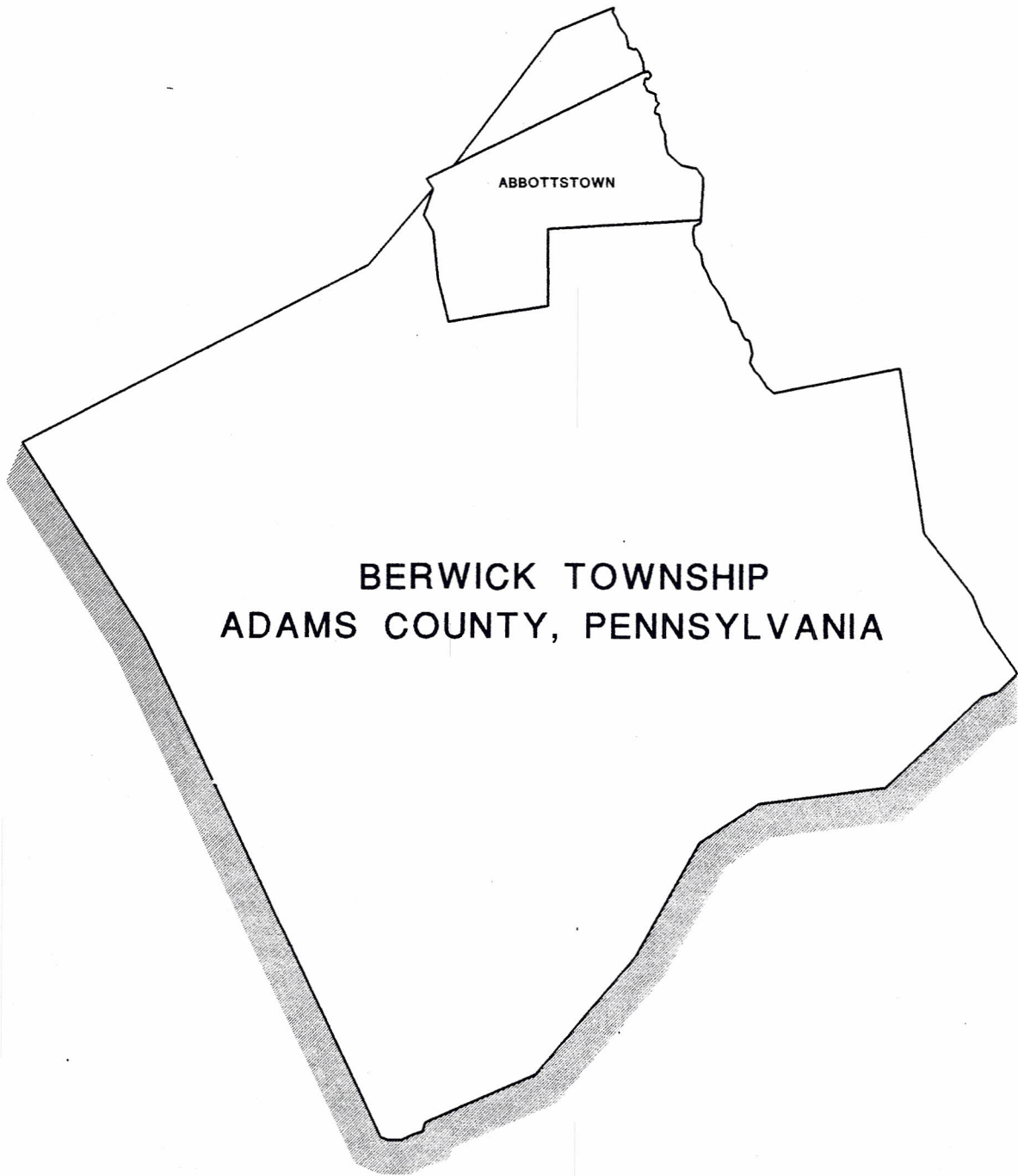


**STORMWATER MANAGEMENT ORDINANCE**



ORDINANCE NO. 42

AN ORDINANCE ESTABLISHING REGULATIONS AND STANDARDS FOR STORMWATER MANAGEMENT WITHIN THE TOWNSHIP OF BERWICK, COUNTY OF ADAMS; ESTABLISHING PROCEDURES FOR THE APPLICATION AND ADMINISTRATION OF THESE REGULATIONS AND STANDARDS; AND PROVIDING PENALTIES FOR THE VIOLATION THEREOF. THIS ORDINANCE REPEALS ALL OTHER STORMWATER MANAGEMENT ORDINANCES PREVIOUSLY ADOPTED.

BE IT ORDAINED by the Supervisors of the Township of Berwick, Adams County, Pennsylvania as follows:

**BERWICK TOWNSHIP, ADAMS COUNTY, PENNSYLVANIA  
STORMWATER MANAGEMENT ORDINANCE**

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## **ARTICLE I - SHORT TITLE, PURPOSE AND JURISDICTION**

### **101 - SHORT TITLE**

This Ordinance shall be known and may be cited as "The Berwick Township Stormwater Management Ordinance".

### **102 - PURPOSE**

This Ordinance is enacted for the primary purpose of establishing criteria for the control of stormwater runoff and associated increased peak flows or volumes and to limit future flood damages and environmental impacts due to land development. In addition, this Ordinance shall seek to provide the residents of the Township of Berwick with conditions which are favorable for health and safety. This Ordinance has been developed to work in conjunction with the Berwick Township Subdivision and Land Development Ordinance.

### **103 - AUTHORITY & JURISDICTION**

The authority of the Berwick Township Supervisors to adopt this Ordinance regulating stormwater management within Berwick Township is granted by the Pennsylvania Stormwater Management Act, of October 4, 1978, P.L. 864, No. 167, and the Pennsylvania Municipalities Planning Code of July 31, 1968, P.L. 805, Act No. 247, reenacted and amended by Act 170 of 1988, as amended, and the Second Class Township Code, Act of May 1, 1933, P.L. 103, No. 69, reenacted and amended July 10, 1947, P.L. 1481, No. 567.

No stormwater management facilities of any type shall be designed, constructed, implemented, or otherwise used without having first been established and certified to be in strict compliance with this Ordinance.

### **104 - INTERPRETATION**

The provisions of this Ordinance shall be interpreted as the minimum requirements to meet the purposes of the Ordinance. Where the provisions of this Ordinance conflict, or are inconsistent with the provisions of any other Ordinance, regulation, or requirement, the more restrictive provision shall apply.

## ARTICLE II - DEFINITIONS

### 201 - GENERAL

Words and phrases shall be presumed to be used in their ordinary context unless such word or phrase is defined or interpreted differently within this section.

### 202 - GENERAL TERMS

In this Ordinance when not inconsistent with the context:

- (1) Words in the present tense imply also the future tense.
- (2) The singular includes the plural.
- (3) The male gender includes the female gender.
- (4) The term "person" includes an individual, partnership, corporation, unincorporated association, estate, or any other legally recognized entity.
- (5) The term "shall" or "must" is always mandatory.
- (6) The term "may" is optional.

### 203 - SPECIFIC TERMS

The following words and phrases shall have the particular meaning assigned by this section of this Ordinance. Additionally, the words and phrases which are used in this Ordinance and not defined below shall have the meaning assigned by the Berwick Township Subdivision and Land Development Ordinance.

1. ADVERSE IMPACT - Any deleterious effect on waters or wetlands, including their quality, quantity, and surface area.
2. ALTERATIONS - As applied to land, any change in topography as a result of earthwork of any variety, also the changing of any surface by causing it to become more or less impervious.
3. BOARD OF SUPERVISORS - The Board of Supervisors of the Township of Berwick, Adams County, Pennsylvania.
4. CHANNEL - A natural or artificial watercourse with a definite bed and banks which confine and conduct continuously or periodically flowing water.
5. CULVERT - A structure with appurtenant works which carries a watercourse under or through an embankment.
6. DEDICATION - The deliberate appropriation of property by its owner for general public use.

7. DESIGN STORM - The magnitude of precipitation from a storm event measured in probability of occurrence (e.g., 25-year storm) and duration (e.g., 24 hour storm) and used in computing storm water management control systems.
8. DETENTION BASIN - A reservoir which temporarily contains storm water runoff and releases it at a reduced volume and rate into a watercourse storm water drainage system.
9. DRAINAGE EASEMENT - A right granted by a landowner to a grantee, allowing the use of private land for storm water management purposes.
10. DRAINAGE AREA - That area which contributes runoff to a point chosen as the design point, along a horizontal path, enclosed by an area of higher elevation.
11. GRADING - Includes any act by which soil is moved, cleared, stripped, stockpiled, filled or any combination thereof.
12. IMPERVIOUS SURFACE - A surface made of materials which prevent the percolation of water into the ground.
13. INFILTRATION - The movement of water into and through a soil strata.
14. INFILTRATION STRUCTURE - A structure designed to convey water into the ground, such as a trench, pit or french drain.
15. ON-SITE STORMWATER MANAGEMENT - The design and construction of systems necessary to control storm water within defined area of proposed development.
16. PEAK DISCHARGE - The maximum rate of flow of water at a given point and time resulting from a specified storm event.
17. RETENTION BASIN - A reservoir designed to retain storm water runoff with its primary release of water being through the infiltration of said water into the ground.
18. RUNOFF - That part of a precipitation event which is not immediately absorbed into the ground and is subject to traveling over a land surface.
19. SEDIMENTATION BASIN - A reservoir designed to retain sediment.
20. SEMI-IMPERVIOUS SURFACE - A surface such as stone, rock, or other material which prevents some percolation of water into the ground.
21. STABILIZATION - The prevention of soil loss through erosion by means of a synthetic or vegetative matrix.

