STORMWATER MANAGEMENT ORDINANCE

ORDINANCE NO. 5 of 2011

MUNICIPALITY OF

WHARTON TOWNSIP

FAYETTE COUNTY, PENNSYLVANIA

Adopted at a Public Meeting Held on

November 07, 2011

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ARTICLE I - GENERAL PROVISIONS

Section 101. Short Title

This Ordinance shall be known and may be cited as the Wharton Township Stormwater Management Ordinance."

Section 102. Statement of Findings

The governing body of the Municipality finds that:

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

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

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

D. Federal and state regulations require certain municipalities to implement a program of stormwater controls. These municipalities are required to obtain a permit for stormwater discharges from their separate storm sewer systems under the National Pollutant Discharge Elimination System (NPDES).

Section 103. Purpose

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

A. Meet legal water quality requirements under state law, including regulations at 25 Pa. Code Chapter 93 to protect, maintain, reclaim and restore the existing and designated uses of the waters of this Commonwealth.

B. Preserve the natural drainage systems as much as possible.

C. Manage stormwater runoff close to the source.

D. Provide procedures and performance standards for stormwater planning and management.

E. Maintain groundwater recharge, to prevent degradation of surface and groundwater quality and to otherwise protect water resources.

F. Prevent scour and erosion of stream banks and streambeds.

G. Provide proper operations and maintenance of all permanent Stormwater Management (SWM) Best Management Practices (BMPs) that are implemented within the Municipality.

H. Provide standards to meet NPDES permit requirements.

I. Encourage the provision or upgrade of stormwater BMPs for existing development.

Section 104. Statutory Authority

A. Primary Authority:

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

B. Secondary Authority:

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

Section 105. Applicability

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

Section 106. Repealer

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

Section 107. Severability

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

Section 108. Compatibility with Other Ordinance Requirements

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

ARTICLE II - DEFINITIONS

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

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

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

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

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

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

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

Buffer, Stream Buffer, Riparian Buffer, or Aquatic Buffer – An area of permanent native vegetation, including trees, shrubs, and herbaceous vegetation, that exists or is established to protect a stream system, lake, reservoir, or costal estuarine area.

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 Regulations promulgated under 25Pa. Code 102.

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

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

DEP - The Pennsylvania Department of Environmental Protection.

Development Site (Site) - See Project Site.

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

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

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

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

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

FEMA – Federal Emergency Management Agency

Floodplain - Any land area susceptible to inundation by water from any natural source or delineated by applicable FEMA maps and studies as being a special flood hazard area. Included are lands adjoining a river or stream that have been or may be expected to be inundated by a 100-year flood. Also included are areas that comprise Group 13 Soils, as listed in Appendix A of the Pennsylvania Department of Environmental Protection (PADEP) Technical Manual for Sewage Enforcement Officers (as amended or replaced from time to time by PADEP).

Floodway - The channel of the watercourse and those portions of the adjoining floodplains that are reasonably required to carry and discharge the 100-year flood. Unless otherwise specified, the boundary of the floodway is as indicated on maps and flood insurance studies provided by FEMA. In an area where no FEMA maps or studies have defined the boundary of the 100-year

floodway, it is assumed - absent evidence to the contrary - that the floodway extends from the stream to 50 feet from the top of the bank of the stream.

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

Hydrologic Soil Group (HSG) - Infiltration rates of soils vary widely and are affected by subsurface permeability as well as surface intake rates. Soils are classified into four HSG's (A, B, C, and D) according to their minimum infiltration rate, which is obtained for bare soil after prolonged wetting. The NRCS defines the four groups and provides a list of most of the soils in the United States and their group classification. The soils in the area of the development site may be identified from a soil survey report that can be obtained from local NRCS offices or conservation district offices. Soils become less pervious as the HSG varies from A to D (NRCS [3,4])

Impervious Surface (Impervious Area) - A surface that prevents the infiltration of water into the ground. Impervious surfaces (or areas) shall include, but not be limited to, roofs, additional indoor living spaces, patios, garages, storage sheds and similar structures, and any new streets or sidewalks. Decks, parking areas, and driveway areas are not counted as impervious areas if they do not prevent infiltration.

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

Land Development (Development) – Inclusive of any or all of the following meanings:

- (i) the improvement of one lot or two or more contiguous lots, tracts, or parcels of land for any purpose involving (a) a group of two or more buildings or (b) the division or allocation of land or space between or among two or more existing or prospective occupants by means of, or for the purpose of streets, common areas, leaseholds, condominiums, building groups, or other features; (ii) any subdividion of land; (iii) development in accordance with Section 503(1.1) of the PA Municipalities Planning Code.

Municipality - (Wharton Township), (Fayette) County, Pennsylvania,.

NRCS – USDA Natural Resources Conservation Service (previously SCS).

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

Pervious Area – Any area not defined as impervious.

Project Site - The specific area of land where any Regulated Activities in the Municipality are planned, conducted, or maintained.

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

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

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

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

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. The probability of a 25-year storm occurring in any one year is 0.04 (i.e. a 4% chance).

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

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

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

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

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

Stormwater Management Plan - The Fayette County Stormwater Management Plan for managing storm water runoff adopted by the County of Fayette, PA as required by the Act of October 4, 1978, P.L. 864, (Act 167), as amended, and known as the "Storm Water Management Act".

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

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

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

Stream – For purposes of administration of this Ordinance (other regulatory Agencies such as the United States Army Corps of Engineers may have a different definition), a stream is defined as a perennial and/or intermittent watercourse identified through site inspection and U.S. Geological Survey (USGS) maps. Perennial streams are those which are depicted on a USGS map with a solid blue line. Intermittent streams are those which are depicted on a USGS map with a dotted blue line.

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

USDA – United States Department of Agriculture.

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

Watershed - Region or area drained by a river, watercourse or other surface water of the Commonwealth.

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.

ARTICLE III - STORMWATER MANAGEMENT STANDARDS

Section 301. General Requirements

A. For all Regulated Activities, unless preparation of a SWM Site Plan is specifically exempted in Section 302:

1. Preparation and implementation of an approved SWM Site Plan is required.

2. No Regulated Activities shall commence until the municipality issues written approval of a SWM Site Plan, which demonstrates compliance with the requirements of this Ordinance.

B. SWM Site Plans approved by the Municipality, in accordance with Section 406, shall be on site throughout the duration of the Regulated Activity.

C. The Municipality may, after consultation with DEP, approve measures for meeting the State Water Quality Requirements other than those in this Ordinance, provided that they meet the minimum requirements of, and do not conflict with, State law including but not limited to the Clean Streams Law.

D. For all Regulated Activities, implementation of the Volume Controls in Section 303 is required

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

F. Impervious Areas:

1. The measurement of impervious areas shall include all of the impervious areas in the total proposed development even if development is to take place in stages.

2. For development taking place in stages, the entire development plan must be used in determining conformance with this Ordinance.

3. For projects that add impervious area to a parcel, the total impervious area on the parcel is subject to the requirements of this Ordinance; except the volume controls in Section 303 and the peak rate controls of Section 304 do not need to be retrofitted to existing impervious areas that are not being altered by the proposed regulated activity..

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

H. All regulated activities shall include such measures as necessary to:

1. Protect health, safety, and property;

2. Meet the water quality goals of this ordinance by implementing measures to:

a. Minimize disturbance to floodplains, wetlands, and wooded areas.

b. Maintain or extend riparian buffers

c. Avoid erosive flow conditions in natural flow pathways.

d. Minimize thermal impacts to waters of this Commonwealth.

e. Disconnect impervious surfaces by directing runoff to pervious areas, wherever possible.

