floor or lining so that the pipe can adequately drain after rainstorms. Inlets shall discharge into areas of the basin that slope toward the outlet structure.

D. Inlet structures and outlet structures shall be separated to the greatest extent possible in order to maximize the flow path through the retention basin.

E. Low Flow Channels. Low flow channels constructed of concrete or asphalt are not permitted. Where low flow channels are necessary, they shall be composed of a natural or bioengineered material. Low flow channels shall be designed to promote water quality and slow the rate of flow through the basin. Low flow channels may also be designed to infiltrate where practical.

F. Outlet Structures. Outlet structures shall meet the following specifications:

1. To minimize clogging and to facilitate cleaning and inspection, outlet pipes shall have an internal diameter of at least fifteen (15) inches and a minimum grade of one percent (1%).

2. Bentonite plugs shall be provided on all outlet pipes within a constructed berm.

3. All principal outlet structures shall be built using reinforced concrete with watertight construction joints.

4. The use of architecturally treated concrete, stucco, painted surface or stone facade treatment shall be considered for enhancing the outlet structure. Such facilities shall be both functional and harmonious in design with the surrounding environment.

5. Outlet pipes shall be constructed of reinforced concrete with rubber gaskets in conformance with AASHTO M170, M198 and M207, or smooth interior HDPE pipe in conformance with AASHTO M252 or M294.

6. Energy dissipation facilities that convert concentrated flow to uniform shallow sheet flow shall be used where appropriate.

7. Basin outlet structures shall have childproof non-clogging trash racks over all design opening exceeding twelve (12) inches in diameter except those openings designed to carry perennial stream flows.

8. Anti-vortex devices, consisting of a thin vertical plate normal to the basin berm, shall be provided at the top of all circular risers or standpipes.

G. Emergency spillways shall be sized and located to permit the safe passage of stormwater flows from an unattenuated 100-year post-development storm with 1 foot of freeboard. The maximum velocities in vegetated spillways excavated in otherwise undisturbed soil shall be analyzed based upon the velocity of peak flow in the emergency spillway during an assumed clogged primary outlet condition. Where maximum velocities exceed design standards contained in the Engineering Field Manual for Conservation Practices (USDA, SCS, July 1984) suitable lining shall be provided. In general, emergency spillways should not be located in fill areas; all such facilities placed on fill materials shall be lined. Lining for emergency spillways shall incorporate native colors and materials where possible, including mono slab revetments, grass pavers, rip rap and native stone.

H. Basin and pond embankments must be designed by a professional engineer registered in the State of Pennsylvania. The design must include an investigation of the subsurface conditions at the proposed embankment location to evaluate settlement potential, groundwater impacts, and the need for seepage controls. The submittal of a geotechnical report from a geotechnical engineer for any embankment over 10 feet in effective height or posing a significant hazard to downstream property or life is required. The selection of fill materials must be subject to approval of the design engineer. Fill must be free of frozen soil, rocks over six inches, sod, brush, stumps, tree roots, wood, or other perishable materials. Embankment fills less than 10 feet in fill height must be compacted using compaction methods that would reasonably guarantee that the fill density is at least 90% of the maximum density as determined by standard proctor (ASTM-698). All embankment fills more than 10 feet in fill height must be compacted to at least 90% of the maximum density as determined by standard proctor (ASTM-698) and must have their density verified by field density testing. A PADEP Dam permit is required for embankments having; a maximum depth of water, measured from the upstream toe of the dam to the top of the dam at maximum storage elevation, of greater than 15 feet; and or for ponds having contributory drainage area of greater than 100 acres; and or for impoundments of greater than 50 acre-feet.

I. The embankment's interior slope may not be steeper than 3:1 (3 horizontal to 1 vertical). The exterior slope of the embankment may not exceed 2:1 (2 horizontal to 1 vertical).

J. The minimum embankment width shall be 4' for embankments less than 6' in height, 6' if the embankment is between 6.1' and 9.9' in height and 8' if the embankment is between 10' and 15' in height.

K. Fencing of the facility is not required if the interior slope of the pond is 4:1 or flatter.

L. Freeboard. Freeboard is the difference between the elevation of the design flow in the emergency spillway (usually the 100 year peak

elevation) and the top elevation of the settled basin embankment (that is, top of berm). The minimum freeboard shall be one (1) foot.

M. Energy dissipators and/or level spreaders shall be installed to prevent erosion and/or initiate sheet flow at points where pipes or drainage ways discharge to or from basins. Level Spreaders shall be used only where the maximum slope between the discharge point and the waterway does not exceed five (5%) percent. Energy dissipators shall comply with criteria in Hydraulic Design of Energy Dissipators for Culverts and Channels, HEC 14, FHWA, July, 2006. Such facilities shall be both functional and attractive; for example, native rock shall be used in constructing dissipators where practical.

N. Stabilization. Proper stabilization structures, including stilling basins, energy dissipators, and channel lining, shall be constructed at the outlets of all basins and emergency spillways. The stabilization structures shall control water to avoid erosion, reduce velocities of released water and direct water so that it does not interfere with downstream activities.

O. Discharge Points. The minimum distance between a proposed basin discharge point (including the energy dissipator, etc.) and a downstream property boundary shall in no case be less than fifteen (15) feet. Where there is discharge onto or through adjacent properties prior to release to a stream, designers shall demonstrate how downstream properties are to be protected. The Municipal Engineer may require that the setback distance be increased based upon factors such as topography, soil conditions, the size of structures, the location of structures, and discharge rates. A drainage easement may also be required.

P. A sediment forebay with a hardened bottom shall be provided at each inlet into the detention basin. The forebay storage capacity shall at minimum be ten (10) percent of the permanent pool storage. The forebay shall be designed to allow for access by maintenance equipment for periodic cleaning.

4.3.6 Conveyance Systems (Open Channels, Drainageways, and Storm Sewers)

A. Applicants are encouraged to design conveyance systems that encourage infiltration and improve water quality wherever practicable.