22. STORM SEWER - A system of pipes, conduits, swales or other similar structures, including appurtenant works, which carries intercepted runoff, and other drainage, but excludes domestic sewage and industrial waste.
23. STORMWATER MANAGEMENT - A program of controls and measures designed to regulate the quantity and quality of storm water runoff from a development while promoting the protection and conservation of groundwaters and groundwater recharge.
24. STORMWATER MANAGEMENT FACILITIES - Those controls and measures (e.g., storm sewers, berms, terraces, bridges, dams, basins, infiltration systems, swales, watercourses, and floodplains) used to effect a storm water management program.
25. STORMWATER RUNOFF - Drainage runoff from the surface of the land resulting from precipitation or snow and ice melt.
26. TOWNSHIP - Berwick Township, Adams County, Pennsylvania.



**ARTICLE III - STORMWATER MANAGEMENT PLAN PROCEDURES  
& REQUIREMENTS**

**301 - GENERAL**

No land development or construction activity in which the standards of this Ordinance applies shall commence until a Stormwater Management Plan has been approved.

**302 - APPLICABILITY**

Any person who engages in the following activities shall be subject to the requirements of this Ordinance:

- A. Land development which creates an additional impervious area on the project site or property of 500 square feet or more. Gravel shall be considered impervious surface for the purpose of determining applicability.
- B. Diversion or piping of any natural or man-made watercourse. This shall include the relocation of such facilities or watercourses.
- C. Removal of ground cover or topsoil, grading, filling, or other excavation or land disturbance in excess of three (3) acres, except for the agricultural use of land when operated in accordance with a farm conservation plan approved by the Adams County Conservation District.

**303 - EXEMPTIONS**

The following activities are considered to be exempt from the provisions of this Ordinance:

- A. Any person who has secured a building permit prior to the effective date of this Ordinance.
- B. Agricultural use of lands in accordance with a farm conservation plan as approved by the Adams County Conservation District. This shall not apply to the construction of farm buildings.
- C. Any person who applies for a building permit for a single family dwelling within a subdivision which was approved by the Township prior to this Ordinance and which has approved stormwater management measures in place or which was approved after the effective date of this Ordinance and is subject to such conditions as may have been attached to said approval at the time of approval. Any person who applies for a building permit for a single family dwelling within a subdivision approved by the Township prior to the effective date of this Ordinance and for which no stormwater management facilities were required or properly installed, shall comply with the provisions of this Ordinance.

D. Single family dwellings on lots of three (3) or more acres.

#### 304 - WAIVERS, VARIANCES, AND APPEALS

The provisions of this Ordinance are intended as a minimum standard providing for the protection of the public health, safety and general welfare. If for some reason adherence to this Ordinance causes undue hardship as it applies to a particular property, the applicant may request a waiver or variance from this Ordinance. The Berwick Township Board of Supervisors may grant a waiver of Stormwater Management requirements if the applicant submits a written request and sufficient documentation to support that such a request is valid. The request shall state in full the exact waiver there from which is requested. A copy of the waiver request is to be sent to the Township Engineer for review prior to approval.

#### 305 - EXPIRATION

All Storm Water Management Plan approvals for Non-Subdivision and Land Development Plans shall expire two (2) years from the date of approval unless an extension has been requested and approved. An extension of an unexpired Stormwater Management Plan may be issued by the Township following submission of a written request if, in the opinion of the Township, following consultation with the Township Engineer, the following characteristics are present:

- A. the subject property or affected surrounding area has not been altered in a manner which requires alterations to the Stormwater Management Plan
- B. in the case where substantial improvements have not been completed, any new standard would not alter the application. The Township shall act on requests for extensions within sixty (60) days of receipt of such request.

The refusal of an extension shall cite the exact reasons for such a refusal.

A Stormwater Management Plan approval shall not expire while a request for an extension is pending.

## 306 - APPLICATION PROCEDURE

### 306 - A - SUBDIVISION / LAND DEVELOPMENT

All applications for a Storm Water Management Permit, where the activity also constitutes a subdivision or land development, shall be submitted concurrently with the Subdivision and Land Development application. In this case, review of the Stormwater Management Plan will be performed in conjunction with the Subdivision or Land Development review. Action on the Storm Water Management Plan will be taken in conjunction with the Subdivision or Land Development Plan within the specified time frame.

### 306 - B - NON-SUBDIVISION / LAND DEVELOPMENT

All Storm Water Management Plans, where the activity does not constitute a subdivision or land development, shall conform with the following procedures:

1. All Storm Water Management Plans shall be submitted to the Township. All applicable information including plans, calculations, reports and application fee(s) shall accompany the submission. The plan must be submitted fifteen (15) business days prior to the Planning Commission meeting at which the Plan is to be considered.
2. The Township shall forward the Plan to the Township Engineer for review.
3. The plan shall be reviewed by the Township Planning Commission who shall make recommendation to the Board of Supervisors.
4. The Board of Supervisors shall review the plan and take formal action.
5. The review and processing period, including approval or disapproval of the plan and notification of the applicant, shall be the same as for Final Plans under the Subdivision and Land Development Ordinance.
6. Following approval by the Board of Supervisors, a permit may be issued and the applicant may proceed as outlined on the approved plan.

## ARTICLE IV - STORMWATER MANAGEMENT PLAN REQUIREMENTS

### 401 - PLAN REQUIREMENTS

Stormwater management plans shall be prepared by professionals registered in the Commonwealth of Pennsylvania to perform such duties. Plans which require engineering expertise shall be sealed by a registered professional engineer with expertise in this field. The plan shall show, be accompanied by, or be prepared in accordance with the following:

#### A. General

1. The plan shall be clearly and legibly drawn at a maximum scale of fifty (50) feet, to the inch. Profile plans shall maintain a ratio of 1:10 vertical to horizontal.
2. Name, address, and telephone number of landowner, applicant, and individual who prepared the plan.
3. Plan date and date of revisions to plan, north point, graphic scale and written scale. All maps shall be drawn at a commonly used engineering scale.
4. A location map, drawn to a maximum of 1" = 2,000' scale, relating the property to intersections of existing roads. The location map shall also indicate municipal boundaries and geodetic north.
5. Note on plan indicating any area that is proposed to be offered for dedication to the Township. Any area that is easemented and not to be offered for dedication shall be identified along with a statement that the Township is not responsible for the maintenance of any area not dedicated to and accepted for public use.
6. Certificate, signed and sealed by an individual registered in the Commonwealth of Pennsylvania and qualified to perform such duties, indicating compliance with the provisions of this Ordinance.

#### B. Existing Features

1. Tract boundaries showing distances, bearings and curve data, as located by field survey or deed plotting, total acreage of tract, and total acreage of project if less than the entire tract.

2. Existing contours, at a maximum vertical interval of two (2) feet for land with average natural slope of fifteen percent (15%) or less and at a maximum vertical interval of five (5) feet for more steeply sloping land. Contours shall be accompanied by the location of the benchmark within or immediately adjacent to the subject tract and a notation indicating the datum used. The United States Geodetic Survey shall be used for benchmark datum unless otherwise approved by the Township Engineer.
3. Names of all owners of all immediately adjacent land, names of all proposed or existing developments immediately adjacent, and locations and dimensions of any streets or easements shown thereon.
4. Names, locations and dimensions of all existing buildings, street rights-of-way, railroads, utilities, watercourses, drainage facilities, floodplains, wetland, on-lot sewage disposal facilities, easements, and other significant features located either within and adjacent to the property or two hundred (200) feet from the property.
5. The size, slope, capacity, and condition of the existing storm water management system and any other facility that may be used to convey storm flows.
6. Soils types as designated by the U.S. Department of Agriculture, Soil Conservation Service, Soil Survey of Adams County.
7. Designation of the location of on-site and off-site sub-watersheds.
8. Designation of the travel flow path used for calculation of the time of concentration for the on-site and off-site sub-watersheds.

#### C. Proposed Features

1. Proposed land use, total number of lots and dwelling units, and extent of commercial, industrial or other non-residential uses.
2. Locations and dimensions of all proposed streets, sidewalks, lot lines, building locations, parking compounds, impervious and semi-impervious surfaces, sanitary sewer facilities, water facilities, stormwater management facilities, utilities, and other significant features. This information shall be provided to the detail necessary to construct the facilities.
3. Proposed changes to land surface and vegetative cover including areas to be cut or filled.

4. Proposed Topographical Data. This information shall be provided by contour lines indicating the existing and proposed grades of the site. Contour lines shall be provided at two (2) foot maximum vertical intervals for slopes of fifteen percent (15%) or less, and at vertical intervals of five (5) feet maximum for more steeply sloping land. Contour intervals of one (1) foot may be required, where in the opinion of the Township Engineer, it is necessary to reflect the required detail.
5. Plans and profiles of proposed storm water management facilities including horizontal and vertical location. Additionally, a detail with all pertinent construction requirements shall be provided for outlet structures. This information shall be of the quality required for the construction of all facilities.
6. The size, slope, capacity, material, elevation, and condition of the proposed storm water management system and other facility that may be used to convey storm flows. This information shall include invert elevations and top of grate elevations.
7. Plans and profiles of all erosion and sedimentation control measures, temporary as well as permanent.
8. Designation of the location of on-site sub-watersheds.
9. Designation of the location of the travel flow path used for calculation of the time of concentration for the on-site sub-watersheds.