3. To the maximum extent practicable, incorporate the techniques for Low Impact Development Practices described in *The Pennsylvania Stormwater Best Management Practices Manual* (**PA BMP** Manual)[1].

I. The design of all facilities over Karst shall include an evaluation of measures to minimize adverse effects.

J. Infiltration BMPs should be spread out, made as shallow as practicable, and located to maximize use of natural on-site infiltration features while still meeting the other requirements of this Ordinance.

K. Normally dry, open top, storage facilities should completely drain both the volume control and rate control capacities over a period of time not less than 24 and not more than 72 hours from the end of the design storm,.

L. The design storm volumes to be used in the analysis of peak rates of discharge should utilize the following: Rainfall Values:

1. Rational Method – The Pennsylvania Department of Transportation Drainage Manual, Intensity-Duration-Frequency Curves, Publication 584, Chapter 7A, latest edition, shall be used in conjunction with the appropriate time of concentration and return period.

2. NRCS Rainfall-Runoff Method – The Soil Conservation Service Type II, 24-hour rainfall distribution shall be used in conjunction with rainfall depths from NOAA Atlas 14 or be consistent with the following table:

Return Interval (Year)	24-hour Rainfall Total (inches)
2	2.47
10	3.46
25	4.08
50	4.60
100	5.13

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

N. Various BMPs and their design standards are listed in the PA BMP Manual[1].

Section 302. Exemptions

A. The following activities are specifically exempt from the plan preparation and submission provisions of this Ordinance, but remain subject to the requirements in Sections 301.E. through L. of this Ordinance (and erosion and sedimentation pollution control requirements).

1. Regulated Activities that create Disconnected Impervious Areas smaller in area than 1,000 sq. ft. and regulated activities that disturb less than 5,000 sq. ft. are exempt from the Peak Rate Control and the SWM Site Plan preparation requirement of this Ordinance. Refer to the Stormwater Management Plan (SMP) Requirements in Appendix C.

2. Regulated Activities that create Disconnected Impervious Areas equal to or greater than 1,000 sq. ft. and less than 5,000 sq. ft., and regulated activities that disturb equal to or greater than 5,000 sq. ft. and less than 20,000 sq. ft. without point source discharge to surface waters may be exempt from the peak rate control requirement of this Ordinance provided that:

a) The Regulated Activity is disconnected from impervious areas as specified in Appendix B of this Ordinance; and
b) The Regulated Activity will not alter or be located within any existing swale or drainageway.

Refer to the Stormwater Management Plan (SMP) Requirements in Appendix C.

3. Agricultural activity is exempt from the rate control and SWM Site Plan preparation requirements of this ordinance provided the activities are performed according to the requirements of 25 Pa.Code Chapter 102 Erosion and Sediment Control.

4. Forest management and timber operations are exempt from the rate control and SWM Site Plan preparation requirements of this ordinance provided the activities are performed according to the requirements of 25 Pa.Code Chapter 102 Erosion and Sediment Control.

5. Use of land for gardening for home consumption.

Exemptions from any provisions of this Ordinance shall not relieve the applicant from the requirements in Sections 301.D through L..

Section 303. Volume Controls

The low impact development practices provided in the BMP Manual shall be utilized for all regulated activities to the maximum extent practicable. Water volume controls shall be implemented using the *Design Storm Method* in Subsection A or the *Simplified Method* in Subsection B below. For Regulated Activity areas equal or less than one (1) acre that do not require hydrologic routing to design the stormwater facilities, this Ordinance establishes no preference for either methodology; therefore, the applicant may select either methodology on the basis of economic considerations, the intrinsic limitations on applicability of the analytical procedures associated with each methodology, and other factors.

A. *The Design Storm Method* (CG-1 in the **PA BMP** Manual[1]) is applicable to any size of Regulated Activity. This method requires detailed modeling based on site conditions.

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

2. For modeling purposes:

a. Existing (pre-development) non-forested pervious areas must be considered meadow or its equivalent.

b. Twenty (20) percent of existing impervious area, when present, shall be considered meadow in the model for existing conditions for redevelopment.

B. *The Simplified Method* (CG-2 in the PA BMP Manual[1]) provided below is independent of site conditions and should be used if the Design Storm Method is not followed. This method is not applicable to Activities that disturb greater than one (1) acre, or for

projects that require design of stormwater storage facilities. For new impervious surfaces:

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

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

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

4. This method is exempt from the requirements of Section 304, Rate Controls.

Section 304. Rate Controls

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

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

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

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

Section 305. Technical Design Standards

All regulated activities shall be conducted in conformance with the following standards:

A. After installation of impervious cover, peak discharges for the 2, 10, 25, 50 and 100 year frequency storms from the site shall not exceed the respective peak discharge performance standards in this ordinance.

Stormwater runoff shall be managed so that no downstream increases in flood damages or impairment of streets and other public facilities occur. The Municipality may require that downstream impacts be evaluated at critical locations such as dams, tributaries, existing developments, undersized culverts, and flood prone areas. The Municipality shall make the final determination with respect to the degree of management required for any site. The applicant shall evaluate the effects of the proposed plan on such critical locations by providing computed water surface elevations (WSEL) for the 10 and 100 year storms. Methods of computation shall have prior approval of the Municipality. At such downstream critical locations, stormwater management may be exercised by:

1. Providing off-site improvements to downstream conveyances in order to contain flow increases.

2. Providing downstream drainage easements with sufficient widths to contain the flood limits.

3. Such other methods as may be approved by the Municipality.

B. Groundwater Recharge: The Municipality may impose stormwater quality measures in accordance with this Ordinance to protect against ground or surface water pollution where the type of business or the nature of the stormwater runoff and soils underlying stormwater management facilities would constitute a substantial risk of contamination.

C. In establishing the site conditions for calculating stormwater runoff prior to development, the following assumptions shall apply:

1. Woodland or meadow in good condition shall be used for all undeveloped areas.

2. Average antecedent moisture conditions as defined by the Natural Resource Conservation Service (NRCS).

3. Determining pre-development peak discharges from Karst geologic areas apply either:
   a. Peak Adjustment Factors in accordance with the USGS Water Resources Investigations Report 00-4189, Techniques for Estimating Magnitude and Frequency of Peak Flows for Pennsylvania Streams, OR

b. Drainage area reductions equal to the area of undrained depressions or pond factor adjustments in accordance with the Urban Hydrology for Small Watersheds, Technical Release No. 55 (TR-55, USDA, NRCS).

D. Hydrologic Methods: All plans and designs for stormwater management facilities shall be prepared by an appropriately trained licensed professional and will be reviewed by the Municipality. Plans for facilities should determine stormwater peak discharge and stormwater runoff by a method acceptable to the Municipality such as that described in the PennDOT Drainage Manual, Publication Number 13, DM-2, Chapter 10, as amended or other appropriate methods as available and accepted by the municipality. The Municipality may permit the use of the Modified Rational Method or other methods for calculation of the storage capacity of a stormwater management facility from drainage areas of twenty (20) acres or less.

1. Coefficients: Acceptable runoff coefficient values for use in the Rational Method equation are identified in Appendix E, of this Ordinance. When applying the Rational Method coefficients in Table A-3, "open space" coefficients shall be used for undeveloped, densely vegetated (non-forest) areas instead of "meadow" coefficients. Refer to PennDOT Drainage Manual, Publication Number 13, DM-2, Chapter 10, as amended, for permissible curve numbers.