B. Wherever conveyance channels are necessary, drainage shall be maintained by an open channel with landscaped banks designed to carry the 10-year, 24-hour stormwater runoff from upstream contributory areas. The Municipal Engineer may increase the design storm, as conditions require. All open channels shall be designed with one (1) foot of freeboard above the design water surface elevation of the design runoff condition.

C. Flood relief channels shall be provided and designed to convey the runoff from the 100-year, 24-hour storm, such that a positive discharge

of this runoff to an adequate receiving stream or conveyance system occurs without allowing this runoff to encroach upon other properties.

D. Manholes and/or inlets shall not be spaced more than three hundred (300) feet apart for pipe sizes up to twenty-four (24) inches in diameter and not more than four hundred fifty (450) feet apart for larger pipe sizes.

E. Where drainage swales are used in lieu of or in addition to storm sewers, they shall be designed to carry the required runoff without erosion and in a manner not detrimental to the properties they cross. Drainage swales shall provide a minimum grade of two percent (2%) but shall not exceed a grade of nine percent (9%). Drainage swales used strictly for conveyance are not the same as Open Vegetated Channels. Design standards for Open Vegetated Channels are provided under Section 4.3.3 of this Ordinance.

F. Street curbing for the purpose of stormwater conveyance is discouraged. On streets that must contain curbing, storm sewers shall be placed in front of the curbing. To the greatest extent possible, storm sewers shall not be placed directly under curbing. At curbed street intersections, storm inlets shall be placed in the tangent section of the road.

G. Use of grassed swales or open vegetated swales in lieu of curbing to convey, infiltrate and/or treat stormwater runoff from roadways is encouraged. Inlets shall be placed at the center of the shoulder swale draining the street and shall be located no closer than four (4) feet from the edge of the cartway.

H. [When requested by the municipality] the developers shall obtain or grant a minimum twenty (20)-foot-wide drainage easement over all storm sewers, drainage swales, channels, etc., that are a component of the stormwater management system when located within undedicated land. All permanent detention basins and/or other stormwater management facilities providing stormwater control for other than a single residential lot shall be located within a defined drainage easement that allows proper legal access and maintenance vehicle access.

I. No property owner shall obstruct or alter the flow, location or carrying capacity of a stream, channel or drainage swale to the detriment of any other property owner, whether upstream or downstream. All subdivision and/or land development plans containing streams, channels, drainage swales, storm sewers or other conveyance systems that cross property boundaries, existing or proposed, or whose discharge crosses such boundaries shall contain a note stating the above.

J. Water Quality Inlets. Storm drainage systems that collect runoff from parking areas and/or loading areas exceeding 10,000 square feet of impervious coverage and discharge to stormwater management systems, including surface or subsurface infiltration systems, shall have a minimum of one (1) water quality inlet per each acre of drainage area.

The purpose of water quality inlets is to remove oil, grease, and heavy particulates or total suspended solids, hydrocarbons and other floating substances from stormwater runoff. Methods other than water quality inlets may be permitted if the Applicant demonstrates to the Municipality's satisfaction that any such alternative will be as effective and as easily maintained. Periodic cleaning of these systems shall be addressed in the Operation and Maintenance Plan submitted to the Municipality.

4.4 Landscaping of Stormwater Management Facilities

Stormwater management facilities shall be landscaped in accordance with the following standards.

4.4.1 Landscaping shall be required in and around all constructed stormwater management facilities with a minimum surface area of one thousand (1,000) square feet for the purposes of:

A. Assisting in the management of stormwater;
B. Stabilizing the soil within such facilities to minimize and control erosion;
C. Enhancing the visual appearance of such facilities; and
D. Mitigating maintenance problems commonly associated with the creation of such facilities.

4.4.2. A planting plan and planting schedule shall be submitted in accordance with the following:

A. Wet meadows including floors of stormwater management facilities.

1. Wet meadows and floors of stormwater management facilities shall be planted with non-invasive plants native to western Pennsylvania such as wildflowers and non-invasive grasses, the intent being to create a mixed meadow of such plantings, where appropriate. Selection of plantings shall be based on whether the area in question is usually well drained or permanently wet and whether the area will be used for recreation purposes. No woody plants shall be planted within the saturated zone (phreatic line) of a stormwater management practice or on a berm constructed for impounded water.

2. Seeding by drills, corrugated rollers, cyclone or drop seeders or hand seeding of such areas is preferred; however, hydroseeding followed by hydromulching can be used on wet ground and steep slopes.

3. Fertilizers, as a nutrient supplement, shall not be used unless it is documented that soil conditions warrant such use and nutrient applied does not exceed plant uptake. Soil for planting of wildflowers shall contain not less than three percent (3%) or more than ten percent (10%) organic matter, as determined by an agricultural chemist, with certification of the test before planting.

4. Seeding shall take place either between April 1 and May 15 or between September 1 and October 15. Planting areas shall be soaked to maintain a consistent level of moisture for at least four (4) to six (6) weeks after planting. For seeding recommendations, reference the DEP's E&S Pollution Control Program Manual.

5. Once established, a single annual mowing when plants are dormant should be sufficient to maintain a wet meadow and/or floor of a stormwater management practice.

B. Wet edges that remain wet all or most of the year shall be planted with wildflowers, grasses and shrubs. Plants to be located on rims or banks, which remain dry most of the year, shall be planted with species tolerant of dry soil conditions.

C. Wooded areas

1. Where stormwater management facilities adjoin wooded areas, trees and shrubs shall be selected and planted outside the practice so as to blend with existing surroundings.

2. Plantings in such areas shall be of sufficient density to eliminate the need for mowing.

3. It is recommended that clusters of trees and shrubs be planted around stormwater management facilities but well away from outfalls and any constructed berms, where applicable, to provide for wildlife habitat, wind control and buffering and screening.

4. Vegetation shall be planted during appropriate times of the year, predominantly between late March and mid May or from early October until evidence of ground freezing, depending upon the species selected. Most deciduous trees and shrubs can be planted in either spring or fall. Evergreens are best planted in late summer or early fall.

D. Slopes

1. Where slopes are gentle, a mixture of meadow grasses and wildflowers (for wet meadows) shall be planted.

2. On steep slopes as defined by the Municipality's code of ordinances, dense spreading shrubs (shrubs tolerant of dry soils) shall be planted. Heavy mat mulch shall be used during the period of establishment.

