

STORMWATER MANAGEMENT ORDINANCE

EAST LAMPETER TOWNSHIP
LANCASTER COUNTY, PENNSYLVANIA

ORDINANCE No. 303.a

Adopted at a Public Meeting Held on April 7, 2014
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ARTICLE I. GENERAL PROVISIONS

Section 101. SHORT TITLE

This Ordinance shall be known and may be cited as "The East Lampeter Township Stormwater Management (SWM) Ordinance".

Section 102. STATEMENT OF FINDINGS

The Board of Supervisors of East Lampeter Township finds that:

- A. Inadequate management of accelerated storm water runoff resulting from development throughout a watershed increases flood flows and velocities, contributes to erosion and sedimentation, overtaxes the carrying capacity of existing streams and storm sewers, greatly increases the cost of public facilities to convey and manage storm water, undermines floodplain management and flood control efforts in downstream communities, reduces groundwater recharge, threatens public health and safety, and increases nonpoint source pollution of water resources.
- B. A comprehensive program of SWM, including reasonable regulation of development and activities causing accelerated runoff, is fundamental to the public health, safety, welfare, and the protection of the people of East Lampeter Township and all the people of the Township and all of the people of the Commonwealth, their resources, and the environment.
- C. Stormwater is an important water resource, which provides groundwater recharge for water supplies and base flow of streams, which also protects and maintains surface water quality.
- D. Federal and state regulations require certain municipalities to implement a program of stormwater controls. These municipalities are required to obtain a permit for stormwater discharges from their Municipal Separate Storm Sewer Systems (MS4) under the National Pollutant Discharge Elimination System (NPDES).
- E. Riparian forest buffers enhance water quality by filtering pollutants in runoff, providing light control and temperature moderation, processing pollutants, increasing infiltration and providing channel and shoreline stability thus decreasing erosion (DEP Riparian Forest Buffer Guidance, November 27, 2010).

Section 103. PURPOSE

The purpose of this Ordinance is to promote health, safety, and welfare within East Lampeter Township 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 practicable.
- 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 Operation and Maintenance of all Stormwater Management Best Management Practices (SWM BMPs) that are implemented within the Municipality.
- H. Provide standards to meet NPDES permit requirements.
- I. Promote stormwater runoff prevention through the use of nonstructural Best Management Practices (BMPs).
- J. Provide a regulatory environment that supports the proportion, density and intensity of development called for in the comprehensive plan; allow for creative methods of improving water quality and managing stormwater runoff; and promote a regional approach to water resource management.
- K. Help preserve and protect exceptional natural resources, and conserve and restore natural resource systems.
- L. Promote stormwater management practices that emphasize infiltration, evaporation, and transpiration.

Section 104. STATUTORY AUTHORITY

A. Primary Authority:

The Board of Supervisors of East Lampeter Township is empowered to regulate these activities by authority of the Act of October 4, 1978, P.L. 864 (Act 167), 32 P.S. Section 680.1, et seq., as amended, the "Storm Water Management Act" and Act 394 of 1937, as amended, 35 P.S. Section 691.1 et seq. the Pennsylvania Clean Streams Law. The Board of Supervisors of East Lampeter Township also is empowered to regulate land use activities that affect stormwater impacts by the authority of the Second Class Township Code, Act of May 1, 1933, (P.L. 103, No. 69), reenacted and amended November 9, 1995 (P.L. 350, No. 60), as amended.

B. Secondary Authority:

The Board of Supervisors of East Lampeter Township 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

The provisions, regulations, limitations and restrictions of this Ordinance shall apply to regulated activities, as defined in this Ordinance.

Any Plan (hereinafter defined) pending at the time of the effective date of this Ordinance shall be allowed to proceed with revisions, finalization and implementation in accordance with any Ordinance in effect prior hereto. Any Subdivision and Land Development Plan filed pursuant to the provisions of the Pennsylvania Municipalities Planning Code where there isn't a prior stormwater management ordinance in effect may proceed with development in accordance with the filing at the time of the effective date of this Ordinance.

Section 106. REPEALER

Any provisions of any ordinance 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

Should any section, provision or part thereof of this Ordinance be declared invalid by a court of competent jurisdiction, 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 pursuant to this Ordinance do not relieve the Applicant of the responsibility to secure required permits or approvals for activities regulated by any other applicable code, rule, act, or ordinance.