   The Rational Formula or other methods as may be approved by the Municipality may be used in lieu of the Soil Cover Complex Method to compute design flows for the sizing of storm sewers, inlets, and swales.

2. Rational Method – The Pennsylvania Department of Transportation Drainage Manual, Intensity-Duration-Frequency Curves, Publication 584, Chapter 7A, latest edition, shall be used in conjunction with the appropriate time of concentration and return period.

   NRCS Rainfall-Runoff Method – The Soil Conservation Service Type II, 24-hour rainfall distribution shall be used in conjunction with rainfall depths from NOAA Atlas 14 or be consistent with the following table:

Return Interval (Year)	24-hour Rainfall Total (inches)
2	2.47
10	3.46
25	4.08
50	4.60
100	5.13

3. Time of concentration shall be determined in accordance with established methods such as those presented in PennDOT Drainage Manual, Publication Number 13, DM-2 Chapter 10, as amended or other methods as accepted by the Municipality.

4. In order to reduce stormwater runoff volumes from developed areas and encourage groundwater recharge, underground basin drains, infiltration trenches, and cisterns are permitted to which roof leaders may be connected. These drains consist of stone-filled basins which temporarily store and release water below ground surface. Plans for such facilities shall be submitted to the Municipality for approval, and the basins shall be used only in those areas where soils, geologic, and water table conditions permit.

E. Stormwater management facilities and related installations shall be provided:

1. To permit unimpeded flow of natural watercourses. Such flow may be redirected as required, subject to the approval of the Pennsylvania Department of Environmental Protection.

2. To ensure adequate drainage of all low points along the curb line of streets.

3. To intercept stormwater runoff along streets at intervals reasonably related to the extent and grade of the area drained, and to prevent substantial flow of water across intersections or flooded intersections during storms, in accordance with the procedures in the PennDOT Drainage Manual, Publication Number 13, DM-2, Chapter 10, as amended.

4. To ensure adequate and unimpeded flow of stormwater under driveways in, near, or across natural watercourses or drainage swales, suitable pipes or other waterways shall be provided as necessary.

5. To properly drain stormwater runoff from all land development projects. All lot and open areas shall be designed to drain to the nearest practical street or drainage system, existing or proposed, as defined by the Municipality, with no impact on adjoining properties, unless an area specifically designed for stormwater detention is provided.

F. Storm sewers and related installations:

1. Storm sewers, where required by zoning and land use densities, shall be placed under or immediately adjacent to the roadway side of the curb, or as directed by the Municipality, when parallel to the street within the right-of-way.

When located in undedicated land, they shall be placed within a drainage easement not less than twenty (20) feet wide as approved by the Municipality.

The use of properly designed, graded, and turfed drainage swales is encouraged in lieu of storm sewers in commercial and industrial areas and, where approved by the Municipality, in residential areas. Such swales shall be designed not only to carry the required discharge without excessive erosion, but also to increase the time of concentration, reduce the peak discharge and velocity, and permit the

water to percolate into the soil, where appropriate. Criteria related to the use and design of drainage swales are as follows:

Criteria:

1. Where vegetated drainage swales are used in lieu of or in addition to storm sewers, they shall be designed to carry the 10-year discharge without erosion, and also to increase the time of concentration, reduce the peak discharge and velocity, and permit the water to percolate into the soil.
2. The maximum encroachment of water on the roadway pavement along roadside swales in cut areas shall not exceed half of a through traffic lane during a 10-year frequency storm of five (5) minute duration. Frequent and/or sustained flooding of the sub-base shall be avoided.
3. Inlets shall be provided to limit the shoulder encroachment and water velocity along roadways.
4. The side slope for any vegetated drainage channel requiring mowing of the vegetation shall have a maximum grade of three (3) horizontal to one (1) vertical on those areas to be mowed.
5. Erosion Prevention: All drainage swales shall be designed to prevent the erosion of the bed and bank areas. Suitable temporary and/or permanent stabilization during vegetative cover establishment shall be provided to prevent erosion.
6. Storm sewers or drainage swales shall discharge to a detention or retention basin to attenuate the peak rate and volume, respectively of stormwater runoff, except as provided in the plan.

Guidelines:

1. Deed restrictions may be required on property(ies) containing drainage swales and/or perennial streams. When required, these deed restrictions shall specify that no property owner obstruct or alter any drainage swale or perennial stream identified in the stormwater management plan.

2. Storm drainage systems shall be designed without surcharging inlets to provide conveyance of stormwater runoff into a detention basin or similar facility utilized to manage the rate of stormwater runoff. To avoid surcharging inlets, and to ensure that inlets will receive stormwater runoff, the hydraulic grade line at the inlet should be at least six (6) inches below the elevation of the inlet grate. Where site grading will direct stormwater runoff from the 100 year design storm to a detention basin or similar facility utilized to manage the rate of stormwater runoff, then the storm sewer may be designed for the 10 year design storm. Where site grading will not direct stormwater runoff from the 100 year design storm to a detention basin or similar facility utilized to manage the rate of stormwater runoff, then the storm sewer shall be designed for the 100 year design storm. Conveyance of storms to the detention basin, up to and including the 100 year frequency, shall be provided so as not to endanger life or seriously damage property.

3. Storm inlet types and inlet assemblies shall conform to the Pennsylvania Department of Transportation Standards for Roadway Construction or as approved by the Municipality.

   a. Inlets shall, at a minimum, be located at the lowest point of street intersections to intercept the stormwater before it reaches pedestrian crossings; or at sag points of vertical curves in the street alignment which provide a natural point of ponding of surface stormwater.

   b. Where the Municipality deems it necessary because of special land requirements, special inlets may be approved.

   c. In curbed sections, the maximum encroachment of water on the roadway pavement shall not exceed half of a through traffic lane or one (1) inch less than the depth of curb during the 10 year design storm of five (5) minute duration. Inlets shall be provided to limit the encroachment of water on the pavement. When inlets are used in a storm system within the right-of-way limits of a street in lieu of manholes, the spacing of such inlets shall not exceed the maximum distance of four hundred fifty (450) feet.

4. Accessible drainage structures shall be located on a continuous storm sewer system at all vertical dislocations, at all locations where a transition in storm sewer pipe sizing is required, at all vertical and horizontal angle points exceeding five (5) degrees, and at all points of convergence of two or more influent storm sewer mains. The construction locations of accessible drainage structures shall be as indicated on the subdivision drainage plan or area drainage plan approved by the Municipality.

5. When evidence available to the Municipality indicates that existing storm sewers have sufficient capacity as determined by hydrograph summation and are accessible, proposed stormwater facilities may connect to the existing storm sewers so long as the peak rate of discharge does not exceed the amount permitted by this Article.

G. Bridges and culverts shall have ample waterway opening to carry expected flows as required by PA DEP and/or the Municipality.

H. Detention or retention basins for the management of stormwater peak discharges shall meet the following requirements:

1. Basins shall be installed prior to or concurrent with any earthmoving or land disturbances which they will serve. The phasing of their construction shall be noted in the narrative and on the plan.

2. The design of all facilities over limestone formations shall include measures to prevent groundwater contamination and, where required, sinkhole formation. Soils used for the construction of basins shall have moderate to low erodibility factors.

3. Energy dissipaters and/or level spreaders shall be installed at points where pipes or drainageways discharge to or from basins.

4. Outlet structures within detention/retention basins shall incorporate childproof, non-clogging trash racks or grates over all horizontally oriented openings. All vertically oriented openings over twelve (12) inches or larger in any dimension where entry by a child could cause injury or death shall be covered with childproof, non-clogging trash racks, except where such openings carry perennial stream flows. Design openings less than six (6) inches in any dimension shall be covered with a pipe screen (e.g. Neenah R-7512 or equivalent). Methods to completely drain detention/retention basins in the event of clogging of the primary design opening(s) shall be incorporated into the design of basin outlet structures.