D. Written Report and Calculations

1. Calculations, assumptions, criteria, methodology, and references used in the design of storm water management facilities, the establishment of capacities, and the pre-development and post-development peak discharge. This information shall include data on all sub-watersheds. Applicants shall submit the Standard Computation Table provided in the appendix.
2. Analysis of the condition and capacity of downstream drainage facilities in which the discharge of stormwater from the project site will be directed.
3. For all basins, a plotting or tabulation of the storage volumes and discharge curves with corresponding water surface elevations, inflow hydrographs, and outflow hydrographs.

4. Soil profiles and characteristics including depth to limiting factors such as seasonal high water table and rock, shall be provided for all proposed subsurface disposal systems and retention facilities or for detention basins which (a) hold two (2) acre feet or more of water, or (b) have an embankment that is six (6) feet or more in height. Plans and data prepared by a registered professional experienced and educated in soil mechanics shall be submitted. This data shall provide design solutions for frost heave potential, shrink-swell potential, soil bearing strength, water infiltration, soil settling characteristics, fill and back-filling procedures and soil treatment techniques as required to protect the improvements or structures. The Township in this case, may also require an analysis of the impacts of failure of the embankment on downstream areas. This analysis, when required, shall be performed in accordance with the standards required by the Pennsylvania Department of Environmental Protection for performance of a dam breach analysis.
5. The following requirements apply to all proposed groundwater recharge methods of storm water management, such as seepage pits, beds, trenches, leaching wells, or retention basins:
  - a. Representative percolation tests must be made throughout the proposed area. At least one percolation test must be included in each soil group and at locations identified by the Township Engineer. Testing, shall follow the guidelines for on-lot sewage systems as established by the Pennsylvania Department of Environmental Protection.
6. Description of all erosion and sedimentation control measures, temporary as well as permanent, including the staging of land moving activities, sufficient in detail to clearly indicate their function. All erosion and sedimentation control measures shall conform to the requirements of the Pennsylvania Department of Environmental Protection, Soil Erosion and Sedimentation Control Manual.
7. Description of an ownership and maintenance program, in a recordable form, that clearly sets forth the ownership and maintenance responsibilities for all temporary and permanent storm water management facilities which shall include the following:
  - a. Description of the method and extent of the maintenance requirements.
  - b. Identification of an individual, corporation, homeowners association or other entity responsible for ownership and maintenance.

- c. When to be maintained by any private entity, a copy of the legally binding document which provides that the Township shall have the right to:
  - 1) Inspect the facilities at any time.
  - 2) Require the private entity to take corrective measures and assign the private entity reasonable time periods for any necessary action.
  - 3) Authorize maintenance to be done by the Township or an agent or contractor of the Township and the liening of the cost of the work against the properties of the private entity responsible for the maintenance.
- d. Establishment of suitable easements for access to storm water management facilities.
- e. When an assignment of responsibility is made to the Township, it must include an acknowledgement of their formal acceptance of the responsibility. This document shall be recorded in the Office of the Recorder of Deeds for Adams County upon issuance of a plan approval. In all cases, the document shall be recorded prior to the initiation of construction and be fully effective at the post-construction period.
- 8. A Pennsylvania Department of Transportation Highway Occupancy Permit for any storm water management facility proposed within the right-of-way of any State road.
- 9. Acknowledgement that a NPDES, DEP permit or other soil erosion and sediment pollution control approval is not required by law, or if such approval is required by law, then a true and correct copy of such approval shall be provided to the Township.
- 10. Notification of approval from the applicable State and Federal agencies for any proposed encroachment into a wetland.
- 11. A schedule for installation of the control measures and devices. In all cases, the proposed storm water management devices must be completed prior to the construction of additional impervious areas.



#### 402 - MODIFICATION OF PLANS

A modification of an approved Storm Water Management Plan shall require a new plan approval except that the Township Engineer may authorize modification provided that such modifications do not, (1) alter the storm water management facilities in a manner which significantly affects the discharge of storm water to an adjacent property, or (2) significantly relocate a major storm water management facility within the project.

**ARTICLE V - DESIGN AND INSTALLATION STANDARDS**

**501 - PRE-DEVELOPMENT VS. POST DEVELOPMENT**

A pre-development and post-development comparison for Type II, 24 hour, 1, 2, 5, 10, 25, 50, and 100 year frequency storm events shall be provided.

The twenty-four (24) hour rainfall values are as follows:

<u>Frequency (years)</u>	<u>Rainfall (inches)</u>
1	2.5
2	3.0
5	3.9
10	4.8
25	5.3
50	6.0
100	6.7

Both, Hydrographs and Peak Discharges shall be computed. For watersheds of less than ten (10) acres, the Rational Formula may be used to compute flow. For larger watersheds, the latest version of the Soil Conservation Service, Technical Release No. 55, Urban Hydrology for Small Watersheds, or other method approved by the Township Engineer shall be used.

**502 - STORMWATER COLLECTION SYSTEM**

The design of stormwater collection and conveyance facilities shall be governed by the following criteria:

**502 - A - STORM SEWERS**

1. Peak discharge shall be computed using the Rational Formula:

$$Q = C I A$$

Where:

Q = Peak discharge in cubic feet per second

C = Runoff coefficient expressed as the ratio of peak runoff rate to the average amount of rainfall over a period of time equal to the time of concentration

I = Average rainfall intensity in inches per hour for a time equal to the time of concentration

A = Drainage area in acres

In general, the procedure from the Pennsylvania Department of Transportation, Design Manual, Part 2 shall be followed.

- a. Typical Runoff coefficients for various surfaces can be found in the Appendix on Exhibit 3 of this Ordinance. Runoff coefficients shall be computed as a weighted average of conditions which represent maximum development potential on the property. Soil types, ground slope, and storm frequency shall all be considered in the selection of Runoff Coefficients.
- b. A computation table similar to the one found in the appendix of this Ordinance shall be submitted with the design of any stormwater collection system.
- c. Storm intensity (I) shall be computed as a function of the time of concentration (Tc). A Tc of five (5) minutes shall be used in determining intensity unless the drainage area parameters justify the use of a greater value. Use of a Tc greater than 5 min. shall be as approved by the Township Engineer.
- d. The minimum full flow velocity of any storm sewer or culvert shall be 2.5 feet per second (fps).

## 2. Storm Frequency

The following storm frequencies are to be used for design:

- a. Local Streets - 10 year
- b. Major Intersections  
of Local Streets - 25 year
- c. Collector Streets  
and Arterial Streets - 50 year

Alternate criteria may be required following recommendation of the Township Engineer. In addition, functional classification of streets shall be as interpreted by the Township Engineer.

3. For storm sewers which will be dedicated to the Township, all pipe material shall either be reinforced concrete or smooth lined corrugated polyethylene pipe to be as determined by the Township. Standards as referenced from ASTM or other source acceptable to the Township Engineer shall be specified.
4. Minimum pipe size for stormsewers shall be fifteen (15) inches in diameter unless otherwise approved by the Township Engineer.
5. Installation:
  - a. Storm sewers shall be installed a sufficient time in advance of final street paving in order to allow for settlement of the trench.

- b. Installation shall be in accordance with manufacturers recommendations, PennDOT Publication 408 and RC standards or as specified by the Township Engineer.
  - c. Storm sewers to be dedicated to the Township shall be placed on a minimum of six (6) inches of stone bedding. Stone backfill shall be required to a point of twelve (12) inches minimum over the top of the pipe for pipes which will not be located under streets or parking lots and to the top of finished subgrade for pipes which will be beneath streets or parking lots. Backfill shall be compacted in lifts and shall be subject to inspection by the Township Engineer.
  - d. Minimum cover from the top of the pipe to the top of subgrade shall be twelve (12) inches.
- 6. Safety features shall be incorporated into the storm sewer system as necessary.
  - 7. Minimum thickness of any corrugated steel or metal pipe shall be 16 gage or as otherwise required by the Township for anticipated load conditions.

#### 502 - B - INLETS / MANHOLES / JUNCTIONS

- 1. In general, inlets, manholes, grates, covers, frames and the like shall conform to the Pennsylvania Department of Transportation Standard Specifications, Publication 408 and RC Standards. Design shall be performed in accordance with the Pennsylvania Department of Transportation or Federal Highway Administration Standards. Additional / alternate criteria may be required following review of the Township Engineer.
  - a. Inlets shall be spaced such that they are not subject to flows higher than 5 cubic feet per second or at a distance greater than four hundred feet (400') along curbed streets and at low points on sag vertical curves with an inlet on each side of the street. Additional inlets shall be placed at the upper side of street intersections, to prevent stormwater from crossing the intersection. Inlets are not allowed on the intersection radii. In no case shall inlets be placed at a location where they function at less than sixty-five percent (65%) efficiency based on criteria in the PennDOT Design Manual. Design shall be such that the maximum allowable spread of water on streets shall not exceed one-half (1/2) of the travel lane.
  - b. Inlets shall have weep holes placed at the appropriate elevations to drain the bottom of the inlet box and the subgrade prior to placing the base and surface courses.
- 2. Where structures are subject to traffic loads, the structure shall be traffic rated.

3. Inlet tops in residential developments shall be bicycle safe unless otherwise approved.
4. Manholes shall not be placed more than five hundred (500) feet apart. Additionally, manholes shall be placed at points of change in horizontal and/or vertical direction of storm sewers. Inlets may be substituted for manholes where they will serve as a means of intercepting runoff.
5. If less than a forty eight (48) inch diameter, curves in pipes or box culverts, without junction are prohibited. Tee joints, elbows, and wyes are always prohibited.