Section 109. ERRONEOUS PERMIT

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

Section 110. MUNICIPAL LIABILITY

Except as specifically provided by the Pennsylvania Storm Water Management Act, Act of October 4, 1978, P.L. 864, No. 167, as amended, 32 P.S. §680.1 et seq., the making of any administrative decision by the Township or any of its officials or employees shall not constitute a representation, guarantee or warranty of any kind by the Township of the practicability or safety of any proposed structure or use with respect to damage from erosion, sedimentation, stormwater runoff, flood, or any other matter, and shall create no liability upon or give rise to any cause of action against the Township and its officials and employees. The Board of Supervisors of East Lampeter Township, by enacting and amending this Ordinance, does not waive or limit any immunity granted to the Township and its officials and employees by the Governmental Immunity Act, 42 Pa. C.S. §8541 et seq., and does not assume any liabilities or obligations.

Section 111. DUTY OF PERSONS ENGAGED IN THE DEVELOPMENT OF LAND

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

Section 112. FINANCIAL SECURITY

- A. A financial security (bond, restricted account or letter of credit) for stormwater related improvements shall be supplied by the Developer in conjunction with the subdivision/land development approval, or in conjunction with the SWM Site Plan approval if no subdivision/land development plan is required.
- B. The applicant shall provide a financial security to the Township for the timely installation and proper construction of all SWM facilities, including E&S BMPS, as required by the approved SWM Site Plan and this ordinance and, as applicable, in accordance with the provisions of Sections 509, 510, and 511 of the MPC.
- C. As the work of installing the required SWM Facilities proceeds, the party posting the financial security may request the Governing Body to release or authorize the release, from time to time, such portions of the financial security necessary for payment to the contractor or contractors performing the work. Any such requests shall be in writing addressed to the Board of Supervisors of East Lampeter Township, and the Board of Supervisors of East Lampeter Township shall have 45 days from receipt of such request within which to allow the Township Engineer to certify, in writing, to the Board of Supervisors of East Lampeter Township that such portion of the work upon the SWM Facilities has been completed in accordance with the approved SWM Site Plan. Upon such certification the Board of Supervisors of East Lampeter Township shall authorize release by the bonding company or lending institution of an amount as estimated by the Township Engineer fairly representing the value of the SWM Facilities completed. The Board of Supervisors of East Lampeter Township may, prior to final release at the time of completion and certification by its Engineer, require retention of 10% of the estimated cost of the aforesaid SWM Facilities.
- D. In the event that any SWM Facilities which may be required have not been installed as provided in the approved SWM Site Plan the Board of Supervisors of East Lampeter Township is hereby granted the power to enforce any corporate bond, or other security by appropriate legal and equitable remedies. If proceeds of such bond, or other security are insufficient to pay the cost of installing or making repairs or corrections to all the SWM Facilities covered by said security, the Board of Supervisors of East Lampeter Township may, at its option, install part of such SWM Facilities and may institute appropriate legal or equitable action to recover the monies necessary to complete the remainder of the SWM Facilities. All of the proceeds, whether resulting from the security or from any legal or equitable action brought against the Developer, or both, shall be used solely for the installation of the SWM Facilities covered by such security, and not for any other Municipal purpose.

ARTICLE II. DEFINITION OF TERMS

Section 201. INTERPRETATION AND WORD USAGE

The language set forth in the text of this Ordinance shall be interpreted in accordance with the following rules of construction:

- A. Words used or defined in one tense or form shall include other tenses or derivative forms.
- B. Words in the singular number shall include the plural number, and words in the plural number shall include the singular number.
- C. The masculine gender shall include the feminine and neuter. The feminine gender shall include the masculine and neuter. The neuter gender shall include the masculine and feminine.
- D. The word "person" includes individuals, firms, partnerships, joint ventures, trusts, trustees, estates, corporations, associations and any other similar entities.
- E. The word "Lot" includes the words "plot", "Tract", and "Parcel".
- F. The words "shall," "must" and "will" are mandatory in nature and establish an obligation or duty to comply with the particular provision. The words "may" and "should" are permissive.
- G. The time, within which any act required by this Ordinance is to be performed, shall be computed by excluding the first day and including the last day. However, if the last day is a Saturday or Sunday or a holiday declared by the United States Congress or the Pennsylvania General Assembly, it shall also be excluded. The word "day" shall mean a calendar day, unless otherwise indicated.
- H. Any words not defined in this Ordinance or in Section 107 of the MPC shall be construed as defined in standard dictionary usage.
- I. References to officially adopted regulations, standards, or publications of DEP or other governmental agencies shall include the regulation, publication, or standard in effect on the date when a SWM Site Plan is first filed. It is the intent of the Board of Supervisors of East Lampeter Township in enacting this Section to incorporate such changes to statutes, regulations, and publications to the extent authorized by 1 Pa. C.S. § 1937.