   Outlet aprons shall be designed and shall extend at a minimum to the toe of the basin slope. Where spillways will be used to manage peak discharges in excess of the 10 year storm, such spillways shall be constructed to withstand the pressures of impounded waters and convey flows at computed outlet velocities without erosion.

5. When the Pennsylvania Department of Environmental Protection requires facilities to be permitted, the designer shall submit all information to the PA DEP Regional Office, and obtain all necessary approvals and permits pursuant to Pennsylvania Code, Title 25, Chapter 105, Dam Safety and Encroachment Act.

6. Downstream Analysis:

   a. Where deemed necessary by the Municipality, the applicant shall submit an analysis of the impacts of detained stormwater flows on downstream areas within the watershed, established with the concurrence of the Municipality. The analysis shall include hydrologic and hydraulic calculations necessary to determine the impact of peak discharge modifications of the proposed development on critical locations such as dams, tributaries, existing developments, undersized culverts, and flood prone areas.

7. Detention basins may be waived by the Municipality at sites in close proximity to larger receiving streams, depending on the hydrology of the watershed. This is to facilitate drainage prior to main stream flooding. It shall be incumbent upon the applicant to demonstrate that no downstream increase in stream flooding or

channel erosion will result in accordance with this Article, and that no increases in peak discharge within the receiving stream will occur as outlined in this Article.

8. Multiple Development Basins: Stormwater management facilities designed to serve more than one property or development in the same watershed are permitted. Staged construction of existing or proposed multiple-use detention facilities by several developers in conjunction with watershed development is encouraged. Each applicant shall be responsible for the incremental increase in stormwater runoff generated by the respective development and incremental construction improvements necessary for the overall detention facility. Prior approval and consultation with the Municipality is required before design of such facilities.

9. Alternative Detention Facilities: Alternative stormwater detention facilities including roof top, subsurface basins or tanks and in-pipe detention storage, or other approved alternative designs are permitted as determined by the Municipality.

I. All calculations shall be submitted to the Municipality on computation sheets acceptable to the reviewer for approval. If the Municipality determines through review and independent computation that the size(s) of storm pipes or detention basins is insufficient, the Municipality may require the applicant to increase the size(s) of said storm pipes or detention basins.

If the storm drainage system design is completed on a computer installation, sufficient supporting data shall be provided to allow comprehensive review by Municipal officials.

J. When the elevation of any existing or proposed entrance to a structure, including windows, is lower than the elevation of the public cartway serving that site, a drainage plan shall be submitted, reviewed and approved as part of the permitting process for the proposed structure.

K. The Municipality may require that stormwater management facilities located outside of existing or proposed right-of-ways shall be located within and accessible by easements as follows:

1. Drainage Easements: Where a tract is traversed by a watercourse, drainageway, channel or stream, there shall be provided a drainage easement paralleling the line of such watercourse, drainageway, channel or stream. The width of the drainage easement will be adequate to preserve the unimpeded flow of natural drainage in the 100 year floodplain.

Drainage easements shall provide for maintenance, and for the purpose of widening, deepening, improving or protecting such drainage facilities.

2. Access Easements: Where proposed stormwater management facilities are not adjacent to proposed or existing public right-of-ways or are not accessible due to

physical constraints, as determined by the Municipality, a twenty (20) foot wide passable access easement specifying rights of entry shall be provided. Access easements shall provide for vehicle ingress and egress on grades of less than ten (10) percent for carrying out inspection or maintenance activities.

3. Maintenance Easements: A maintenance easement shall be provided which encompasses the stormwater facility and appurtenances and provides for access for maintenance purposes. The maintenance easement must be located at least twenty (20) feet outside of the 100 year surface elevation and the stormwater facility and appurtenances.

4. Easements shall stipulate that no trees, shrubs, structures, excavation, or fill be placed, and no regrading is to be performed within the area of the easement without written approval from the Municipality. Upon approval, such landscaping may be placed in maintenance easements, provided it does not impede access.

5. Whenever practicable, easements shall be parallel to width and linked to property lines of the subdivision.

6. All easement agreements shall be recorded with a reference to the recorded easement indicated on the site plan. The format and content of the easement agreement shall be reviewed and approved by the Municipality.

L. Sinkhole Protection:

1. Stormwater from roadways, parking lots, storm sewers, roof drains, or other concentrated stormwater runoff paths shall not be discharged directly into sinkholes.
2. To protect sensitive Karst areas, the Municipality may require basins to contain an impervious liner. The liner may be of the impervious membrane type, placed in accordance with the manufacturer's recommendations, or an approved alternative as approved by the Municipality.

M. Erosion and Sedimentation Control:

All plans for erosion and sediment pollution control (E&SPC) shall meet the requirements of The Clean Streams Law, Act of June 22, 1937, P.L. 1987 as amended, 35 P.S. §691.1, et.seq. & 25 PA Code 102.1 et.seq Erosion Control.

It shall be the responsibility of the applicant to submit the E&SPC Plan, Application, and other necessary material to the Conservation District or DEP Office, as appropriate. A copy of the transmittal letter shall be provided to the Municipality. Comments shall be received and E&SPC Plan approval obtained from the Conservation District prior to Stormwater Plan approval.

N. Minor SWM Plan

A Minor SWM Plan is required per Section 302.C and as outlined in Appendix C. Minor SWM Plans shall consist of the following, and are not subject to Sections 303 Volume Controls and 304 Rate Controls of this Ordinance. Minor Plan Preparation Steps are as follows:

1. Prepare a scaled drawing showing key features of the site.

   The Plan can be developed from a site survey, or other accurate drawing of the site. The property and boundaries should be accurate in scale. The Plan should include:

   - A line showing the limit and location of area(s) that will be cleared for Regulated Activities such as buildings, driveways and lawns.
   - The location of all structures, existing and proposed (house, shed, garage, etc.). Include driveways, parking areas, any other impervious surfaces, well and septic system locations.
   - The location of property boundaries, any streams or wetlands, and separation distances of structure(s) to any water body or stream.
   - The angle/slope of the property in relation to any water body or stream.

2. Calculate the volume of stormwater runoff created by the project.

   Identify the newly created impervious areas. Note on the plan the area of each proposed structure and impervious surface (paved, walkways, etc.) and calculate the sum of the areas. For example:

   - 20' x 20' shed = 400 sf
   - 6' x 60' sidewalk = 360 sf
   - Total Impervious Area = 760 sf

3. Calculate the volume of stormwater runoff.

   For minor projects, multiply the total square footage of newly created total impervious area by (2.47 in / 12 in/ft). For example:

   760sf x (0.23ft) = 156 cubic feet

   (2.47 inches is the 2-year, 24-hour rainfall for Fayette County, PA, taken from NWS-NOAA Atlas 14, September 25 -29, 2008.

4. Identify / choose the appropriate stormwater control measures. Size and place the measures on the project site, and add the measures to the SWM Plan.

   The volume of stormwater runoff calculated in Step #3 is now used to size the stormwater control storage devices. Vegetative controls and structural measures can be used individually or in combination to provide the required storage

volume. The PA BMP manual identifies structural and non-structural control measures that may be used, as well as instructions to calculate the volume provided by each.

Please note that all minor stormwater management plans should provide appropriate erosion control measures. Refer to Section 305.M above. The PA Erosion and Sediment Pollution Control Program Manual is available for guidance. Please contact the Fayette County Conservation District for additional information.