#### 502 - C - CHANNELS AND CULVERTS

1. In cases where drainage is collected by means of a headwall, and inlet or outlet conditions control, the pipe shall be designed as a culvert.
  - a. The minimum diameter of the culvert shall be 18". Design shall be in accordance with the U.S. Federal Highway Administration design procedure.
  - b. The maximum HW/D ratio for inlet control shall be 1.25 or such that water surface elevation is one half (1/2) foot below the edge of street grade during a 25 year storm event, whichever is more stringent.
  - c. Headwalls and endwalls shall be provided for all culverts unless otherwise approved by the Township Engineer. Material shall be reinforced concrete unless otherwise approved.
  - d. Culvert pipe and material shall be the same as that required for storm sewers

All applicable nomographs and supporting documentation shall be submitted.

2. Mannings equation shall be used for the design of all open channels. Complete calculations shall be submitted which detail flow, depth, and velocity. For channels and swales, design for Erosion Control must be provided.
3. All channels shall be designed to prevent erosion of the channel bottom and sides. The flow velocity in all vegetated drainage channels shall not exceed the maximum permissible velocity to prevent soil erosion. Stabilization techniques such as rip-rap, sodding, geofabrics and/or premanufactured products shall be utilized where necessary to minimize erosion potential.

4. The design of swales and channels shall, as a minimum, conform to the design procedures as outlined by (1) The Federal Highway Administration, and (2) The Pennsylvania Department of Environmental Protection, Bureau of Soil and Water Conservation, Erosion and Sediment Pollution Control Manual.
5. Where swales are installed, and vegetative stabilization has not or will not occur between November 1 and March 1, other means of temporary stabilization shall be provided.
6. Design criteria for swales and channels shall be the same as that required for storm sewers.

#### **503 - STORMWATER MANAGEMENT FACILITIES**

##### **503 - A - GENERAL DESIGN CRITERIA**

1. Peak Discharge and runoff shall be computed using the soil-cover complex method contained in the "Urban Hydrology for Small Water Sheds", Technical Release No. 55, published by the Engineering Division, Soil Conservation Service, United States Department of Agriculture. Alternate methodology may be used subject to approval by the Township Engineer.
2. Any pre-existing, pervious areas shall be assumed to be "meadow" for purposes of establishing an existing ground cover condition.
3. Pre-existing, pervious or impervious areas, where stormwater management controls have been previously provided, may be included as existing conditions in pre-development runoff calculations. However, if stormwater management controls have not been previously provided, ground cover shall be considered as meadow.
4. The rate and quantity of stormwater runoff from any proposed subdivision and/or land development shall not exceed the rate and quantity of runoff prior to development (i.e. zero (0) increase in runoff) for the 1, 2, 5, 10, 25 and 50 year storm event frequencies.
5. Applicants are encouraged to include stormwater quality considerations in the design of stormwater management facilities.
  - a. Where, required by the Township, following review by the Township Engineer, high concentrations of oils, greases, metals and sediment may occur, the design shall include provisions for the interception of such constituents prior to discharge into surface waterways or municipal storm sewers.

6. Stormwater shall not be re-routed or concentrated in a manner which is inconsistent with downstream conditions or where downstream properties are likely to be affected. In addition the proposed stormwater discharge at the perimeter of the site shall not exceed the capacity of any existing facility nor shall it alter the pre-development flow characteristics.

All new concentrated discharges of stormwater onto adjacent properties shall be within existing storm sewers or channels. The Township may require written acknowledgement or easement from adjacent property owners in the event that these conditions are not met.

## 503 - B - DETENTION BASINS

### 1. BASIN DESIGN CRITERIA

- a. Basins shall provide control of post development peak runoff rates as previously specified.
- b. Basins shall be designed to safely convey the quantity of stormwater runoff resulting from a one hundred (100) year, twenty four (24) hour storm under full development conditions, neglecting the discharge capacity of the principle outlet structure. Contributing flow to the basin shall also include any off-site runoff which may enter the basin.

The design of the facility shall be verified by routing the 1, 2, 5, 10, 25, 50, and 100 year frequency storm hydrographs through the facility.

- c. The Modified PULS Routing technique or other method approved by the Township Engineer shall be used for routing computations.

### 2. BASIN CONSTRUCTION STANDARDS

- a. Basins shall not be located over any existing or proposed utility lines.
- b. The maximum slope of earthen embankments shall be three (3) to one (1), with four (4) to one (1) preferred. The top or toe of any slope shall be located a minimum of fifteen (15) feet from adjacent property lines, except for a downstream property line where there shall be sufficient additional distance for energy dissipation. Greater slopes may be allowed with the provision of a design basis which considers fill material and stabilization where approved by the Township Engineer. In areas which are not easily accessible for maintenance, side slopes shall not exceed five (5) to one (1).
- c. Where possible the side slopes and basin shape shall blend with the natural topography.

- d. The minimum top width of detention basin berms shall be six (6) feet.
- e. All basins shall have provisions for de-watering so as not to create unmaintainable conditions. The minimum grade of the basin floor shall be two percent (2%) to insure proper drainage towards the outlet structure. This requirement may be waived if a paved low flow channel (@ 1% grade) is provided.
- f. All submitted basin plans shall indicate the construction specifications and compaction requirements to be used during construction. All earth fill dams shall be designed and certified by a registered professional engineer. Construction specifications shall be reviewed and approved by the Township Engineer.
- g. A cutoff trench shall be excavated along the center line of any dam on an earth fill embankment. The minimum depth shall be three (3) feet. The minimum bottom width shall be ten (10) feet or wide enough to permit operation of compaction equipment.
- h. A minimum of six (6) inches of topsoil shall be placed on all areas affected by the basin construction (i.e. basin floor, side slopes, top of berm, and the like) to allow for the establishment of vegetation.
- i. All basins shall be stabilized using methods acceptable to the USDA Soil Conservation Service.
- j. The maximum water depth of a finished detention basin (measured from the lowest point in the basin floor to the crest of the emergency spillway) shall not exceed eight feet (8') unless otherwise approved by the Township Engineer.
- k. Fencing may be required where the Township, following consultation with the Township Solicitor and/or Township Engineer, determines that circumstances warrant a concern for Township liability. Fencing shall be as required by the Township for the specific case. Height of such fence shall be four (4) feet to six (6) feet as required and shall include a locking man gate and vehicle access.
- l. A minimum of one (1) foot freeboard shall be provided above the basin water surface elevation during a one hundred (100) year frequency storm.
- m. Minimum floor elevations for all structures shall be two (2) feet (minimum) above the basin water surface elevation during a one hundred (100) year frequency storm. If basements will be provided, detailed calculations and water proofing design shall be provided which addresses the effects of stormwater on the structure.



- n. The Township may, upon recommendation of the Township Engineer, impose additional requirements on earth fill dams for the safety and welfare of the Township.
- o. For sites of geologic concern, a geotechnical analysis and design of the site as it relates to the proposed basin shall be provided.

### 3. EMERGENCY SPILLWAY STANDARDS

- a. Minimum freeboard, or the distance between the design flow elevation and the top of the settled basin embankment, shall be one foot (1') for a one hundred (100) year frequency storm.
- b. Emergency spillway design should be based on a 100 year design storm when neglecting the capacity of the outlet structure and outfall culvert.
- c. Emergency spillways shall be constructed on undisturbed earth, where possible. Emergency spillways shall be constructed of vegetated earth, reinforced concrete, or concrete mound slabs. Emergency spillways shall NOT discharge stormwater over earthen fill or other easily erodible material without adequate protection against soil erosion. Detailed calculations and design shall be submitted.

### 4. OUTLET PIPES AND STRUCTURES

The following measures shall be incorporated into the design and construction of all outlet structures and pipes. Supporting calculations and drawings shall be submitted for approval with the Stormwater Management Plan:

- a. Antiseep collars shall be installed around all outlet pipes through embankments. The antiseep collars and their connections to the pipe barrel shall be watertight. Design calculations in accordance with the USDA Soil Conservation Service shall be submitted.
- b. Temporary sedimentation controls shall be provided during construction to prevent the flow of sediment-laden runoff through the basin outlet pipe. Such measures may include temporary riser pipes, rock-filled gabions, plywood standboxes, silt fences and the like. Design of such measures shall comply with the requirements of the Adams County Conservation District.
- c. Energy dissipation shall be provided at the outlet of detention basins, along outfall channels, and at the discharge end of all conveyance pipes.
- d. Outlet control structures shall be constructed to prevent flotation.

- e. Outlet control structures shall be equipped with a childproof, non-clogging, removable, trash rack for all openings larger than twelve inches (12") in diameter.
- f. All pipes through earthen embankments shall be of a type which watertight joint systems are available. Outfall pipes and culverts shall be reinforced concrete unless otherwise approved by the Township Engineer.

## 503 - C - SUBSURFACE DISPOSAL / RETENTION BASIN SYSTEMS

### 1. GENERAL REQUIREMENTS

Subsurface disposal or surface infiltration of stormwater shall be allowed only where the applicant demonstrates that soils in that area are suitable for such control measures. Test pits shall be required to establish a soil profile which shall identify any potential limiting zones such as seasonal high water table, rock presence, spring activity, sinkholes, etc. Soil testing shall also be performed to determine permeability or percolation rates at locations where subsurface facilities are planned. All percolation tests shall be conducted in accordance with the Pennsylvania Department of Environmental Protection, rules and regulations regarding subsurface disposal of wastewater. Tests shall be performed by a representative of the Township Engineer as directed by the Township, or an individual certified to perform such tests in which case the tests will be observed by the Township Engineer. The Township reserves the right disallow the use of subsurface disposal or retention basin systems in areas which are deemed to be unsatisfactory.