Section 202. DEFINITIONS OF TERMS

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

Access Easement - A right granted by a landowner to a grantee, allowing entry for the purpose of inspecting, maintaining and repairing SWM Facilities.

Act 167 Plan - A plan prepared under the authority of Pennsylvania's Stormwater Management Act of October 4, 1978.

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

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

Animal Heavy Use Areas - A barnyard, feedlot, loafing area, exercise lot, or other similar area on an agricultural operation where due to the concentration of animals, it is not possible to establish and maintain vegetative cover of a density capable of minimizing accelerated erosion and sedimentation by usual planting methods. The term does not include entrances, pathways and walkways between areas where animals are housed or kept in concentration.

Applicant - A Landowner and/or Developer, as hereinafter defined, including his heirs, successors and assigns, who has filed an application to the Township for approval to engage in any regulated activity as a Development Site located within the Township.

BMP (Best Management Practice) - Activities, facilities, control measures, planning or procedures used to minimize accelerated erosion and sedimentation and manage stormwater to protect, maintain, reclaim, and restore the quality of waters and the existing and designated uses of waters within this Commonwealth before, during and after earth disturbance activities¹. See also Non-structural BMP and Structural BMP.

BMP Manual - The Pennsylvania Stormwater Best Management Practices Manual of December 2006, or most recent version thereof.

Building - Any enclosed or open structure, other than a boundary wall or fence, occupying more

than four (4) square feet of area and/or having a roof supported by columns, piers, or walls.

Carbonate Geology - Limestone or dolomite bedrock. Carbonate geology is often associated with karst topography.

Certificate of Completion - Documentation verifying that all permanent SWM facilities have been constructed according to the plans and specifications and approved revisions thereto.

Chapter 102 - 25 Pa. Code Chapter 102, Erosion and Sediment Control

Chapter 105 - 25 Pa. Code, Chapter 105, Dam Safety and Waterway Management

Chapter 106 - 25 Pa. Code, Chapter 106, Floodplain Management

Cistern - A reservoir or tank for storing rainwater.

Clean Water Act - the 1972 Amendments to the Federal Water Pollution Control Act, P.L. 92-500 of 1972, 33 U.S.C. §1251 et seq.

Conservation Plan - A plan written by an NRCS certified planner that identifies Conservation Practices and includes site specific BMPs for agricultural plowing or tilling activities and Animal Heavy Use Areas.

Conservation Practices - Practices installed on agricultural lands to improve farmland, soil and/or water quality which have been identified in a current Conservation Plan.

Conveyance - (n) Any structure that carries a flow. (v) The ability of a pipe, culvert, swale or similar facility to carry the peak flow from the design storm.

Culvert - A structure with appurtenant works which can convey a stream under or through an embankment or fill.

Dam – As defined under the requirements of Chapter 105, Dam Safety and Waterway Management.

DEP also PA DEP or PADEP - The Pennsylvania Department of Environmental Protection or any agency successor to the Pennsylvania Department of Environmental Protection.

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

Designee - The agent of a municipal governing body involved with the administration, review or enforcement of any provisions of this ordinance by contract or memorandum of understanding.

Detention Basin - An impoundment structure designed to manage stormwater runoff by temporarily storing the runoff and releasing it at a controlled rate.

Developer - A person who undertakes any Regulated Activity of this Ordinance.

Development Site (Site) - The specific area of land where regulated activities in the Township are planned, conducted or maintained.

Disappearing Stream - A stream in an area underlain by limestone or dolomite that flows underground for a portion of its length.