A Sample Minor Stormwater Management Plan can be found in Appendix D.

O. All regulated activities that do not fall under the exemption criteria referenced herein shall submit a drainage plan to the municipality for review. These criteria shall apply to the total proposed development even if development is to take place in stages. Impervious cover shall include, but not be limited to, any roof, parking or driveway areas and any new streets and sidewalks. Any areas designed to initially be gravel or crushed stone shall be considered to be impervious for the purposes of comparison to the waiver criteria, unless they are installed and maintained as provided for in the PA BMP Manual.

1. Stormwater drainage systems shall be provided in order to permit unimpeded flow along natural watercourses, except as modified by stormwater management facilities or open channels consistent with this Ordinance.

2. Areas of existing diffused drainage discharge shall be subject to any applicable discharge criteria in the general direction of existing discharge, whether proposed to be concentrated or maintained as diffused drainage areas, except as otherwise provided by this ordinance. If diffused flow is proposed to be concentrated and discharged onto adjacent property, the Applicant must document that adequate downstream conveyance facilities exist to safely transport the concentrated discharge, or otherwise prove that no erosion, sedimentation, flooding or other harm will result from the concentrated discharge.

3. Where a development site is traversed by watercourses, drainage easements shall be provided conforming to the line of such watercourses. The terms of the easement shall prohibit excavation, the placing of fill or structures, and any alterations that may adversely affect the flow of stormwater within any portion of the easement. Also, maintenance, including mowing of vegetation within the easement shall be required, except as approved by the appropriate governing authority.

4. When it can be shown that, due to topographic conditions, natural drainageways on the site cannot adequately provide for drainage, open channels may be constructed conforming substantially to the line and grade of such natural drainageways. Work within natural drainageways shall be subject to approval by PA DEP through the Joint Permit Application process, or, where deemed appropriate by PA DEP, through the General Permit process.

5. Any stormwater management facilities regulated by this Ordinance that would be located in or adjacent to waters of the Commonwealth or wetlands shall be subject to approval by PA DEP through the Joint Permit Application process, or where deemed appropriate by PA DEP, the General Permit process. When there is a question whether wetlands may be involved, it is the responsibility of the Applicant or his agent to show that the land in question cannot be classified as wetlands, otherwise approval to work in the area must be obtained from PA DEP.

6. Any stormwater management facilities regulated by this Ordinance that would be located on State highway rights-of-way shall be subject to approval by the Pennsylvania Department of Transportation (PA DOT).

7. Minimization of impervious surfaces and infiltration of stormwater runoff through seepage beds, infiltration trenches, etc. are encouraged, where soil conditions permit, to reduce the size or eliminate the need for detention facilities.

8. In order to promote overland flow and infiltration, roof drains should not discharge directly to streets or storm sewers. Roof drains may discharge directly to streets or storm sewers when deemed necessary by the Municipality. Under no circumstances shall roof drains discharge directly to sanitary sewer systems.

ARTICLE IV - STORMWATER MANAGEMENT (SWM) SITE PLAN REQUIREMENTS

Section 401. Plan Contents

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

A. Appropriate sections from the Municipal Subdivision and Land Development Ordinance, and other applicable local ordinances, shall be followed in preparing the SWM Site Plans. In instances where the Municipality lacks Subdivision and Land Development regulations, the content of SWM Site Plans shall follow the County's Subdivision and Land Development Ordinance.

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

C. Provisions for a permanent access or maintenance easement for all physical SWM BMPs, such as ponds and infiltration structures, as necessary to implement the Operation and Maintenance Plan discussed in Item I.9 below.

D. The following signature block for the Municipality:

"(Municipal Official or designee), on this date (date of signature) has reviewed and hereby certifies that the SWM Site Plan meets design standards and criteria of the Municipal Ordinance No. (Number assigned to the Ordinance)."

E. The following signature block for the registered professional preparing the Plan:

"I, _____, hereby certify on this date (_____) that the stormwater management plan meets the design standards and criteria of the Ordinance No. (Number assigned to the Ordinance)."

F. The following statement by the owner:

"I/we _____hereby acknowledge that I/we and/or my/our assignees/grantees shall be responsible for maintenance of the stormwater management system shown hereon, in accordance with approved stormwater management ownership and maintenance plan for this project, and that such stormwater system shall remain as a permanent fixture that cannot be altered, replaced, or removed without prior written approval from the Wharton Township."

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

1. The overall stormwater management concept for the project.

2. A determination of Site Conditions in accordance with the PA BMP Manual[1]. A detailed site evaluation shall be completed for projects proposed in areas of carbonate geology or karst topography, and other environmentally sensitive areas such as brownfields.

3. Stormwater runoff design computations and documentation as specified in this Ordinance, or otherwise necessary to demonstrate that the maximum practicable measures have been taken to meet the requirements of this Ordinance, including the recommendations and general requirements in Section 301.

4. Expected project time schedule.

5. A soil erosion and sediment control plan, where applicable, as prepared for and approved by the Fayette County Conservation District.

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

7. Plans and profile drawings of all SWM BMPs including open channel structures, pipes, open channels, and swales.

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

9. The SWM Site Plan shall include an operation and maintenance (O&M) plan for all existing and proposed physical stormwater management facilities. This plan shall address long-term ownership and responsibilities for O&M as well as schedules and costs for O&M activities.

10. Horizontal and vertical profiles of any existing and proposed watercourses, drainageways, channels or streams, including hydraulic capacityHydrologic and hydraulic computations for all existing and proposed stormwater management facilities and measures.

11. Unless specifically exempted in writing, the following must also be shown on the SWM Site Plan, prepared in a form which meets the requirements for recording in the Office of the Register and Recorder of Fayette County, Pennsylvania:

    a) Annotated maps, drawings, engineering plans, and construction details. Said plan shall be prepared by a registered professional land surveyor, qualified geologist, landscape architect, architect, or engineer licensed in the State of Pennsylvania, with said preparer's seal and registration number affixed to the

planAll lettering shall be drawn to a size to be legible . All sheets comprising a submission shall be on one size.

b) The name of the proposed development and the name and address of the owner of the property and the individual or firm preparing the plan.

c) Date of submission and revision, graphic scale, and North arrow.

d) Total tract boundary with distances marked to the nearest foot and bearings to the nearest degree and the total acreage of the tract.

e) Key map (drawn to scale) showing all existing natural and man-made features beyond the property boundary affected by the project and the extent of the watershed or sub-basin which drains through the project site for 1,000 feet or as specified by the Municipality.

f) Existing and proposed topographic contours shall be provided at intervals not greater than five (5) feet for existing and proposed conditions. Topographic contours at intervals less than five (5) feet may be required for flat sites, and to depict certain existing and future stormwater management features. The reference datum used to develop topographic contours shall be stated on the plans.

g) Existing and proposed use, including the total area of impervious surfaces after construction.

h) If stormwater management facilities are off-site, a note on the plan referring to location and agreements indicating responsibility for conveyance to and maintenance of the facilities; all such off-site facilities shall meet the design standards and criteria specified in this Ordinance, and details of the facilities shall be included with the plan.

Section 402. Plan Submission

A. Five (5) copies of the SWM Site Plan shall be submitted to Wharton Township for distribution to the Municipal Engineer, County Conservation District, County Planning Commission, and other agencies as applicable.