3. No woody plant materials or trees shall be located on a constructed or natural berm acting as the impoundment structure of a stormwater management practice. Trees shall be located downstream of an impoundment berm a sufficient distance from

the toe of the constructed slope to assure that the toe of the slope is outside the dripline of the species planted at maturity but in no case less than fifteen (15) feet.

E. In cases where stormwater management facilities are to be located in proximity to wetlands or waterways, the Applicant's planting plan and schedule shall consider the sensitive conditions existing therein and be modified accordingly to reflect existing flora.

F. Stormwater management facilities shall be screened in a manner which complements the existing landscape and provides sufficient access for maintenance.

4.5 Stream Buffer Requirements

Stream buffers shall be provided for new development sites as per the following requirements:

4.5.1 A minimum stream buffer width of 50 feet landward in each direction from the top of stream banks is required for all waterways having both a defined bank and a contributing watershed area of greater than 100 acres.

4.5.2 A minimum stream buffer width of 15 feet landward in each direction from the centerline of the waterway is required for smaller waterways having a contributing watershed area of less than 100 acres and greater than 10 acres.

4.5.3 The stream buffer area should be maintained in a natural state.

4.5.4 When wetland(s) extend beyond the edge of the required buffer width, the buffer shall be adjusted so that the buffer consists of the extent of the wetland plus a 25-foot zone extending beyond the wetland edge.

4.5.5 Stream buffer averaging may be applied to account for encroachments such as road crossings. The following criteria must be met in order to utilize buffer averaging on a development site:

1. Buffer averaging is required for water quality buffers that have stream crossings.

2. An overall average buffer width of at least 50 feet must be achieved within the boundaries of the property to be developed. Stream buffer corridors on adjoining properties cannot be included with buffer averaging on a separate property, even if owned by the same property owner.

3. The average width must be calculated based upon the entire length of stream bank that is located within the boundaries of the property to be developed. When calculating the buffer length, the natural stream channel should be followed.

4. Stream buffer averaging shall be applied to each side of a stream independently. If the property being developed encompasses both sides of a stream, buffer averaging can be applied to both sides of the stream, but must be applied to both sides of the stream independently.

5. On each stream bank, the total width of the buffer shall not be less than 25 feet at any location, except at approved stream crossings. Those areas of the buffer having a minimum width of 25 feet (or less at approved stream crossings) can comprise no more than 50 percent of the buffer length.

4.5.6 Stream buffer locations and widths should be illustrated on all subdivision plans with notations requiring that they be maintained in a natural state.

4.5.7 Stream buffers should be illustrated on all grading and erosion and sedimentation control plans. The defined stream buffer location should be properly recorded. The recording should provide a plan illustrating the stream buffer location, width and the requirement that it be maintained in a natural state.

Section 5.0 Operation and Maintenance Responsibilities

5.1 General Responsibilities

5.1.1 The owner of stormwater management facilities shall be responsible for the proper operation and maintenance of those facilities during and after construction. An Operation and Maintenance Plan consistent with the requirements of Section 5.3 shall be prepared for review and approval by the Municipal Engineer and shall be executed and signed by the Municipal Engineer and Applicant.

5.1.2 The Owner of the stormwater management facilities for a tract shall be responsible for the proper installation and function of those facilities in accordance with the approved Stormwater Management Plan. All temporary soil erosion and sedimentation control measures shall be removed or converted to their permanent configuration in accordance with an approved erosion control plan. This requirement in no way precludes the authority of the Allegheny County Conservation District to determine when sufficient stabilization has occurred on a site in order to convert to the permanent stormwater management facilities.

5.1.3 Dedication and Acceptance of Stormwater Management Facilities.

A. Upon completion of construction of stormwater management facilities shown on an approved subdivision or land development plan as being dedicated to the Township and within ninety (90) days after approval of such construction, the Applicant shall submit a written offer of such stormwater management facilities for dedication to the Municipality. Said offer shall include a deed of dedication covering said facilities together with satisfactory proof establishing an Applicant's clear title to said property. Such documents are to be filed with the Municipal Secretary for review by the Municipal Solicitor. Deeds of dedication for

stormwater management facilities may be accepted by resolution of the Municipality at a regular meeting thereof.

B. Municipality may require that stormwater management facilities remain undedicated, with operation and maintenance the responsibility of individual lot owners or a homeowners association or similar entity, or an organization capable of carrying out maintenance responsibilities.

C. Regardless of ownership, the Applicant shall submit a written offer deeding an access and/or drainage easement to Municipality pursuant to Section 5.2. Such easement shall cover the stormwater management facilities, any drainage to and from such facilities, and shall clearly permit municipal entry for inspection and/or maintenance purposes.

D. Regardless of ownership, the Applicant shall submit an actual "as built" plan to Municipality for the stormwater management facilities required per the approved Stormwater Management Plan. The "as built" plan shall show all final design specifications for all permanent stormwater management facilities including, but not limited to, pipe material and diameter, inlet, outlet and overflow elevations, 2' contours for all detention/retention basins and drainage swales and a comparison of "as-built" capacities compared to the capacities of the approved design facilities and shall be prepared and certified by a licensed professional engineer. The "as built" plan shall be based on an actual field survey performed by a licensed professional land surveyor. The surveyor shall certify as to the accuracy of the plan. The "as built" plan shall be submitted to Municipality for review by the Municipal Engineer. Any performance and/or financial securities established for the project shall include requirements for submittal of "as built" plans.