Disturbed Area - A land area where an earth disturbance activity is occurring or has occurred.

Downslope Property Line - That portion of a property line of a parent tract located at the topographically lowest point of the tract such that some or all overland, swale, or pipe flow from a Development Site would be directed toward it.

Drainage Conveyance Facility - A storm water management facility designed to transmit storm water runoff and shall include streams, channels, swales, pipes, conduits, storm sewers, etc.

Drainage Easement - Rights to occupy and use another person's real property for the installation and operation of stormwater management facilities, or for the maintenance of natural drainageways to preserve and maintain a channel for the flow of stormwater therein, or to safeguard health, safety, property, and facilities

Drainage Permit - A permit issued by the municipal governing body after the Storm Water Management Site Plan has been approved. Said permit is issued prior to or with the final municipal approval.

E&S – Erosion and Sediment.

E&S Plan (also Erosion and Sediment Control Plan) – A site-specific plan consisting of both drawings and a narrative that identifies BMPs to minimize accelerated erosion and sedimentation before, during and after earth disturbance activities.

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; land development; agricultural plowing or tilling; operation of animal heavy use areas; timber harvesting activities; road maintenance activities; oil and gas activities; well drilling;

mineral extraction; building construction; and the moving, depositing, stockpiling, or storing of soil, rock, or earth materials¹.

Environmentally Sensitive Area - slopes greater than 15% percent, shallow bedrock (located within 6 feet of ground surface²), wetlands, Natural Heritage Areas and other areas designated as Conservation or Preservation in ***Greenscapes***, the Green Infrastructure Element of the County Comprehensive Plan, where encroachment by land development or land disturbance results in degradation of the natural resource.

Ephemeral Stream - A transient stream, one that flows for a relatively short time.

Erosion - The natural process by which the surface of the land is worn away by water, wind, or chemical action. See also, "Accelerated Erosion" as defined above.

Existing Conditions - The dominant land cover during the 5-year period immediately preceding a proposed regulated activity.

FEMA - the Federal Emergency Management Agency.

Flood - A general but temporary condition of partial or complete inundation of normally dry land areas from the overflow of streams, rivers, and other waters of this Commonwealth.

Flood Fringe - That portion of the floodplain outside of the floodway³.

Floodplain - Any land area susceptible to inundation by water from any natural source or delineated by applicable Department of Housing and Urban Development, Federal Insurance Administration Flood Hazard Boundary - Mapped as being a special flood hazard area. Also, the area of inundation which functions as a storage or holding area for floodwater to a width required to contain a base flood of which there is a one percent (1%) chance of occurrence in any given year. The floodplain contains both the floodway and the flood fringe.

Flood Plain Management Act - Act of October 4, 1978, P.L. 851, No. 166, as amended 32 P.S. Section 679.101 et seq., and as may be amended in the future.

Floodway - That portion of the floodplain which is effective in carrying flow, within which this carrying capacity must be preserved and where the flood hazard is generally highest, i.e., where water depths and velocities are the greatest. It is that area which provides for the discharge of the base flood so the cumulative increase in water surface elevation is no more than one foot³.

Alternative Definition from 25 Pa Code Chapter 105:

Floodway - The channel of the watercourse and those portions of the adjoining floodplains which are reasonably required to carry and discharge the 100-year frequency

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 frequency 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 stream⁴.

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

Freeboard - A vertical distance between the maximum design highwater elevation and the top of a dam, levee, tank, basin, or diversion ridge.

Frequency - The probability or chance that a given storm event/flood will be equaled or exceeded in a given year.

Grade - (n) A slope, usually of a road, channel or natural ground specified in percent and shown on plans as specified herein. (v) to finish the surface of a roadbed, top of embankment or bottom of excavation.

Grassed Waterway - A natural or constructed waterway, usually broad and shallow, covered with erosion-resistant grasses, used to conduct surface water from cropland.

Groundwater Recharge - The process by which water from above the ground surface is added to the saturated zone of an aquifer, either directly or indirectly.

Hydrologic Soil Group (HSG) - Refers to soils grouped according to their runoff-producing characteristics by NRCS. There are four (4) runoff potential groups ranging from A to D.

A. (Low runoff potential) Soils having high infiltration rates even when thoroughly wetted and consisting chiefly of deep, well to excessively drained sands or gravels. These soils have a high rate of water transmission (greater than 0.30 inches/hour).