B. Additional copies shall be submitted as requested by Wharton Township or DEP.

Section 403. Plan Review

A. The SWM Site Plan shall be reviewed by the Municipality for consistency with the provisions of this ordinance..

B. The Municipality shall notify the applicant in writing within 45 calendar days whether the SWM Site Plan is approved or disapproved. If the SWM Plan involves a Subdivision or Land Development Plan, the notification shall occur within the time period allowed by the Municipalities Planning Code (90 days) If a longer notification period is provided by other statute, regulation, or ordinance, the applicant will be so notified by the Municipality.

C. The Municipality's approval of a SWM Site Plan shall be valid for a period not to exceed two (2) years. This two-year time period shall commence on the date that the Municipality signs the approved SWM Site Plan. If stormwater management facilities included in the approved SWM Site Plan have not been constructed, or if an as-built survey of these facilities has not been approved within this two-year time period, then the Municipality may consider the SWM Site Plan disapproved and may revoke any and all permits. SWM Site Plans that are considered disapproved by the Municipality shall be resubmitted in accordance with Section 405 of this Ordinance. The two year time period may be renewed for two successive two year terms upon request of the applicant if there have been no adopted or pending revisions to the SWM Ordinance.

D. If the municipality disapproves the SWM Site Plan, the municipality will state the reasons for the disapproval in writing. The municipality also may approve the SWM Site Plan with conditions and, if so, shall provide the acceptable conditions for approval in writing.

Section 404. Modification of Plans

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

Section 405. Resubmission of Disapproved Stormwater Management Site Plans

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

Section 406. Authorization to Construct and Term of Validity

The Municipality's approval of a SWM Site Plan authorizes the Regulated Activities contained in the SWM Site Plan for a maximum term of validity of five years following the date of approval The Municipality may specify a term of validity shorter than five years in the approval for any specific SWM Site Plan. Terms of validity shall commence on the date the Municipality signs the approval for a SWM Site Plan. If an approved SWM Site Plan is not completed according to Section 407 within the term of validity, then the Municipality may consider the SWM Site Plan disapproved and may revoke any and all permits. SWM Site Plans that are considered disapproved by the Municipality shall be resubmitted in accordance with Section 405 of this Ordinance.

Section 407. As-Built Plans, Completion Certificate and Final Inspection

A. The Developer shall be responsible for completing an as-built plan(s) of all SWM BMPs included in the approved SWM Site Plan. The as-built plans and an explanation of any discrepancies with the construction plans shall be submitted to the Municipality.

B. The as-built submission shall include a certification of completion signed by a Qualified Professional verifying that all permanent SWM BMPs have been constructed according to the approved plans and specifications. If any licensed Qualified Professionals contributed to the construction plans, then a licensed Qualified Professional must sign the completion certificate.

C. After receipt of the completion certification by the Municipality, the Municipality may conduct a final inspection.

ARTICLE V - OPERATION AND MAINTENANCE

Section 501. Responsibilities of Developers and Landowners

A. The Municipality shall make the final determination on the continuing maintenance responsibilities prior to final approval of the SWM Site Plan. The Municipality may require a dedication of such facilities as part of the requirements for approval of the SWM Site Plan. Such a requirement is not an indication that the Municipality will accept the facilities. The Municipality reserves the right to accept the ownership and operating responsibility for any or the entire stormwater management controls.

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

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

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

Section 502. Operation and Maintenance Agreements

A. Prior to final approval of the SWM Site Plan, the property owner shall sign and record an Operations and Maintenance (O&M) Agreement (see Appendix A) covering all stormwater control facilities which are to be privately owned.

1. The owner, successor and assigns shall maintain all facilities in accordance with the approved maintenance schedule in the O&M Plan.
2. The owner shall convey to the Municipality conservation easements to assure access for periodic inspections by the Municipality and maintenance, as necessary.
3. The owner shall keep on file with the Municipality the name, address, and telephone number of the person or company responsible for maintenance activities; in the event of a change, new information shall be submitted by the owner to the Municipality within ten (10) working days of the change.

B The owner is responsible for operation and maintenance (O&M) of the SWM BMPs. If the owner fails to adhere to the O&M Agreement, the municipality may perform the services required and charge the owner appropriate fees. Nonpayment of fees may result in a lien against the property.

Section 503. Performance Guarantee

For SWM Site Plans that involve subdivision and land development, the applicant shall provide a financial guarantee to the Municipality for the timely installation and proper construction of all stormwater management controls as required by the approved SWM Site Plan and this Ordinance in accordance with the provision of Sections 509, 510, and 511 of the Pennsylvania Municipalities Planning Code.

Section 601. General

The Municipality may include all costs incurred in the review fee charged to an applicant.

The review fee may include but not be limited to costs for the following:

A. Administrative/clerical processing.

B. Review of the SWM Site Plan.

C. Attendance at meetings.

D. Inspections.

ARTICLE VII - PROHIBITIONS

Section 701. Prohibited Discharges and Connections

A. Any drain or conveyance, whether on the surface or subsurface, which allows any non-stormwater discharge including sewage, process wastewater, and wash water to enter the Waters of this Commonwealth is prohibited.

B. No person shall allow, or cause to allow, discharges into surface Waters of this Commonwealth which are not composed entirely of stormwater, except (1) as provided in subsection C below, and (2) discharges allowed under a state or federal permit.

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

-Discharges from fire fighting activities	-Flows from riparian habitats and wetlands
-Potable water sources including water line flushing	-Uncontaminated water from foundations or from footing drains
-Irrigation drainage	-Lawn watering
-Air conditioning condensate	-Dechlorinated swimming pool discharges
-Springs	-Uncontaminated groundwater
-Water from crawl space pumps	-Water from individual residential car washing

-Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (unless all spill material has been removed) and where detergents are not used	-Routine external building wash down (which does not use detergents or other compounds)
Diverted stream flows	

D. In the event that the Municipality or DEP determines that any of the discharges identified in Subsection 701.C, significantly contribute to pollution of the Waters of this Commonwealth, the Municipality or DEP will notify the responsible person(s) to cease the discharge.

Section 702. Roof Drains

Roof drains and sump pumps shall discharge to infiltration or vegetative BMPs to the maximum extent practicable to satisfy the criteria for Disconnected Impervious Area.

Section 703. Alteration of SWM BMPs

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

ARTICLE VIII - ENFORCEMENTS AND PENALTIES

Section 801. Right-of-Entry

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

Section 802. Inspection

SWM BMPs should be inspected by the landowner, or the owner's designee (including the Municipality for dedicated and owned facilities) according to the following list of minimum frequencies:

1. Annually for the first 5 years.

2. Once every 3 years thereafter,

3. During or immediately after the cessation of a 10 year or greater storm event.

Section 803. Enforcement

A. It shall be unlawful for a person to undertake any Regulated Activity except as provided in an approved SWM Site Plan, unless specifically exempted in Section 302.

B. It shall be unlawful to violate Section 703 of this Ordinance or 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.

D. If the Municipality determines at any time that any permanent stormwater management facility has been eliminated, altered, or improperly maintained, the Municipality shall advise the responsible party of required corrective measures, and shall provide said responsible party with a specific time to implement the required corrective measures. If such action is not taken by the property owner, the Municipality may cause the work to be done and back-charge all costs to the property owners in accordance with this Ordinance.

804. Suspensions and Revocation

A. Any approval or permit issued may be suspended or revoked by the Municipality for:

1. Non-compliance with or failure to implement any provision of the approved SWM Site Plan or Operation and Maintenance Agreement.