### 2. DESIGN CRITERIA

Various methods of subsurface disposal may be utilized, based on the applicability and efficiency of each. Acceptable methods include but are not limited to infiltration trenches, basins, and/or seepage beds and the like. In all instances, the applicant shall provide calculations to verify that facility is sized correctly to control stormwater runoff. Where required by the Township Engineer infiltration / permeability rates shall be accounted for in the design of subsurface disposal or retention basins.

- a. Design criteria for subsurface disposal shall be that adequate storage capacity shall be provided to accommodate the increase in runoff volume over the area in which ground cover is affected by development for a fifty (50) year frequency storm. Increase in runoff volume shall be calculated by determining the runoff depth for "pre" and "post" development conditions. The methodology shall be as required under stormwater management facilities.
- b. Additional design criteria for retention basins shall be the same as for detention basins.

### 3. INSTALLATION REQUIREMENTS

The following procedures and materials shall be required for all subsurface facilities:

- a. Excavation for infiltration facility shall be performed with equipment which will not compact the bottom of the seepage bed, infiltration trench or like facility.
- b. The bottom of the bed or trench shall be roughened prior to placement of aggregate.
- c. Only clean, open graded aggregate, free of fines, shall be used in subsurface systems.
- d. The top, sides, and bottom of all seepage beds, infiltration trenches, or like facilities shall be covered with a drainage filtration fabric which meets the requirements of the Pennsylvania Department of Transportation, Publication 408 for Class I Geofabrics.
- e. All pipes leading into subsurface drainage systems shall be equipped with screening devices to prevent debris from entering the system.
- f. The bottom of all subsurface disposal or retention basin systems shall be a minimum of twelve (12) inches above the limiting zone as established by the site specific soil profile. Depths of less than twelve (12) inches above the limiting zone will only be allowed where the developer provides a written report certified by a registered professional engineer, geologist, or hydrogeologist, which certifies that the condition will not create an environmental hazard.
- g. Inspection points, cleanouts and overflow facilities shall be provided for subsurface disposal systems.
- h. All subsurface stormwater disposal systems or retention basins shall be located a minimum of 100 feet from any potable water wells.

The Owner or developer shall be responsible for the proper installation, operation, and maintenance of all subsurface stormwater disposal facilities. If, in the opinion of the Township, the system is not functioning properly, the developer or Owner shall be required to make necessary improvements and/or corrections or provide a new alternate facility which does function properly. Ownership and Maintenance shall be the same as under Stormwater Management Facilities.

### 503 - D - BASINS WITH PERMANENT POOLS (WET BASINS)

1. Basins designed to have a permanent pool of water stored in the reservoir shall conform to the design standards of detention or retention basins. Where deemed to be necessary, after consulting with the Township Engineer, the Township may impose additional criteria for design and construction of wet basins. Earthen embankment designs shall be sealed by a registered professional engineer experienced in such design.
2. Embankments shall have a slope not exceeding 4 horizontal to 1 vertical.
3. Adequate stabilization shall be provided to control anticipated wave action.

### 504 - EROSION AND SEDIMENT POLLUTION CONTROL

#### 504 - A - GENERAL REQUIREMENTS

Where required by the Township, all earth moving activities, as identified in this Ordinance, shall be reviewed and approved by the Adams County Soil Conservation District. In addition, a copy of the Erosion Control Plan shall be submitted as part of the Grading Plan to the Township Engineer for review and comment. Approval of the Erosion Control Plan is required prior to approval of the Stormwater Management Plan.

#### 504 - B - DESIGN CRITERIA

Design criteria and drawing requirements shall conform to the Pennsylvania Department of Environmental Protection, Soil Erosion and Sedimentation Control Manual, and as supplemented by the Adams County Conservation District and the Township Engineer. The following practices shall be incorporated (at a minimum) into the Erosion Control Plan:

1. Silt fences shall be utilized in lieu of strawbale silt barriers and shall be securely anchored in place.
2. Temporary and permanent seeding and mulch specifications shall be noted on all plans. The specifications shall include lime and fertilizer, rates of application and other provisions regarding stabilization procedures and materials.
3. Stone base course for driveways, roadways, streets, and parking lots shall be placed as soon as possible to prevent soil erosion of the subgrade.
4. Temporary vegetation, mulching, sodding or other measure shall be used to protect critical areas during construction. (Critical areas are those areas where the soil is extremely vulnerable to soil erosion.)

5. Stripping of vegetation, regrading or other development shall be done in such a way that will minimize soil erosion.
6. Earthmoving activities shall be minimized where possible and practical to preserve desirable natural features and the topography of the site.
7. Disturbed areas shall be stabilized with vegetation, mulch, erosion control fabric, and the like as soon as possible following completion of earthmoving activities.

If a conflict arises between this Ordinance and Soil Conservation District requirements, the more stringent of the two shall apply.

#### **505 - EASEMENTS**

Easements shall be provided where stormwater or surface water drainage facilities are existing or proposed, whether located within or beyond the boundaries of the property. Easement for maintenance of pipes and culverts shall run from outlet to inlet. Swales which receive runoff from more than one lot must be provided with an easement.

The plan shall comply with the requirements of the Township Subdivision and Land Development Ordinance and shall be adequately designed to provide area for (1) the collection and discharge of water, (2) the maintenance, repair, and reconstruction of the drainage facilities and, (3) the passage of machinery for such work.

Easements shall include a description of an ownership and maintenance program, in a recordable form, that clearly sets forth responsibility for all temporary and permanent storm water management facilities. In the case of Lot Boundaries in Subdivisions, it shall be the property owners responsibility to maintain adequate drainage from the property to the point of access to the public right-of-way or to privately owned storm sewer drainage facilities.

#### **506 - FLOODPLAINS**

- A. All storm water management plans shall conform with the Floodplain Standards specified in other applicable Township Ordinances, Regulations, or codes.
- B. The downstream toe of any embankments shall be located outside of any designated floodway. In the absence of a designated floodway the toe of the embankment shall be located a minimum of sixty (60) feet from the top of any stream bank.

C. Where the embankment of any stormwater management facility is shown to be located within a designated floodplain as indicated on the Township Flood Insurance Rate Map, the following additional information shall be provided.

1. Calculations shall be submitted to verify that the emergency spillway will be capable of passing the 100 year flood flows associated with the floodplain as referenced from the Flood Insurance Rate Map as prepared by the Federal Emergency Management Agency or in the absence of detailed flow data in the Federal Emergency Management Agency Study, the applicant shall submit calculations, as prepared by a registered Professional Engineer, to substantiate such design. The calculations shall be reviewed by the Township Engineer. If determined to be necessary by the Township to protect downstream property, such calculations shall include a dam breach analysis prepared in accordance with criteria established by the Pennsylvania Department of Environmental Protection, Bureau of Waterways Engineering. In addition, the Township may refer such design to the Pennsylvania Department of Environmental Protection where determined to be necessary.
2. Design drawings sealed by a registered Professional Engineer which indicate protection from flood flows associated with the 100 year flood plain.
3. All requirements of the Township subdivision and land development ordinance relating to structures within flood plains shall be met.
4. Calculations to indicate that the embankment will not cause an increase in 100 year flood water surface elevation.
5. Slope protection shall be incorporated into all embankments, for earthen embankments this may include keyed rip-rap, geogrid, or other approved method. Design of such stabilization shall be certified by a registered geo-technical engineer.

## ARTICLE VI - ADMINISTRATION

### 601 - INSPECTION REQUIREMENTS

- A. In the case of a subdivision or land development which is being administered under the Subdivision and Land Development Ordinance, inspection shall be coordinated with the inspection of other improvements.

Inspections shall be required prior to the start of construction, during installation of materials and structures, and upon the completion of all improvements. Prior to the initiation of construction, the developer shall arrange a pre-construction meeting with the Township Engineer so that an inspection schedule can be coordinated with the construction schedule. The Township Engineer shall be notified a minimum of two (2) working days in advance of any intended date of construction or as a final inspection of the construction. The Township shall inspect all phases of the Land Disturbance Activity including, but not limited to, the following:

1. Prior to the start of any Land Disturbance Activity.
  2. During construction of the permanent stormwater management facilities at such times as specified by the Township.
  3. Upon installation of permanent stormwater management facilities.
  4. Upon completion of any final grading, vegetative control measures or other site restoration work done in accordance with the permit.
  5. At other times as deemed necessary by the Township Engineer.
- B. No work shall begin on a subsequent phase until the preceding phase has been inspected and approval has been noted on the permit.
- C. Any portion of the work which does not comply with the approved plan must be corrected by the applicant. No work may proceed on any subsequent phase until the required corrections have been made.
- D. Inspection shall occur during the first year of operation and periodically thereafter at the discretion of the Township.
- E. No person shall interfere with or obstruct the ingress or egress to or from any site or premises by an authorized agent of the Township engaged in the inspection of work for compliance with the approved Stormwater Management Plan.