B. Soils having moderate infiltration rates when thoroughly wetted and consisting chiefly of moderately deep to deep, moderately well-to-well drained soils with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission (from 0.15 to 0.30 inches/hour).

C. Soils having slow infiltration rates when thoroughly wetted and consisting chiefly of soils with a layer that impedes downward movement of water, or soils with moderately

fine to fine texture. These soils have a slow rate of water transmission (from 0.05 to 0.15 inches/hour).

D. (High runoff potential) Soils having very slow infiltration rates when thoroughly wetted and consisting chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a clay pan or clay layer at or near the surface, and shallow soils over nearly impervious material. These soils have a very slow rate of water transmission (from 0 to 0.05 inches/hour).

Impervious Surface (Impervious Area) - Surfaces which prevent the infiltration of water into the ground. All structures, buildings, parking areas, driveways, roads, streets, sidewalks, decks, and any areas of concrete, asphalt, packed stone, and compacted soil shall be considered impervious surface if they prevent infiltration.

Impoundment - A retention or detention facility designed to retain stormwater runoff and infiltrate it into the ground (in the case of a retention basin) or release it at a controlled rate (in the case of a detention basin).

Infiltration Structures - A structure designed to direct runoff into the ground (e.g. french drains, seepage pits, seepage trench, rain gardens, vegetated swales, pervious paving, infiltration basins, etc.).

Inlet - A surface connection to a closed drain. The upstream end of any structure through which water may flow.

Intermittent - A natural, transient body or conveyance of water that exists for a relatively long time, but for weeks or months of the year is below the local water table and obtains its flow from both surface runoff and groundwater discharges.

Invasive Vegetation (Invasives) - Plants which grow quickly and aggressively, spreading, and displacing other plants. Invasives typically are introduced into a region far from their native habitat. See Invasive Plants in Pennsylvania by the Department of Conservation and Natural Resources.

Karst - A type of topography or landscape characterized by features including but not limited to surface depressions, sinkholes, rock pinnacles/uneven bedrock surface, underground drainage, and caves. Karst is formed on carbonate rocks, such as limestone or dolomite.

Land Development - Any of the following activities:

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

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

Landowner - The legal or beneficial owner or owners of land including the holder of an option or contract to purchase (whether or not such option or contract is subject to any condition), a lessee if he is authorized under the lease to exercise the rights of the landowner, or other person having a proprietary interest in land.

Land Disturbance - Any activity involving grading, tilling, digging, or filling of ground or stripping of vegetation or any other activity that causes an alteration to the natural condition of the land.

Limiting Zone - A rock formation, other stratum, or soil condition which is so slowly permeable that it effectively limits downward passage of effluent¹². Season high water tables, whether perched or regional also constitute a limiting zone.

Lineament - A linear feature in a landscape which is an expression of an underlying geological structure such as a fault.

Main Stem (Main Channel) - Any stream segment or other runoff conveyance facility used as a reach in the Conestoga River hydrologic model.

Manning's Equation - An equation for calculation of velocity of flow (e.g. feet per second) and flow rate (e.g. cubic feet per second) in open channels based upon channel shape, roughness, depth of flow and slope. Manning's Equation assumes steady, gradually varied flow.

Maximum Extent Practicable (MEP) - Applies when the applicant demonstrates to the Municipality's satisfaction that the performance standard is not achievable. The applicant shall take into account the best available technology, cost effectiveness, geographic features, and other competing interests such as protection of human safety and welfare, protection of endangered and threatened resources, and preservation of historic properties in making the

assertion that the performance standard cannot be met and that a different means of control is appropriate.⁵

Memorandum of Understanding - An agreement between East Lampeter Township and the Lancaster County Conservation District to provide for cooperation between the Lancaster County Conservation District and the East Lampeter Township officials, Lancaster County, to include within its ordinances, and to jointly promote conservation of natural resources within East Lampeter Township on lands both public and private, for the purposes of preventing accelerated soil erosion and sedimentation of streams, reducing storm water damage, and promoting the health, safety and general welfare of the residents of East Lampeter Township.