E. The "as-built" plan(s) shall be submitted to the Municipality in a digital format or formats approved by the Municipality

5.2 Ownership and Maintenance

All stormwater management facilities identified within an approved Stormwater Management Plan shall be owned and maintained by one, or a combination of, the following entities:

5.2.1 Private Ownership

A. Where individual on-lot stormwater management facilities are proposed, the subdivision and/or land development plan shall contain a note in a form satisfactory to the Municipal Solicitor designating the entity responsible for operation and maintenance of the on-lot facilities consistent with an approved Operation and Maintenance Plan and, in the event that the responsible person or entity fails to do so, granting to the Municipality the right but not the duty to enter upon the premises to repair or restore said facilities, to charge and assess the costs thereof to the owner, including a reasonable allowance for overhead, and to enforce said charges and assessments by lien upon the property. In addition, the

deed for each lot shall contain a perpetual covenant binding the grantee and all successors in interest designating the responsibility for operation and maintenance of the on-lot facilities essentially in the following form:

> "UNDER AND SUBJECT, nevertheless, to the following conditions and restrictions: Prior to any Earth Disturbance for which stormwater management facilities are required by the Municipality, Grantee shall construct the permanent stormwater management facilities as shown on the stormwater management plan (the "Plan") prepared by <NAME>, P.E., dated <DATE> and last revised <DATE> and approved by Municipality; thereafter, the Grantee, his heirs, executors, administrators, successors and assigns ("Owner"), at his sole cost and expense, shall operate, maintain and repair said stormwater management facilities on the lot in accordance with said Plan, so that the facilities shall at all times continue to operate and function in the same manner and capacity as they were designed. In the event of the failure of the Owner to comply with these conditions and restrictions, Municipality shall have said stormwater management facilities repaired or restored as required, and the costs thereof plus a reasonable allowance for overhead shall be assessed to the Owner; said assessment shall be a charge and a continuing lien upon the property herein. The Municipality, before it may exercise this right, shall notify the Owner by certified mail of its intention to take the aforesaid action. The notice shall set forth in what manner the Owner has neglected the operation and maintenance of or repair to the stormwater management facilities, and if the Owner fails, within a period of ninety (90) calendar days, to correct or repair the items listed in the notice from the Municipality, then and only then, may the Municipality exercise this right."

B. In addition to the above, developers of parcels with more than one (1) dwelling unit shall record in the Office of Recorder of Deeds for Allegheny County a declaration of covenants and restrictions in a form satisfactory to the Municipal Solicitor describing the responsibility for operation and maintenance of the on-lot facilities, consistent with an approved Operation and Maintenance Plan, prior to the sale of any individual lots. The terms of this covenant and restriction shall run with the land and be binding upon the initial grantees of each lot within the subdivision, his, her or their heirs, administrators, successors or assigns.

5.2.2 Homeowners or Condominium Association Ownership

Where a homeowners' association is created to own and manage common facilities, the subdivision and/or land development plan shall contain a note in a form satisfactory to the Municipal Solicitor designating the entity responsible for construction and/or maintenance of the stormwater management facilities consistent with an approved Operation and Maintenance Plan and, in the event that the responsible entity fails to do so, granting to the Municipality the right but not the duty to enter upon the premises to repair or restore said facilities, to

charge and assess the costs thereof plus a reasonable allowance for overhead to each owner of property within the development and to enforce said charges and assessments by lien upon each property within the development. In addition, the developer shall record in the office of Recorder of Deeds for Allegheny County a declaration of covenants in a form satisfactory to the Municipal Solicitor setting forth the rights and responsibilities of the homeowners' association for operation and maintenance of the stormwater management facilities, prior to the sale of individual lots. The terms of this covenant and restriction shall run with the land and be binding upon the initial grantees of each lot within the subdivision, his, her or their heirs, administrators, successors and assigns.

5.2.3 Municipal Ownership

Where the Municipality has accepted an offer of dedication of the permanent stormwater management facilities, the Municipality shall be responsible for operation and maintenance. Municipal ownership notwithstanding, the Applicant is required to prepare a Stormwater Management Plan and an Operation and Maintenance Plan, as defined herein. Upon approval of the stormwater management facilities by the Municipality, the Applicant shall provide a lump sum long-term maintenance payment to the Municipality, to be reserved and used at all times by the Municipality only for costs of operation and maintenance of the dedicated facilities, as follows:

A. Long-term Maintenance Payment – the long-term maintenance payment shall be in an amount equal to the present value of operation and maintenance costs for the facilities for a ten-year period. The long-term maintenance payment shall be based on a ten-year cost estimate prepared by the Applicant's engineer and reviewed and approved by the Municipal Engineer. The amount of the payment shall include all costs of operation and maintenance which shall include but not be limited to, typical operation and maintenance costs as well as costs such as landscaping and planting, tax payments required and construction of any kind associated with the use, benefit and enjoyment of the facilities by the owners. In particular, a description of routine facility operation and day-to-day management requirements and a description of projected maintenance actions and schedules necessary to ensure proper operation of stormwater management facilities shall be submitted for review and approval to the Municipal Engineer.

B. Documentation. The terms of the long-term maintenance payment shall be documented as part of the Stormwater Management Plan and the Operation and Maintenance Plan.

5.3 Operation and Maintenance Plan

An Operation and Maintenance Plan shall be prepared by an engineer licensed to practice in the Commonwealth of Pennsylvania that identifies the ownership, operation and maintenance responsibilities and as-built conditions for all stormwater management facilities. At a minimum, the Operation and Maintenance Plan shall include the following:

5.3.1. Any obligations concerning perpetuation and/or maintenance of natural drainage or infiltration facilities, and other facilities identified within the Stormwater Management Plan. Ownership of and responsibility for operation and maintenance of stormwater management facilities, including names and contact information, shall be required.

5.3.2. A description of the permanent stormwater management facilities on the site, explaining how each facility is intended to function and operate over time. All drainage and access easements shall be depicted and any site restrictions to be recorded against the property shall be identified on the recorded plan. All such easements and restrictions shall be perfected to run with the land and be binding upon the landowner and any successors in interest.

5.3.3. A description of the actions, budget and schedule for operating and maintaining the stormwater management facilities. This description should be written in a clear manner, consistent with the knowledge and understanding of the intended user.

5.3.4. A general description of operation and maintenance activities and responsibilities for facilities held in common or on-lot, including but not limited to, lawn care, vegetation maintenance, clean out of accumulated debris and sediment (including from grates, trash racks, inlets, etc.), liability insurance, maintenance and repair of stormwater management facilities, landscaping and planting, payment of taxes and construction of any kind associated with the use, benefit and enjoyment of the facilities by the owners. In particular, a description of routine facility operation and day-to-day management requirements (as needed) and a description of routine maintenance actions and schedules necessary to ensure proper operation of stormwater management facilities shall be submitted.