## **602 - AS-BUILT DRAWINGS**

Upon completion of all required improvements the applicant shall submit an as-built plan showing the location, dimension and elevation of all stormwater management facilities. In addition, the plan shall indicate that the resultant grading, drainage structures and/or drainage systems, and erosion and sediment control practices, including vegetative measures, are in substantial conformance with the previously approved drawings and specifications. The applicant's engineer shall certify that the construction of the stormwater management facilities were completed in accordance with the plans and specifications as approved by the Township including a certified volume of detention and retention basins in which case a stage vs. storage table shall be shown on the as-built plan. Two (2) copies of the plan shall be submitted, one (1) for the Township's files and one (1) for the Township Engineer.

## **603 - GUARANTEES**

### **603 - A - PERFORMANCE GUARANTEES**

The Township may, prior to approving a Storm Water Management Plan, require a Performance Guarantee for installation of stormwater management facilities.

Where required, the developer shall file with the Board of Supervisors, financial security in an amount sufficient to cover the costs of the stormwater management facilities. The administration of the financial security shall comply with the financial security provisions of the Berwick Township Subdivision and Land Development Ordinance.

### **603 - B - MAINTENANCE GUARANTEES**

At the time a Stormwater Management Plan is submitted for review by the Township, the ownership and maintenance responsibilities of all temporary and permanent stormwater management and soil erosion and sedimentation control facilities shall be clearly defined on the plan.

In all instances maintenance of all stormwater management facilities during development and until completion of construction shall be the sole responsibility of the developer and shall include but not be limited to:

1. Removal of silt from all basins, traps or other structures or measures when thirty percent (30%) of capacity is filled with silt;
2. Periodic maintenance of temporary control facilities as described in the soil erosion and sedimentation control plan such as replacement of silt fencing, straw filters, or similar measures;



3. Establishment or re-establishment of vegetation by seeding and mulching or sodding of scoured areas or areas where vegetation has not successfully been established.
4. Installation of necessary controls to correct unforeseen problems caused by storm events within designed frequencies.
5. Removal of all temporary measures and installation of permanent measures upon completion of the project.
6. Requirements of the Pennsylvania Department of Environmental Protection, Chapter 102 Regulations.

Ownership of all stormwater management facilities after construction shall be the sole responsibility of the developer or the private landowner as set forth in the plan. The only stormwater management facilities which are to be controlled by the Township shall be those facilities which have been offered for dedication and accepted for dedication by the Township. Future offers for dedication can only be made for facilities which meet Township specifications.

#### **603 - C - PRIVATE FACILITIES**

1. Prior to the approval of any stormwater management plan, the Township shall require the applicant or owner to execute an inspection and maintenance agreement binding on all subsequent owners of land served by the private stormwater facility. Such agreement shall provide for access to the facility at reasonable times for regular inspection by the Township or its authorized representative and for regular or special inspections of stormwater facilities to ensure that the facility is maintained in proper working condition to meet the approved design standards and any provisions or conditions established by the Township.
2. All executed Agreements shall be approved by the Township Solicitor and shall be recorded by the applicant or owner in the land records of Adams County. Proof of recording shall be submitted to the Township by the Developer prior to issuance of a permit.
3. The owner of the property on which work has been done pursuant to this Ordinance for private stormwater facilities or any other person or agent in control of such property shall maintain same in good condition and promptly repair and restore all grade surfaces, walls, drains, dams and structures, vegetation, erosion and sedimentation control measures, and other protective device. Such repair, restoration, and maintenance shall be in accordance with approved plans.

4. A maintenance schedule shall be developed for the life of any private stormwater management facility and shall state the maintenance to be completed, the time period for completion, and who shall perform the maintenance. This maintenance schedule shall be printed on the stormwater management plan.
5. The agreement shall also provide that, if after notice by the Township to correct a violation requiring maintenance work and satisfactory corrections are not made by the owner(s) within a reasonable period of time (30 days maximum), the Township may perform all necessary work to place the facility in proper working condition. The owner(s) of the facility shall be assessed the cost of the work and any penalties as defined under this Ordinance

#### 603 - D - PUBLIC FACILITIES

It is the intent of these regulations to provide private ownership of stormwater management facilities, and under no circumstances does the Township intend to accept dedication of Erosion Control Facilities. For facilities to be located within existing or proposed public rights-of-way, which are part of a Subdivision or Land Development, the procedure for dedication of improvements as outlined in the Subdivision and Land Development Ordinance shall be followed. The Township does not encourage dedication of stormwater management facilities that are to be located outside of a public right - of - way however, stormwater management facilities, excluding infiltration structures, may be accepted for dedication by the Township, subject to agreement by the Township and after the following requirements have been met:

1. Facilities shall be accepted one year after eighty (80%) percent of the houses in the development are completed, but no sooner than two years after completion of the stormwater management facilities. At the end of this interim period, the Township shall inspect the facilities to ascertain that construction is in proper operating condition in accordance with approved plans. Any deficiency noted shall be corrected by the Owner prior to acceptance by the Township.
2. A deed in fee to the Township shall be executed, which must include a minimum ten (10) foot wide perpetual easement for sufficient access to the structure from a public road or a width as determined by the Township to be necessary to provide adequate access. The deed in fee shall also include sufficient maintenance area surrounding the stormwater facilities.
3. The Developer shall be responsible for maintenance of the stormwater management facilities prior to acceptance by the Township. A security deposit in an amount satisfactory to the Township shall be supplied to assure proper maintenance.

4. Prior to acceptance by the Township, the Developer shall deposit with the Township sufficient monies to underwrite the perpetual maintenance, and repair of the stormwater management facilities, including access driveways. The dollar amount of the escrow funds shall be recommended by the Township Engineer and fixed by Resolution adopted by Township Supervisors.
5. All easements and agreements including security deposit agreements shall be subject to approval by the Township Solicitor.
6. The Township shall reserve the right to refuse acceptance of such facilities.
7. Prior to acceptance for dedication, the developer may be required to provide a maintenance bond in the format as required in the Township's Subdivision and Land Development Ordinance.

#### **604 - REMEDIES**

Any person, partnership or corporation who being the owner of land on which a Land Disturbance Activity for which a stormwater management plan is required, as defined in this Ordinance, has occurred or is engaged in shall comply with the provision of this Ordinance and the approved Storm Water Management Plan. Any Land Disturbance conducted in violation of this Ordinance or the approved Storm Water Management Plan is hereby declared a public nuisance.

In the event of a violation, Berwick Township may initiate the following actions:

#### **604 - A - SUSPENSION OF A STORMWATER MANAGEMENT PERMIT**

Any permit issued under this Ordinance may be suspended by the Township based upon the following. Under the suspension of an approval, only such work as the Township so authorized may proceed. This work shall be limited to that which is necessary to correct the violation.

1. The noncompliance with or failure to implement any provision of the Stormwater Management Plan.
2. A violation of any provision of this Ordinance relating to the project.
3. The creation of any condition or the commission of any act during construction which constitutes or creates a hazard or nuisance or which endangers the life or property of others.

4. A suspended approval shall be reinstated by the Township when:
  - a. The Township has inspected and approved the corrections to the stormwater management facilities or the elimination of the hazard or nuisance, and
  - b. The Township is satisfied that the violation of the Ordinance has been corrected.
5. A permit will not expire while under suspension or noncompliance exists with the permit.

**604 - B - REVOCATION OF A STORMWATER MANAGEMENT PLAN APPROVAL**

1. Based upon a report from the Township Engineer that the existing site condition or further construction is likely to endanger property or create hazardous conditions, the Township may:
  - a. Revoke an approval.
  - b. Require protective measures to be taken and assign a reasonable time period for the necessary action.
  - c. Authorize protective measures to be done and lien all cost of the work against the property on which work is required.
2. An approval which has been revoked cannot be reinstated. The applicant may apply for a re-approval in accordance with the processing procedures listed in this Ordinance.
3. In the event of a suspension or revocation of an approved Storm Water management Plan, the Township shall provide written notification of the violation to the landowner and/or applicant at his last known address. Such notification shall:
  - a. Cite the specific violation, describe the requirements which have not been met, and cite the provisions of the Ordinance relied upon.
  - b. Identify the specific protective measures to be taken.
  - c. Assign a reasonable time period necessary for action or in the case of revocation, identify if the Township has authorized protective measures to be performed at cost to the landowner.
  - d. Identify the right to request a hearing before the Board of Supervisors if aggrieved by the suspension or revocation.

## 604 - C - CIVIL REMEDIES

Suits to restrain, prevent, or abate a violation of this Ordinance may be instituted in equity or at law by the Township. Such proceedings in equity or law may be initiated before any court of competent jurisdiction.

In cases of emergency where, in the opinion of the court, the circumstances of the case require immediate abatement of the unlawful conduct, the court may, in its decree, fix a reasonable time during which the person responsible for the unlawful conduct shall correct or abate the same. The expense of such proceedings shall be recoverable from the violator in such manner as may now or hereafter be provided by law.

## 605 - PENALTIES

Any person who shall violate any of the provisions of this Ordinance, or who shall fail to comply with any written notice from Berwick Township which describes a condition of non-compliance, shall be guilty of a summary offense, and upon conviction thereof, shall be subject to a fine payable to Berwick Township of not more than one thousand (\$1,000) dollars for each violation, recoverable with cost. In default of payment of the fine, such person shall be liable to imprisonment for not more than thirty (30) days. A new and separate violation shall be deemed to be committed for each day after receipt of the aforesaid notice that such violation exists.

In addition, the Township may institute injunctive, or any other appropriate action or proceeding of 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, writs, or other appropriate forms of remedy or relief.