MPC - The Pennsylvania Municipalities Planning Code, Act of 1968, P.L. 805, No. 247, as reenacted and amended, 53 P.S. Section 10101 et seq., and as may be amended in the future.

Municipal Separate Storm Sewer - A conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains), which is all of the following: (1) owned or operated by a state, city, town, borough, township, county, district, association or other public body (created under state law) having jurisdiction over disposal of sewage, industrial wastes, stormwater or other wastes; (2) designed or used for collecting or conveying stormwater; (3) not a combined sewer; and (4) not part of a Publicly Owned Treatment Works as defined at 40 CFR § 122.2.

Municipal Separate Storm Sewer System (MS4) - All separate storm sewers that are defined as “large” or “medium” or “small” municipal separate storm sewer systems pursuant to 40 CFR §§ 122.26(b)(18), or designated as regulated under 40 CFR § 122.26(a)(1)(v).

Municipality - The Township of East Lampeter, Lancaster County, Pennsylvania.

NRCS - Natural Resources Conservation Service (previously Soil Conservation Service, or SCS).

National Pollution Discharge Elimination System (NPDES) - A permit issued under 25 Pa. Code Chapter 92a (relating to National Pollutant Discharge Elimination System permitting, monitoring and compliance) for the discharge or potential discharge of pollutants from a point source to surface waters.

Native Vegetation - Plant species that have evolved or are indigenous to a specific geographical area. These plants are adapted to local soil and weather conditions as well as pests and diseases.

Natural Drainageway - An existing channel for water runoff that was formed by natural processes.

Natural Ground Cover - Ground cover which mimics the infiltration characteristics of predominant hydrologic soil group found at the site.

Nonpoint Source Pollution - Any source of water pollution that does not meet the legal definition of "point source" in section 502(14) of the Clean Water Act.

Non-structural BMPs - Planning and design approaches, operational and/or behavior-related practices which minimize stormwater runoff generation resulting from an alteration of the land surface or limit contact of pollutants with stormwater runoff.

Open Channel - A drainage element in which stormwater flows with an open surface. Open channels include, but shall not be limited to, natural and man-made drainage ways, swales, streams, ditches, canals, and pipes flowing partly full. Open channels may include closed conduits so long as the flow is not under pressure.

Outfall - Point where water flows from a conduit, stream, pipe, or drain.

Outlet - Points of water disposal from a stream, river, lake, tidewater or artificial drain.

Parking Lot Storage - Involves the use of impervious parking areas as temporary impoundments with controlled release rates during rainstorms.

PaDEP - The Pennsylvania Department of Environmental Protection, former entity the Pennsylvania Department of Environmental Resources, or any agency successor to the Pennsylvania Department of Environmental Protection [Note: The Department of Environmental Resources was abolished by Act 18 of 1995].

PaDOT - The Pennsylvania Department of Transportation or any agency successor thereto.

Parent Tract - All contiguous land held in single and separate ownership, regardless of whether (i) such land is divided into one or more lots, parcels, purparts or tracts; (ii) such land was acquired by the landowner at different times or by different deeds, devise, partition or otherwise; or (iii) such land is bisected by public or private streets or rights-of-way, which was held by the landowner or his predecessor in title on the effective date of this Ordinance.

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

Pervious Area - Any material / surface that allows water to pass through at a rate equal to or greater than Natural Ground Cover.

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

Plans - The stormwater management and erosion and sediment pollution control plans and narratives.

Planning Commission - The planning commission of East Lampeter Township, Lancaster County, Pennsylvania.

Probable Maximum Flood (PMF) - The flood that may be expected from the most severe combination of critical meteorologic and hydrologic conditions that are reasonably possible in any area. The PMF is derived from the probable maximum precipitation (PMP) as determined on the basis of data obtained from the National Oceanographic and Atmospheric Administration (NOAA).

Process Wastewater - Water that comes in contact with any raw material, product, by-product, or waste during any production or industrial process.

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

Rate Control - SWM controls used to manage the peak flows for the purposes of channel protection and flood mitigation.

Rational Formula (Rational Method) - A rainfall-runoff relation used to estimate peak flow.

Record Plan - Where a regulated activity constitutes a subdivision or land development, the Final Subdivision or Land Development plan which contains the information the Ordinance requires. Where a regulated activity does not constitute a subdivision or land development, a Storm Water Management Site plan containing all required information and prepared in a form acceptable to the Office of the Recorder of Deeds for recording.