5.3.5. Assurances that no action will be taken by any lot owner to disrupt or in any way impair the effectiveness of any stormwater management system, setting forth in deed restrictions the ability of the Municipality to take corrective measures if it is determined at any time that stipulated permanent stormwater management facilities have been eliminated, altered, or improperly maintained, including the ability of the Municipality to cause the work to be done and lien all costs plus a reasonable overhead allowance against the property should the required corrective measures not be taken by the lot owner, following written notification, within a period of time set by Municipal Engineer.

5.3.6 Parties responsible for the long term operation and maintenance of stormwater management facilities shall make records of the installation and of all maintenance and repairs, and shall retain the records for at least ten (10) years. These records shall be submitted to the Municipality as established by the Operation and Maintenance Plan or if otherwise required by the Municipality.

5.4 Operations and Maintenance Agreement

5.4.1 The owner of any land upon which permanent stormwater management facilities and/or BMPs will be placed, constructed or implemented, as described in an approved Stormwater Management Plan and the Operations and Maintenance Plan, shall record the following documents in the Office of the Recorder of

Deeds for Allegheny County, within 15 days of approval of the Operations and Maintenance Plan by the Municipality:

A. The Operations and Maintenance Plan, or a summary thereof,
B. Operations and Maintenance Agreement, and
C. Access and/or drainage Easements.

5.4.2 The Operation and Maintenance Agreement shall be substantially the same as the sample agreement in Appendix C of this Ordinance, provided that the Municipality may require other parties, such as the developer, a homeowner's association, and other third parties to become a party to and execute the Operation and Maintenance Agreement where the addition of such parties will help to promote the proper operation and maintenance of any permanent stormwater facilities or BMPs.

5.4.3 Other items or conditions may be included in the Operation and Maintenance Agreement where determined necessary to guarantee the satisfactory operation and maintenance of all permanent stormwater facilities and BMPs. The agreement shall be subject to the review and approval of the Municipality.

5.4.4 The Municipality may suspend or revoke any approvals granted for the project site upon discovery of the failure of the owner to comply with Section 5 of this Ordinance.

5.5 Special Stormwater Facility Maintenance Fund (Optional)

5.5.1 Persons installing storm water storage facilities will be required to pay a specified amount to the Municipal Stormwater Facility Maintenance Fund if one exists to help defray costs of periodic inspections and annual maintenance expenses. The amount of the deposit shall be determined as follows:

5.5.1.1 If the storage facilities are to be privately owned and maintained, the deposit shall cover the cost of periodic inspections performed by the Municipality for a period of ten (10) years, as estimated by the Municipal Engineer. After that period of time, inspections will be performed at the expense of the Municipality.

5.5.1.2 If the storage facilities are to be owned and maintained by the Municipality, the deposit shall cover the estimated annual costs for maintenance and inspections for ten (10) years. The Municipal Engineer will establish the estimated annual maintenance costs utilizing information submitted by the applicant.

5.5.1.3 The amount of the deposit to Maintenance Fund, covering annual inspection and maintenance costs, shall be converted to present worth of the annual series values.

The Municipal Engineer or Manager shall determine the present worth equivalents which shall be subject to the final approval of the Governing Body.

5.5.1.4 If a storage facility is proposed, which also serves as a recreation facility such as a lake or ballfield, the Municipality may reduce or waive the amount of the maintenance fund deposit based on the value of the land for public recreational purposes.

5.5.2 If any storage facility (whether publicly or privately owned) is subsequently eliminated due to the installation of storm sewers or another storage facility (e.g., a distributed storage facility), the unused portion of Maintenance Fund may be applied to the cost of abandoning the facility and connecting to the storm sewer system or other facility. Any amount of the deposit remaining after the costs of abandonment are paid will be returned to the depositor.

Section 6 Plan Submission, Review and Review Fees

6.1 Plan Submission- the Municipality shall require receipt of a complete plan, as specified in this Ordinance.

6.1.1 Six (6) copies of the Stormwater Management Plan shall be submitted and distributed as follows:

A. Two (2) copies to the Municipality accompanied by the requisite Municipal Review Fee as established by the Municipality.

B. Two (2) copies to the County Conservation District.

C. One (1) copy to the Municipal Engineer.

D. One (1) copy to the County Planning Commission/Department.

6.2 Review

6.2.1 The Municipal Engineer shall review the Stormwater Management Plan for consistency with the Stormwater Ordinance. Any Stormwater Management Plan found incomplete shall not be accepted for review and shall be returned to the Applicant.

6.2.2 The Municipal Engineer shall review the Stormwater Management Plan for any subdivision or land development against the municipal subdivision and land development ordinance provisions not superseded by this Ordinance.

6.2.3 When required by regulation, the County Conservation District shall review and approve the Erosion & Sedimentation Control Plan for consistency with PADEP's Chapter 102 regulations.

6.2.4 For activities regulated by this Ordinance, the Municipal Engineer shall notify the Applicant and the Municipality, whether the Stormwater Management Plan is consistent with the Ordinance.

A. Should the Stormwater Management Plan be determined to be consistent with the approved Act 167 Plan, the Municipal Engineer shall forward an

approval letter to the Municipal Secretary who will then forward a copy to the Applicant.

B. Should the Stormwater Management Plan be determined to be inconsistent with the approved Act 167 Plan, the Municipal Engineer shall forward a disapproval letter to the Municipal Secretary who will then forward a copy to the Applicant. The disapproval letter shall cite the reason(s) and specific Ordinance sections for the disapproval. Disapproval may be due to inadequate information to make a reasonable judgment as to compliance with the stormwater management plan. Any disapproved Stormwater Management Plans may be revised by the Applicant and resubmitted consistent with this Ordinance.