## 606 - LIABILITY

Neither approval of a stormwater management plan nor compliance with the provisions hereto or any conditions imposed by the municipality shall relieve any person from any responsibility for damages otherwise imposed by law, nor impose any liability upon Berwick Township or its officers, appointed professionals, and employees for damages to persons or property.

## 607 - FEES AND EXPENSES

- A. Fees covering the cost to the Township for plan reviews, plan approval, and inspections shall be established by resolution of the Board of Supervisors. Fees shall be related to the Engineering, legal and Administrative costs incurred by the Township. Approval to begin any work shall not be issued until all the required fees have been paid. Fees payable by an applicant shall at a minimum cover:

1. Review of the stormwater management/erosion and sedimentation control plan.
  2. Site inspections.
- B. In addition to the fees required in subsections A.1 and A.2. of this Section, the applicant shall deposit with the Township, before a plan is finally approved, a sum set by resolution. The sum deposited by the applicant shall be used by the Township to cover the following costs:
1. Inspection of required controls and improvements during construction
  2. Final inspection upon completion of the controls and improvements required in the plan
  3. Any additional work required to enforce the conditions of the approved plan, correct violations, and assure the completion of stipulated remedial actions
- C. Any additional costs incurred by the Township in the administration of this Section not paid by the applicant pursuant to the previous conditions shall be charged to the applicant and shall be paid promptly by the applicant.
- D. Upon completion of construction of stormwater management facilities and upon final approval thereof by the Township Engineer, any monies in excess of Township cost or expenses deposited by the applicant, shall be refunded to the applicant.

#### 608 - PAYMENTS IN LIEU OF STORMWATER MANAGEMENT FACILITIES

- A. Where the applications of the standards and requirements of this Ordinance would result in unique and undue hardship to a particular applicant, person, or particular site or where the Township Engineer and Board of Supervisors determine that the intent of this Ordinance would better be accomplished, the Township may, in its sole discretion, require the payment of a fee in lieu of compliance with the provisions of this Ordinance.

In determining whether a fee may be imposed by the Township in lieu of compliance with the provisions of this Ordinance, the Township shall consider, where relevant, the following criteria:

1. The amount of impervious area to be added to the site.
2. The relationship of such impervious areas to property lines.
3. The area available for on-lot stormwater management facilities.

4. The capacity and condition of receiving channels.
  5. The location of existing or proposed stormwater management facilities which would affect, or be affected by development of the site.
  6. Such other information as the person proposing development or the Township may deem relevant.
- B. Where it has been determined by the Township that a fee may be paid in lieu of compliance with the provisions of this Ordinance, the following procedures shall be followed:
1. The amount of the fee, as established by resolution of the Board of Supervisors, shall be for each square foot of impervious material to be added to the site.
  2. The fee must be paid to the Township prior to issuance of any building or other permits.
  3. All money paid to the Township in this manner shall be kept in a capital reserve fund established as provided by law. Money in such capital reserve fund must be used only for the acquisition of land, construction of facilities, or maintenance of facilities for stormwater management purposes.
  4. Funds collected pursuant to this Section shall be designated as collected from the watershed in which the proposed development is to occur and shall be used for improvements in that watershed.
  5. The provisions of these regulations governing the setting and collection of fees in lieu of construction of stormwater management facilities shall not be utilized until the Township has established a capital reserve fund.

#### 609 - SEVERABILITY

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

ARTICLE VII - ENACTMENT

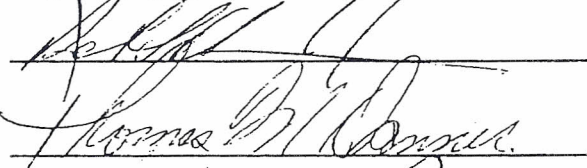
This Stormwater Management Ordinance shall become effective on 5 days After Adoption, and shall remain in force until modified, amended, and/or rescinded by the Board of Supervisors of Berwick Township, Adams County, Pennsylvania. Enacted and Ordained this 28<sup>th</sup> day of September,

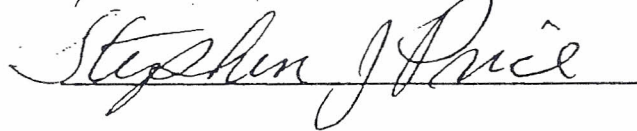
BERWICK TOWNSHIP

BOARD OF SUPERVISORS

  
\_\_\_\_\_  
CHAIRMAN

  
\_\_\_\_\_  
VICE - CHAIRMAN

  
\_\_\_\_\_

  
\_\_\_\_\_

ATTEST:

  
\_\_\_\_\_  
SECRETARY



BERWICK TOWNSHIP, ADAMS COUNTY, PENNSYLVANIA  
APPLICATION FOR STORMWATER MANAGEMENT PERMIT

1. DATE: \_\_\_\_\_

2. PROJECT NAME: \_\_\_\_\_

Commercial / Residential / Industrial          Acres          No. Lots

3. DEVELOPER: \_\_\_\_\_  
Name / Address / Phone

4. STORMWATER MANAGEMENT PLAN PREPARER: \_\_\_\_\_  
Name / Address / Phone

5. LOCATION OF PROJECT: \_\_\_\_\_  
(incl. watershed) \_\_\_\_\_

6. APPLICATION FEE (Per Township Fee Schedule):

ADMINISTRATIVE \_\_\_\_\_

ENGINEERING / LEGAL \_\_\_\_\_

7. SUBMITTED BY (Signature): \_\_\_\_\_  
Name / Title

FOR TOWNSHIP USE ONLY

File No.: \_\_\_\_\_ Date of Receipt / Filing: \_\_\_\_\_

Accepted by: (Signature): \_\_\_\_\_  
Name / Title

Remarks: \_\_\_\_\_  
\_\_\_\_\_



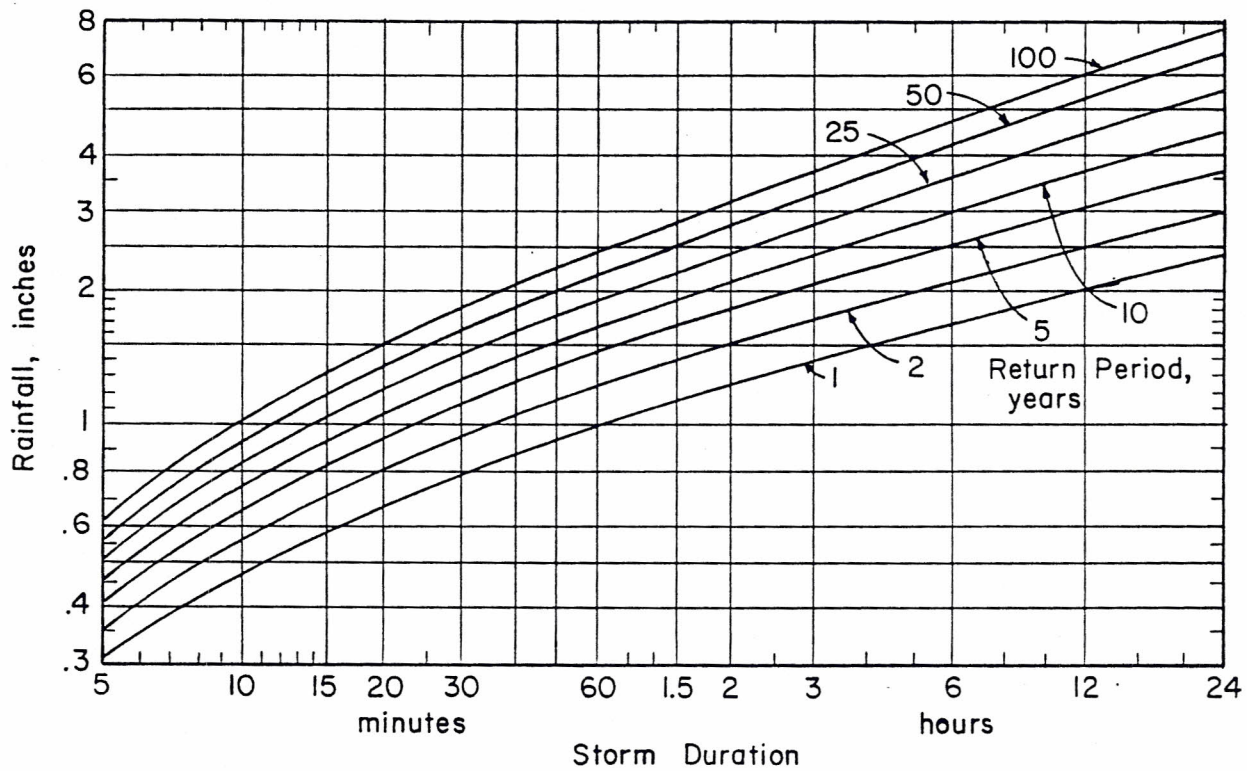
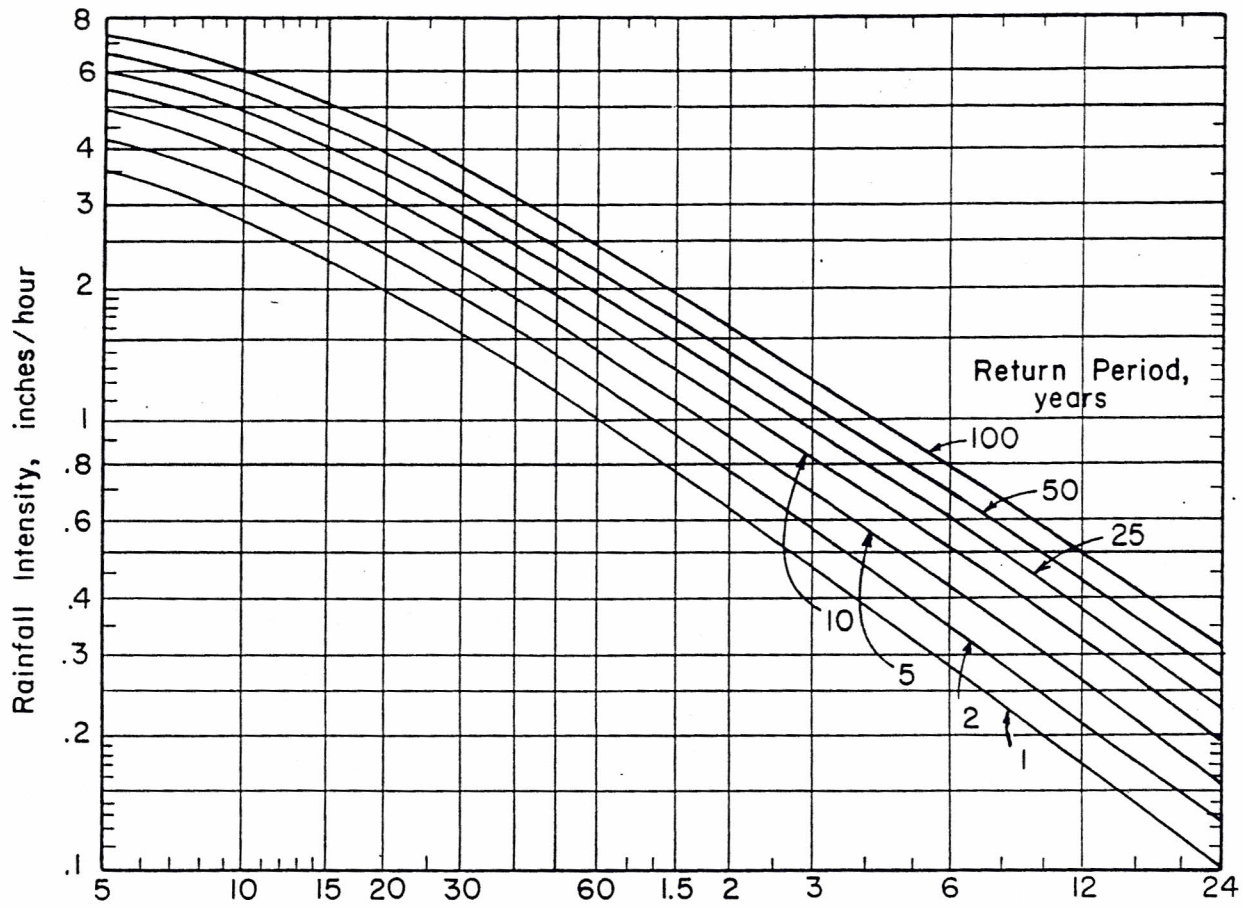
### Typical Composite Runoff Coefficients, by Land Use\*