Redevelopment - Any physical improvement to a previously developed lot that involves earthmoving, removal, or addition of impervious surfaces.

Regional Stormwater Management Plan - A plan to manage stormwater runoff from an area larger than a single Development Site. A Regional Stormwater Management Plan could include two adjacent parcels, an entire watershed, or some defined area in between. Regional Stormwater Management Plans can be prepared for new development, or as a retrofit to manage runoff from already developed areas.

Regulated Activities - Activities, including Earth Disturbance Activities that involve the alteration or development of land in a manner that may affect stormwater runoff. Regulated activities shall include, but not be limited to:

- Land Development subject to the requirements of the East Lampeter Township Subdivision and Land Development Ordinance;
- Removal of ground cover, grading, filling or excavation;
- Construction of new or additional impervious or semi-impervious surfaces (driveways, parking lots, etc.), and associated improvements;
- Construction of new buildings or additions to existing buildings;
- Installation or alteration of stormwater management facilities and appurtenances thereto;
- Diversion or piping of any watercourse; and,
- Any other regulated activities where the Municipality determines that said activities may affect any existing watercourse's stormwater management facilities, or stormwater drainage patterns.

Release Rate - For a specific design storm or list of design storms, the percentage of peak flow rate for existing conditions which may not be exceeded for the proposed conditions.

Release Rate Map - A graphical representation of the release rates for a specific area.

Retention Basin - A reservoir designed to retain storm water runoff with its primary release of water being through the infiltration of said water into the ground.

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

Riparian – Pertaining to a stream, river or other watercourse. Also, plant communities occurring in association with any spring, lake, river, stream or creek through which waters flow at least periodically⁶.

Riparian Buffer – A BMP that is an area of permanent vegetation along a watercourse.

Riparian Corridor – A narrow strip of land, centered on a stream or river that includes the floodplain as well as related riparian habitats adjacent to the floodplain⁶.

Riparian Corridor Easement – An easement created for the purpose of protecting and preserving a Riparian Corridor.

Riparian Forest Buffer – A type of Riparian Buffer that consists of permanent vegetation that is predominantly native trees, shrubs and forbs along a watercourse that is maintained in a natural state or sustainably managed to protect and enhance water quality, stabilize stream channels and banks, and separate land use activities from surface waters.

Riser - A vertical pipe extending from the bottom of a pond that is used to control the discharge rate from the pond for a specified design storm.

Rooftop Detention - Temporary ponding and gradual release of storm water falling directly onto flat roof surfaces by incorporating controlled-flow roof drains into building designs.

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

SCS - U.S. Department of Agriculture, Soil Conservation Service (now known as NRCS).

Sediment - Soils or other materials transported by stormwater as a product of erosion¹.

Sediment Basin - A barrier, dam, retention or detention basin located and designed to retain rock, sand, gravel, silt, or other material transported by water.

Sediment Pollution - The placement, discharge or any other introduction of sediment into the waters of the Commonwealth occurring from the failure to design, construct, implement or maintain control measures and control facilities in accordance with the requirements of this Ordinance.

Sedimentation - The action or process of forming or depositing sediment in Waters of this Commonwealth¹.

Seepage Pit/Seepage Trench - An area of excavated earth filled with loose stone or similar coarse material, into which surface water is directed for infiltration into the ground.

Semi-impervious / Semi-pervious Surface - A surface which prevents some infiltration of water into the ground.

Sheet Flow - Runoff which flows over the ground surface as a thin, even layer, not concentrated in a channel.

Small Project - Regulated activities that, measured on a cumulative basis from the date of enactment of this Ordinance, create new impervious areas of more than 500 sq. ft. residential use and 1000 sq. ft. agricultural use and less than (2,500 sq. ft. residential use and 5,000 sq. ft. agricultural use) or involve removal of ground cover, grading, filling, or excavation of an area less than 5,000 sq. ft. and do not involve the alteration of stormwater facilities or watercourses.

Small Storm Event - A storm having a frequency of recurrence of once every two (2) years or smaller.