6.2.5 For Regulated Activities specified in Section 2.0 of this Ordinance, which require a building permit, the Municipal Engineer shall notify the Municipal Building Permit Officer in writing, within a time frame consistent with the Municipal Building Code and/or Municipal Subdivision Ordinance, whether the Stormwater Management Plan is consistent with the approved Act 167 Plan and forward a copy of the approval/disapproval letter to the Applicant. Any disapproved Stormwater Management plan may be revised by the Applicant and resubmitted consistent with this Ordinance.

6.2.6 For regulated activities under this Ordinance that require an NPDES Permit Application, the Applicant shall forward a copy of the Municipal Engineer's letter stating that the Stormwater Management Plan is consistent with the approved Act 167 Plan to the County Conservation District. PADEP and the County Conservation District may consider the Municipal Engineer's review comments in determining whether to issue a permit.

6.2.7 The Municipality shall not grant preliminary or final approval to any subdivision or land development for Regulated Activities specified in Section 2.0 of this Ordinance if the Stormwater Management Plan has been found to be inconsistent with the approved Act 167 Plan, as determined by the Municipal Engineer. All required permits from PADEP must be obtained prior to approval of any subdivision or land development.

6.2.8 No building permits shall be issued for any Regulated Activity specified in Section 2.0 of this Ordinance if the Stormwater Management Plan has been found to be inconsistent with the approved Act 167 Plan, as determined by the Municipal Engineer, or without considering the comments of the Municipal Engineer. All required permits from PADEP must be obtained prior to issuance of a building permit.

6.2.9 The Applicant shall be responsible for completing record drawings of all stormwater management facilities included in the approved Stormwater Management Plan. The record drawings and an explanation of any discrepancies with the design plans shall be submitted to the Municipal Engineer for final approval. In no case shall the Municipality approve the record drawings until the Municipality receives a copy of an approved Highway Occupancy Permit from the PennDOT District Office, NPDES Permit, and any other applicable permits or approvals, from PADEP or the County Conservation District. The above

permits and approvals must be based on the record drawings. The record drawings must include copies of all applicable permits and approvals.

6.2.10 The Municipality's approval of a Stormwater Management Plan shall be valid for a period not to exceed five (5) years commencing on the date that the Municipality approves the Stormwater Management Plan. If stormwater management facilities included in the approved Stormwater Management plan have not been constructed, or if constructed and record drawings of these facilities have not been approved within this time period, then the Municipality may consider the Stormwater Management Plan disapproved and may revoke any and all permits. Stormwater Management Plans that are considered disapproved by the Municipality shall be resubmitted in accordance with Section 6.4 of this Ordinance.

6.3 Modification of Plans

6.3.1 A modification to a Stormwater Management Plan under review by the municipality for a development site that involves a change in stormwater management facilities or techniques, or that involves the relocation or re-design of stormwater management facilities, or that is necessary because soil or other conditions are not as stated on the Stormwater Management Plan as determined by the Municipal Engineer, shall require a resubmission of a modified Stormwater Management Plan consistent with this Ordinance and shall be subject to review as specified in Section 6 of this Ordinance.

6.4 Resubmission of Disapproved Stormwater Plans

6.4.1 A disapproved Stormwater Management Plan may be resubmitted; with the revisions addressing the Municipal Engineer's concerns documented in writing, and addressed to the Municipal Secretary in accordance with Section 6 of this Ordinance and distributed accordingly and shall be subject to review as specified in Section 6 of this Ordinance. Any applicable Municipal Review and Inspection Fee must accompany a resubmission of a disapproved Stormwater Management Plan.

6.5 Municipal Stormwater Plan Review and Inspection Fees

6.5.1 Fees may be established from time-to-time by the Municipality by resolution in accordance with applicable laws to defray plan review and construction inspection costs incurred by the Municipality. All fees shall be paid by the Applicant at the time of Stormwater Management Plan submission.

6.5.2 Any fees established pursuant to this Ordinance may include, but not necessarily be limited to, any of the following:

A. Administrative costs.

B. The review of the Stormwater Management Plan by the Municipality, County (if applicable), Allegheny County Conservation District (if applicable) and the Municipal Engineer.

C. The site inspections.

D. The inspection of stormwater management facilities and Stormwater Management improvements during construction.

E. The final inspection upon completion of the stormwater management facilities.

F. Any additional work required to enforce any permit provisions regulated by this Ordinance, correct violations, and assure proper completion of stipulated remedial actions.

Section 7.0 Definitions

AASHTO - American Association of State Highway & Transportation Officials. The web site home page for ASHTO is http://transportation1.org/aashtonew/.

ACT 167 - The Storm Water Management Act (Act of October 4, 1978, P.L. 864 No. 167; 32 P.S. §680.1-680.17, as amended).

ACT 167 Plan (or watershed plan) - The plan for managing stormwater runoff throughout a designated watershed adopted by Allegheny County as required by the Pennsylvania Storm Water Management Act.

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 for approval to engage in any Regulated Earth Disturbance activity at a project site in the Municipality.

Attenuate – To reduce the magnitude of the flow rate by increasing the time it takes to release a specified volume of runoff (for example the 1 year, 24 hour storm event). Attenuation is a method of reducing the peak flow rates for post development compared to the peak flow rates in predevelopment.

Aquifer - A geologic formation, group of formations, or part of a formation that contains sufficient saturated, permeable material to yield useful quantities of ground water to wells and springs.

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

Best Management Practice (BMP) – Methods, measures or practices and facilities to prevent or reduce surface runoff and/or water pollution, including but not limited to, structural and non-structural stormwater management practices and facilities and operation and maintenance procedures.

ACCD – Allegheny County Conservation District

ACHD – Allegheny County Health Department

CFS – Cubic Feet per Second.

Channel - A natural or artificial watercourse that conveys, continuously or periodically, flowing water.