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. If a violation causes no immediate danger to life, public health, or property, at its sole discretion, the Municipality shall provide a reasonable timeframe for the owner to correct the violation. In these cases, the Municipality will provide the owner, or the owner's

designee, with a written notice of the violation and the time period allowed for the owner to correct the violation. If the owner does not correct the violation within the allowed time period, the Municipality may revoke or suspend any, or all, applicable approvals and permits pertaining to any provision of this Ordinance.

Section 805. 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 three-hundred dollars ($300.00) 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 of proceeding at law or in equity for the enforcement of this Ordinance. Any court of competent jurisdiction shall have the right to issue restraining orders, temporary or permanent injunctions, mandamus, or other appropriate forms of remedy or relief.

Section 806. Appeals

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

B. Any person aggrieved by any decision of the Municipality, relevant to the provisions of this Ordinance, may appeal to the County Court Of Common Pleas in the county where the activity has taken place within thirty (30) days of the Municipality's decision.

ARTICLE IX - REFERENCES

1. Pennsylvania Department of Environmental Protection (DEP). No. 363-0300-002 (2006), as amended and updated. *Pennsylvania Stormwater Best Management Practices Manual.* Harrisburg, PA.

2. The Pennsylvania Department of Environmental Protection (DEP). 363-2134-008 (2000), as amended and updated. *Erosion and Sediment Pollution Control Program Manual.* Harrisburg, PA.

3. United States Department of Agriculture (USDA), National Resources Conservation Service (NRCS). *National Engineering Handbook.* Part 630: Hydrology, 1969-2001. Originally published as the *National Engineering Handbook*, Section 4: Hydrology. Available online at: http://www.wcc.nrcs.usda.gov/hydro/hydro-techref-neh-630.html.

4. United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS). 1986. *Technical Release 55: Urban Hydrology for Small Watersheds*, 2nd Edition. Washington, D.C.

5. US Department of Commerce (USDC), National Oceanic and Atmospheric Administration (NOAA), National Weather Service (NWS), Hydrometeorological Design Studies Center. 2004-2006. *Precipitation-Frequency Atlas of the United States, Atlas 14, Volume 2*, Silver Spring, Maryland, 20910. Internet address: http://hdsc.nws.noaa.gov/hdsc/pfds/.

6. PennDOT Drainage Manual, Publication Number 13, DM-2, Chapter 10, as amended.
7. Commonwealth of Pennsylvania, *Storm Water Management Act No. 167.*

Ordinance Number 05 of 2011

ENACTED and ORDAINED at a regular meeting of the

Wharton Township Supervisors

on this 11 day of November, 2011.

This Ordinance shall take effect immediately.

[Name] [Title] Supervisor

[Name] [Title] Supervisor

[Name] [Title] Supervisor

ATTEST:

Secretary

APPENDIX A

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

THIS AGREEMENT, made and entered into this _____ day of _____, 200__, by and between _____, (hereinafter the "Landowner"), and Wharton Townshiup, Fayette County, Pennsylvania, (hereinafter "Municipality");

WITNESSETH

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

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

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

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

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

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

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

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

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

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

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

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

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

8. The Municipality intends to inspect the BMPs at a minimum of once every three years to ensure their continued functioning.

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

ATTEST:

WITNESS the following signatures and seals:

(SEAL) For the Municipality:

_____

(SEAL) For the Landowner:

_____

ATTEST:

_____ (City, Borough, Township)

County of Fayette, Pennsylvania

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

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

_____ _____

NOTARY PUBLIC **(SEAL)**

APPENDIX B

DISCONNECTED IMPERVIOUS AREA (DIA)

B.1. Rooftop Disconnection

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

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

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

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

Table B.1: Partial Rooftop Disconnection

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

B.2. Pavement Disconnection

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

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

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

If the discharge is concentrated at one or more discrete points, no more than 1000 square feet may discharge to any one point. In addition, a gravel strip or other spreading device is required for concentrated discharges. For non-concentrated discharges along the entire edge of pavement, this requirement is waived; however, there must be provision for the establishment of vegetation along the pavement edge and temporary stabilization of the area until vegetation becomes stabilized.

REFERENCE

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

APPENDIX C

Stormwater Management Plan (SMP) Requirements

Plan Requirement	Impervious Area*	Disturbed Area*	References
Exempt	<1,000 sq. ft.	<5,000 sq. ft.	Section 302.A.
May Be Exempt	1,000 sq. ft. to <5,000 sq. ft. if disconnected from impervious areas	5,000 sq. ft. to <20,000 sq. ft. without point source to surface waters	Section 302.B. Appendix B
Minor SMP	1,000 sq. ft. to < 5,000 sq. ft. if connected to impervious areas	5,000 sq. ft to <20,000 sq. ft with point source to surface waters	Section 305.N. Appendix B Appendix C
SMP	5,000 sq. ft. or greater	20,000 sq. ft. or greater	Article IV

* The measurement of impervious or disturbed areas shall include all of the impervious or disturbed areas in the total proposed development even if development is to take place in stages (Section 301.F.)