Description of Area (1)	Runoff Coefficients (2)
Business	
Downtown	0.70 to 0.95
Neighborhood	0.50 to 0.70
Residential	
Single Family	0.30 to 0.50
Multi-units, detached	0.40 to 0.60
Multi-units, attached	0.60 to 0.75
Residential (suburban)	0.25 to 0.40
Apartment	0.50 to 0.70
Industrial	
Light	0.50 to 0.80
Heavy	0.60 to 0.90
Parks, cemeteries	0.10 to 0.25
Playgrounds	0.20 to 0.35
Railroad yards	0.20 to 0.35
Unimproved	0.10 to 0.30

### Normal Range of Runoff Coefficients\*

Character of Surface (1)	Runoff Coefficients (2)
Pavement	
Asphalt and Concrete	0.70 to 0.95
Brick	0.70 to 0.85
Roofs	0.75 to 0.95
Lawns, Sandy Soil	
Flat (2 percent)	0.05 to 0.10
Average (2 to 7 percent)	0.10 to 0.15
Steep (>7 percent)	0.15 to 0.20
Lawns, Heavy Soil	
Flat (2 percent)	0.13 to 0.17
Average (2 to 7 percent)	0.18 to 0.22
Steep (>7 percent)	0.25 to 0.35

\*The range of "C" values presented are typical for return periods of 2-10 years. Higher values are appropriate for larger design storms.



Rainfall intensity-duration-frequency curves

STORM WATER MANAGEMENT PERMIT  
LAND DISTURBANCE ACTIVITY

BERWICK TOWNSHIP  
ADAMS COUNTY, PENNSYLVANIA

PERMIT NO. \_\_\_\_\_

The property of \_\_\_\_\_  
located at \_\_\_\_\_  
has received approval of the storm water management plans dated \_\_\_\_\_  
\_\_\_\_\_, last revised \_\_\_\_\_, in accordance with the  
Berwick Township Storm Water Management Ordinance.

Approved By: \_\_\_\_\_  
Date: \_\_\_\_\_

Expiration Date: \_\_\_\_\_

SCHEDULE OF INSPECTIONS

Approved

Date

During construction of the following specific storm water  
management facilities:

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

\_\_\_\_\_ Upon installation of all permanent storm water  
management facilities.

\_\_\_\_\_ Final grading, vegetative control measures, or other  
site restoration work.

**A RESOLUTION OF THE TOWNSHIP OF BERWICK, ADAMS COUNTY,  
PENNSYLVANIA, ESTABLISHING FEES FOR THE SUBMISSION,  
ADMINISTRATIVE PROCESSING, AND ENGINEERING AND LEGAL REVIEW OF  
STORMWATER MANAGEMENT PLANS.**

BE IT RESOLVED, that from on and after the date of the adoption of this resolution, the following fees shall be charged for the services specified below:

1. The fee for copies of the stormwater management ordinance shall be \$10.00 per copy.
2. The filing fee for consideration of a stormwater management plan shall be broken into categories based upon the type of development proposed. In all instances, the monies shall either be deposited with the Township or an escrow account established prior to the Townships consideration of the Plan.

**Category I Residential Development:**

<u>Number of lots or dwelling units</u>	<u>General Fee</u>	<u>Deposit for Consultants' ** and legal review fees</u>
1	\$ 50.00	\$ 200.00
2 - 5	\$ 50.00	\$ 400.00
6 - +	\$ 50.00	\$ 700.00

**Category II Non-Residential Development:**

<u>Number of lots</u>	<u>General Fee</u>	<u>Deposit for Consultants' ** and legal review fees</u>
1	\$ 50.00	\$ 500.00
2 - 5	\$ 50.00	\$ 700.00
6 - +	\$ 50.00	\$ 1,000.00

\* Any unused portions of the deposit for consultant's review fees shall be returned to the applicant following approval or disapproval of the Stormwater Management Plan. In the event that the actual amount for engineering and legal review fees exceeds the amount of the deposit, the applicant shall reimburse the Township an amount equal to the increased fee.

\*\* In instances, where determined by the Township that the project is of a nature that additional monies will be required, the Township reserves the right to require such additional fees in an amount determined by the Township following review with the Township Engineer and/or Solicitor.

3. The developer or subdivider shall pay the ordinary and customary hourly rate charged to the Township for review and comment on the plan(s) by any consultant the Township deems necessary to review said plan(s). Said charge shall be for time devoted by said consultant on the requested review. The rate charged shall not exceed the rate charged by the consultant to the Township for other work performed at the Township's request for which there is no outside reimbursement. Such costs shall include, but not be limited to:
  - a. Reviewing the plan for conformance to the provisions of the codes and ordinances of the Township.
  - b. Site inspection for conformance to topographic survey.
  - c. Reviewing cost estimates of required improvements.
  - d. Such other fees which shall be sufficient to cover the cost of all necessary reviews by the Township's consultants.

The definition of "consultant" shall include the services of the Township Solicitor, Engineer or other professional or specialist whose services the Township deems necessary to the review of any land development or subdivision plan.

4. In all instances, any outstanding fees shall be paid prior to the release of the signed stormwater management plan or permit by the Township to the developer/subdivider.
5. The developer/subdivider shall be obligated to pay any engineering fees incurred for inspecting and approving final construction pursuant to the Berwick Township Stormwater Management Ordinance and the Pennsylvania Municipalities Planning Code. An escrow or deposit in the amount estimated by the Township Engineer shall be submitted to the Township to be applied to the cost of inspection fees. The escrow/deposit shall be submitted at such time that the approved Stormwater Management Plan or Permit is released to the Developer. Any remaining deposit monies for engineering and legal review fees may be used towards the inspection fee deposit. Any unused portion of the deposit for inspection fees shall be returned to the applicant at such time that construction of improvements is completed and/or accepted for dedication by the Township. In the event the actual amount of inspection fees exceeds the amount of the deposit, the applicant shall reimburse the Township an amount equal to the increased fee or shall be required to submit additional deposit monies in advance of inspection. In the event that the cost of inspection is anticipated to be significantly greater than the amount of deposit required, the Township may require the estimated total inspection fee be submitted or included in the performance bond to be submitted by the applicant.
6. All Ordinances or parts of Ordinances, Resolutions or parts of Resolutions inconsistent herewith are expressly repealed.

APPROVED THIS \_\_\_\_\_ DAY OF \_\_\_\_\_, 1998

\_\_\_\_\_ TOWNSHIP

\_\_\_\_\_  
Secretary - Treasurer