Conservation Design - A series of holistic land development design practices that maximize protection of key land and environmental resources, preserve significant concentrations of open space and greenways, evaluate and maintain site hydrology, and ensure flexibility in development design to meet community needs for complementary and aesthetically pleasing development. Conservation Design encompasses the following objectives: conservation/enhancement of natural resources, wildlife habitat, biodiversity corridors and greenways (interconnected open space); minimization of environmental impact resulting from a change in land use (minimum disturbance, minimum maintenance); maintenance of a balanced water budget by making use of site characteristics and infiltration; incorporation of unique natural, scenic and historic site features into the configuration of the development; preservation of the integral characteristics of the site as viewed from adjoining roads; and reduction in maintenance required for stormwater management practices. Such objectives can be met on a site through an integrated development process that respects natural site conditions and attempts, to the maximum extent possible, to replicate or improve the natural hydrology of a 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.

Concentrated Storm Runoff - Surface runoff from rainfall events, which converges and flows primarily through water conveyance features such as swales, gullies, waterways, channels or storm sewers and which exceeds the maximum specified flow rates of filters or perimeter controls intended to control sheet flow.

DEP - The Pennsylvania Department of Environmental Protection.

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 or **To Detain** - The prevention of, or to prevent, the discharge, directly or indirectly, of a given volume of stormwater runoff into surface waters by temporary storage.

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 shortly after any given rainfall event and are dry until the next rainfall event.

Development Site (Site) - See Project Site.

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

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

Ditch - An artificial waterway for irrigation or stormwater conveyance.

Drainage Area - That land area contributing runoff to a single point and that is enclosed by a ridge line.

Drainage System - All facilities and natural features used for the movement of stormwater through and from a drainage area, including, but not limited to, any and all of the following; conduits, pipes and appurtenant features: channels, ditches, flumes, culverts, streets, swales, gutters as well as all watercourses, water bodies and wetlands.

EPA - Environmental Protection Agency.

Earth Disturbance - 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.

Easement – A right of use of a specified portion of land of another for a specified purpose.

Engineer - A professional engineer duly appointed as the engineer for municipality.

Erosion – The wearing away of land surface by water or wind which occurs naturally from weather or runoff, but is often intensified by human activity.

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

FEMA – Federal Emergency Management Agency.

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.

Floodway - The channel of the watercourse and those portions of the adjoining floodplains that is 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.

First Order Stream – Upper-most perennial tributary in a watershed that has not yet confluenced with another perennial stream. The confluence of two first order streams forms a "second" order stream.

Freeboard - Freeboard is the difference between the elevation of the design flow in the emergency spillway (usually the 100 year peak elevation) and the top elevation of the settled basin embankment (that is, top of berm). The minimum freeboard shall be one (1) foot.

Ground Water – Water that occurs in the subsurface and fills or saturates the porous openings, fractures and fissures of under-ground soils and rock units.

Hotspots – An area where land use or activities generate highly contaminated runoff, with concentrations of pollutants in excess of those typically found in stormwater.

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 HSG's (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.

Hydrology – The study of the properties, distribution, circulation and effects of water on the Earth's surface, soil and atmosphere.

Hydrograph - A graph of discharge versus time for a selected point in the drainage system.

Impervious Cover – See "Impervious Surface".

Impervious Surface - A surface (area), which has been compacted or covered with a layer of material so that it is resistant to infiltration by water. It includes semi-pervious surfaces such as compacted clayey soils, as well as most conventionally surfaced streets, roofs, sidewalks, parking lots, and other similar surfaces. Net Increase of Impervious Surface refers to the difference between the existing impervious coverage and the total impervious surface proposed.

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

Intensity - The depth of accumulated rainfall per unit of time.

Intermittent Stream – A defined channel in which surface water is absent during a portion of the year, as ground water levels drop below the channel bottom.

Karst – A type of topography that is formed over limestone or other carbonate rock formations by dissolving or solution of the rock by water, and that is characterized by closed depressions, sinkholes, caves, a subsurface network of solution conduits and fissures through which ground water moves, and no perennial surface drainage features.

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.

Level Spreader – A low earthen berm constructed perpendicular to the direction of slope and extending across the width of the slope for the purpose of intercepting surface runoff and spreading it behind the berm to enhance infiltration and reduce erosion and runoff from the slope. The purpose of a level spreader is to prevent concentrated, erosive flows from occurring and to spread out stormwater runoff uniformly over the ground as sheet flow.

Loading – The total amount (generally measured in pounds or kilograms per acre per year) of material (sediment, nutrients, oxygen-demanding material, or other chemicals or compounds) brought into a lake, stream or water body by inflowing streams, runoff, direct discharge through pipes, ground water, the air (aerial or atmospheric deposition) and other sources over a specific period of time (often annually).

Maintenance -The action taken to restore or preserve the as-built functional design of any facility or system.

Meadow Condition - A natural groundcover with less than one viable tree of a DBH of six (6) inches or greater per fifteen-hundred (1,500) square feet within ten (10) years of application; a cover condition for which SCS curve numbers have been assigned or to which equivalent rational method runoff coefficients have been assigned.

MS4 - Municipal Separate Storm Sewer System.

Municipality – the local government that adopted the subject Ordinance.

NOAA - National Oceanic and Atmospheric Administration.

NRCS – Natural Resources Conservation Service.

National Pollution Discharge Elimination System (NPDES) – Created in 1972 under the Clean Water Act to authorize discharges to local receiving waters only pursuant to governmental permits, in an effort to reduce point source and non-point source pollutants.

New Development – Any activity regulated by this Ordinance that is not considered a redevelopment as defined in this Ordinance.

Non-structural Stormwater Management Practices - Passive, site design approaches or regulatory approaches that positively impact water quality and reduce or minimize the generation of stormwater runoff without requiring the construction of specific or discrete stormwater management control structures.

Open Channel – Any natural or man-made watercourse or conduit in which water flows with a free surface.

Open Vegetated Channel – also known as swales, grass channels, and biofilters. These systems are used for the conveyance, retention, infiltration and filtration of stormwater runoff.

PACD - Pennsylvania Association of Conservation Districts.

PADEP – Pennsylvania Department of Environmental Protection.

Pasture Condition – A ground cover of grassland or range with continuous forage for grazing and greater than 75% ground cover and lightly or only occasionally grazed; a cover condition for which the Soil Conservation Service curve numbers have been assigned or to which equivalent rational method runoff coefficients have been assigned.

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

PennDOT – Pennsylvania Department of Transportation.