APPENDIX D Update for better example

SAMPLE MINOR STORMWATER MANAGEMENT PLAN

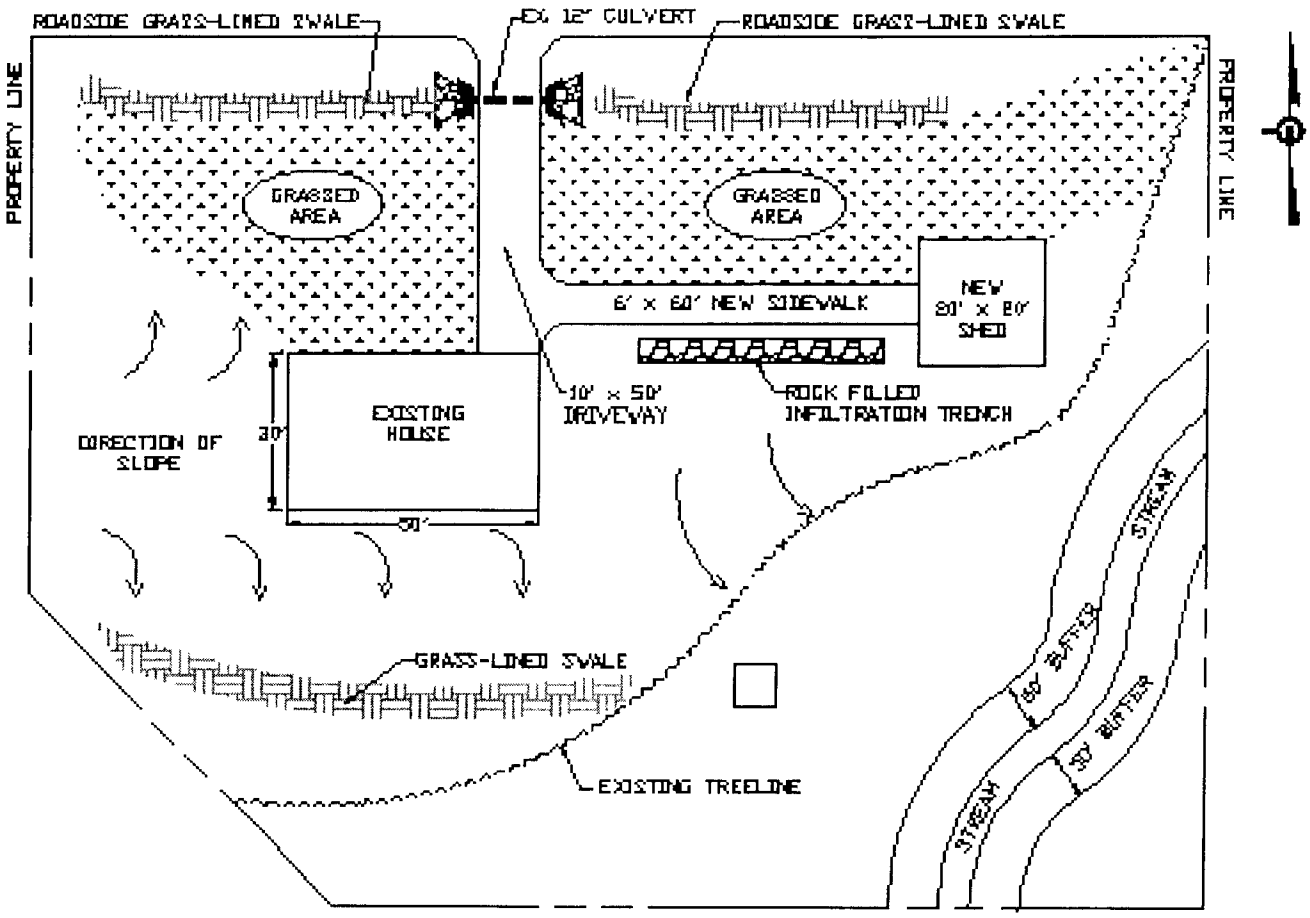
Property Owner _____

Tax ID # _____

Proposed by _____

Date _____ Drawn by _____

Scale _____



Insert Appendix E - Runoff Coefficients

To Follow

Appendix E

TABLE A-3
Runoff Coefficients* for the Rational Equation

LAND USE	A Soils[1]			B Soils[1]			C Soils[1]			D Soils[1]		
	<2%	2-6%	>6%	<2%	2-6%	>6%	<2%	2-6%	>6%	<2%	2-6%	>6%
Cultivated land	0.08	0.13	0.16	0.11	0.15	0.21	0.14	0.19	0.26	0.18	0.23	0.31
Pasture	0.12	0.20	0.30	0.18	0.28	0.37	0.24	0.34	0.44	0.30	0.40	0.50
Meadow	0.10	0.16	0.25	0.14	0.22	0.30	0.20	0.28	0.36	0.24	0.30	0.40
Forest	0.05	0.08	0.11	0.08	0.11	0.14	0.10	0.13	0.16	0.12	0.16	0.20
Residential lot size 1/8 acre	0.25	0.28	0.31	0.27	0.30	0.35	0.30	0.33	0.38	0.33	0.36	0.42
Residential lot size 1/4 acre	0.22	0.26	0.29	0.24	0.29	0.33	0.27	0.31	0.36	0.30	0.34	0.40
Residential lot 1/3 acre	0.19	0.23	0.26	0.22	0.26	0.30	0.25	0.29	0.34	0.28	0.32	0.39
Residential lot size 1/2 acre	0.16	0.20	0.24	0.19	0.23	0.28	0.22	0.27	0.32	0.26	0.30	0.37
Residential lot size 1 acre	0.14	0.19	0.22	0.17	0.21	0.26	0.20	0.25	0.31	0.24	0.29	0.35
Industrial	0.67	0.68	0.68	0.68	0.68	0.69	0.68	0.68	0.69	0.69	0.69	0.70
Commercial	0.71	0.71	0.72	0.71	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Streets	0.70	0.71	0.72	0.71	0.72	0.74	0.72	0.73	0.76	0.73	0.75	0.78
Open Space	0.05	0.10	0.14	0.08	0.13	0.19	0.12	0.17	0.24	0.15	0.21	0.28
Parking	0.85	0.86	0.87	0.85	0.86	0.87	0.85	0.86	0.87	0.85	0.86	0.87
Construction Sites – Bare packed soil, smooth	0.30	0.35	0.40	0.35	0.40	0.45	0.40	0.45	0.50	0.50	0.55	0.60
Construction Sites - Bare packed soil, rough	0.20	0.25	0.30	0.25	0.30	0.35	0.30	0.35	0.40	0.40	0.45	0.50

*Runoff Coefficients for storm recurrence intervals less than 25 years

Adapted from McCuen, R.H., Hydrologic Analysis and Design (2004)

1. According to the USDA NRCS Hydrologic Soils Classification System

Table E-2a Runoff curve numbers for urban areas [1]

Cover description: Cover type and hydrologic condition	Average percent impervious area [2]	Curve numbers for hydrologic soil group: A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) [3]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) [4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation) [5]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

[1] Average runoff condition, and $I_a = 0.2S$.

[2] The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

[3] CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

[4] Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

[5] Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Table E-2b Runoff curve numbers for cultivated agricultural lands [1]

Cover description			Curve numbers for hydrologic soil group			
Cover type	Treatment [2]	Hydrologic condition [3]	A	B	C	D
Fallow	Bare soil	—	77	86	91	94
	Crop residue cover (CR)	Poor	76	85	90	93
		Good	74	83	88	90
Row crops	Straight row (SR)	Poor	72	81	88	91
		Good	67	78	85	89
	SR + CR	Poor	71	80	87	90
		Good	64	75	82	85
	Contoured (C)	Poor	70	79	84	88
		Good	65	75	82	86
	C + CR	Poor	69	78	83	87
		Good	64	74	81	85
	Contoured & terraced (C&T)	Poor	66	74	80	82
		Good	62	71	78	81
	C&T+ CR	Poor	65	73	79	81
		Good	61	70	77	80
Small grain	SR	Poor	65	76	84	88
		Good	63	75	83	87
	SR + CR	Poor	64	75	83	86
		Good	60	72	80	84
	C	Poor	63	74	82	85
		Good	61	73	81	84
	C + CR	Poor	62	73	81	84
		Good	60	72	80	83
	C&T	Poor	61	72	79	82
		Good	59	70	78	81
	C&T+ CR	Poor	60	71	78	81
		Good	58	69	77	80
Close-seeded or broadcast legumes or rotation meadow	SR	Poor	66	77	85	89
		Good	58	72	81	85
	C	Poor	64	75	83	85
		Good	55	69	78	83
	C&T	Poor	63	73	80	83
		Good	51	67	76	80

[1] Average runoff condition, and I_a=0.2S

[2] Crop residue cover applies only if residue is on at least 5% of the surface throughout the year.

[3] Hydraulic condition is based on combination factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes, (d) percent of residue cover on the land surface (good ≥ 20%), and (e) degree of surface roughness.

Poor: Factors impair infiltration and tend to increase runoff.

Good: Factors encourage average and better than average infiltration and tend to decrease runoff.

Table E-2c Runoff curve numbers for other agricultural lands [1]

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. [2]	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. [3]	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30 [4]	48	65	73
Woods—grass combination (orchard or tree farm) [5]	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods. [6]	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30 [4]	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

1 Average runoff condition, and $I_a = 0.2S$.

2 *Poor:* <50%) ground cover or heavily grazed with no mulch.
Fair: 50 to 75% ground cover and not heavily grazed.
Good: > 75% ground cover and lightly or only occasionally grazed.

3 *Poor:* <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.

4 Actual curve number is less than 30; use CN = 30 for runoff computations.

5 CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

6 *Poor:* Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

Table E-2d Runoff curve numbers for arid and semiarid rangelands [1]

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition [2]	A [3]	B	C	D
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element.	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper—pinyon, juniper, or both; grass understory.	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory.	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus.	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

1 Average runoff condition, and I_a = 0.2S. For range in humid regions, use table 2-2c.

2 Poor: <30% ground cover (litter, grass, and brush overstory).
Fair: 30 to 70% ground cover.
Good: > 70% ground cover.

3 Curve numbers for group A have been developed only for desert shrub.