Percolation Rate – The rate of movement of water under hydrostatic pressure through interstices of rock or soil. For stormwater analysis, it is typically measured as a distance per unit of time (e.g., inches per hour).

Pervious Area – Any area not defined as impervious.

Predevelopment Assumption - The ground cover assumption used when analyzing the stormwater runoff characteristics of a drainage area prior to the proposed development.

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.

Rainfall Intensity -The depth of accumulated rainfall per unit of time.

Rate - Volume per unit of time.

Receiving Waters – Any water bodies, watercourses or wetlands into which surface waters flow.

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

Redevelopment - An existing, developed property and/or a graded, altered and compacted site (as of or after the date of adoption of this Ordinance) that is proposed for reconstruction involving the demolition or partial demolition of the property.

Regulated Activities- Any Earth Disturbances or any activities that involve the alteration or development of land in a manner that may affect post construction stormwater runoff.

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

Release Rate Percentage - The percentage of predevelopment peak rate of runoff from a watershed subarea (as delineated in the Act 167 watershed plan), which defines the allowable post-development peak discharge from any development site in that subarea.

Retention or **To Retain** - The prevention of direct discharge of stormwater runoff into receiving waters or water bodies by temporary or permanent containment in a pond or depression; examples include systems which discharge by percolation to ground water, exfiltration, and/or evaporation processes and which generally have residence times of less than three days.

Retention Basin - An impoundment designed to collect and retard stormwater runoff by temporarily storing the runoff and releasing it at a predetermined rate. Retention basins may also be designed to permanently retain additional stormwater runoff. Retention basins are designed to retain a permanent pool of water during dry weather.

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.

Riparian – Pertaining to anything connected with or immediately adjacent to the banks of a stream or other body of water.

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.

Runoff –see **Stormwater.**

SLAMM – Source Loading and Management Model. This model is based on small storm hydrology and pollutant runoff from urban land uses. Pollutant sources are identified and both structural and nonstructural stormwater practices can be accounted for in the model.

SCS – Soil Conservation Service.

SWMM – Stormwater Management Model. EPA developed this model for analyzing stormwater quantity and quality associated with runoff from urban areas. Both single event and continuous simulation can be performed on catchments having storm sewers, or combined sewers and natural drainage, for prediction of flows, stages and pollutant concentrations. Information on SWMM is available at *http://www.epa.gov/ceampubl/swater/swmm/index.htm*.

Sediment – Fragmented material that originated from weathering rocks and decomposing organic material that is transported by, suspended in, and eventually deposited in the streambed.

Sedimentation – Occurs when sediment particles that have been suspended within flowing water are deposited on the stream bottom or floodplain.

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

Special Flood Hazard Area - Those areas identified by the Federal Emergency Management Agency (FEMA), Federal Insurance Administration (FIA) as floodway area (FW), flood fringe

area (FF), and general floodplain area (FA); where determined by the Municipality, identified alluvial soils may be included as well.

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.

Storm Event - The storm of a specific duration, intensity, and frequency.

Stormwater or **Runoff** - The flow of water overland and/or in water bodies that results from and occurs during and immediately following a rainfall event.

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

Stormwater Management Plan - The approved detailed analysis, design, and drawings of the stormwater management system required for all construction.

Stormwater Management Practices - The designed and/or constructed features which infiltrate, treat, collect, convey, channel, store, inhibit, or divert the movement of stormwater; such practices include structural and non-structural practices.

Structure - Anything constructed or installed with a fixed location on the ground, or attached to something having a fixed location on the ground.

Structural Stormwater Management Practices - Any measures that require the design and construction of a facility to help reduce or eliminate a non-point source of pollution and control stormwater.

Subarea (subbasin) - A portion of the watershed (basin) that has similar hydrological characteristics and drains to a common point.

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

Subgrade -The top elevation of graded and compacted earth underlying roadway pavement.

Swale - An artificial or natural waterway which may contain contiguous areas of standing or flowing water only following a rainfall event, or is planted with or has stabilized vegetation suitable for soil stabilization, stormwater treatment, and nutrient uptake, or is designed to take into account the soil erodibility, soil percolation, slope, slope length, and contributing drainage area so as to prevent erosion and reduce the pollutant concentration of any discharge.

Total Site Area (Site Area) – Total area of the parcel(s) being developed.

USDA – United States Department of Agriculture.

USDOT FHWA – United States Department of Transportation Federal Highway Administration.

Water Body - Any natural or artificial pond, lake, reservoir, or other area which ordinarily or intermittently contains water and which has a discernible shoreline and receives surface water flow.

Watercourse – A permanent or intermittent stream or other body of water, whether natural or man-made, which gathers or carries surface water.

Water Table – The upper most level of saturation of pore space or fractures by subsurface water in an aquifer. Seasonal High Water Table refers to a water table that rises and falls with the seasons due either to natural or man-made causes.

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 and underground water, or parts thereof, whether natural or artificial, within or on the boundaries of this Commonwealth.

Watershed - Land area that drains to a common water body or downstream point.

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.

Wetlands - Land areas that are inundated or saturated by surface or groundwater with 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, and similar areas); or areas that are defined and delineated in accordance with the Federal Manual for Identifying and Delineating Jurisdictional Wetlands, dated January 10, 1989, and as may be amended from time to time; or as further defined and delineated by the United States Army Corps of Engineers, the United States Environmental Protection Agency, or the Pennsylvania Department of Environmental Protection.

Woodland Condition - A natural groundcover with more than one viable tree of a DBH (diameter at breast height) of six (6) inches or greater per fifteen-hundred (1,500) square feet which existed within ten (10) years of application; a cover condition for which SCS curve numbers have been assigned or to which equivalent rational method runoff coefficients have been assigned.

Section 3. Effective Date. This Ordinance shall take effect on October 5, 2008.

ORDAINED and ENACTED this 2nd day of September, 2008 by the Board of Supervisors of the Township of Harmar in lawful session duly assembled.

ATTEST:

Annette M Dietz
Township Secretary

TOWNSHIP OF HARMAR:

By: Barbara Noll
Barbara Noll
Chairperson, Board of Supervisors