Soil-Cover Complex Method - A method of runoff computation developed by the SCS (now NRCS) that is based on relating soil type and land use/cover to a runoff parameter called Curve Number (CN). For more information, see “Urban Hydrology for Small WATERSHEDS”, Second edition, Technical Release No. 55, SCS, June 1986 (or most current edition).

Soil Group, Hydrologic - See “Hydrologic Soil Group”.

Spillway - A depression in the embankment of a pond or basin which is used to pass a Post development 100 year storm peak flow rate.

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

Storage – A volume above or below ground that is available to hold stormwater.

Storage Indication Method - A reservoir routing procedure based on solution of the continuity equation (inflow minus outflow equals the change in storage) with outflow defined as a function of storage volume and depth.

Storm Event - A storm of a specific duration, intensity, and frequency.⁷

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

Storm Sewer - A system of pipes and/or open channels designed to convey stormwater.

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

Stormwater Management Act - Act of October 4, 1978, P.L. 864, No. 167, as amended 32 P.S. Section 680.1 et seq.

Stormwater Management Best Management Practices (SWM BMP) - See BMPs.

Stormwater Management Facility (SWM Facility) - Any structure, natural or man-made, that, due to its condition, design, or construction, conveys, stores, infiltrates/evaporates/transpires, cleans or otherwise affects stormwater runoff. Typical SWM facilities include, but are not limited to, detention and retention basins, open channels, watercourses, road gutters, swales, storm sewers, pipes, BMPs, and infiltration structures.

Stormwater Management Operation and Maintenance Plan (O & M Plan) - A plan, including a narrative, to ensure proper functioning of the SWM facilities in accordance with Article VI of this Ordinance.

Stormwater Management Site Plan (SWM Site Plan) - The Plan prepared by the Developer or his representative indicating how stormwater runoff will be managed at a particular development site according to this Ordinance.

Stream – A watercourse

Stream Enclosure - A bridge, culvert or other structure in excess of 100 feet in length upstream to downstream which encloses a regulated water of this Commonwealth.

Structural BMPs - Physical devices and practices that capture and treat stormwater runoff. Structural stormwater BMPs are permanent appurtenances to the Development Site.

Structure - Any man-made object having an ascertainable stationary location on or in land or water, whether or not affixed to the land.⁸

Subwatershed Area - The smallest drainage unit of a watershed for which storm water management criteria have been established in the Act 167 Plan.

Subdivision - The division or re-division of a single Lot, Tract or Parcel of land by any means into two (2) or more Lots, Tracts, Parcels or other divisions of land, including changes in existing Lot Lines for the purpose, whether immediate or future, of lease, partition by the court for distribution to heirs or devisees, transfer of ownership, or Building, or Lot development. Or As defined in the MPC.

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

SWM - Stormwater Management.

SWM Site Plan - A Stormwater Management Site Plan.

Timber Operations - See Forest Management.

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

Top of Streambank - First substantial break in slope between the edge of the bed of the stream and the surrounding terrain. The top of streambank can either be a natural or constructed (that

is, road or railroad grade) feature, lying generally parallel to the watercourse.

Township - The Township of East Lampeter, Lancaster County, Pennsylvania

TR-20 (calibrated) - The computer-based hydrologic modeling technique adapted to the appropriate watershed for the Act 167 Plan. The model has been “calibrated” to reflect published and observed flow values by adjusting key model input parameters.

Treatment Train - The sequencing of structural Best Management Practices to achieve optimal flow management and pollutant removal from urban stormwater.

USDA - United States Department of Agriculture.

Volume Control - SWM controls, or BMPs, used to remove a predetermined amount of runoff or the increase in volume between the pre- and post-development design storm.

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

Watershed - The entire region or area drained by a watercourse.

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

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, ferns, and similar areas.

Woodland – Land predominantly covered with trees and shrubs. Without limiting the foregoing, Woodlands include all land areas of 10,000 square feet or greater, supporting at least 100 trees per acre, so that either (i) at least 50 trees are two inches or greater in [diameter at breast height] [(DBH)], or (ii) 50 trees are at least 12 feet in height.

ARTICLE III. DESIGN CRITERIA FOR STORMWATER MANAGEMENT FACILITIES

Section 301. GENERAL REQUIREMENTS

- A. Preparation of a SWM Site Plan is required for all regulated activities, unless preparation and submission of the SWM Site Plan is specifically exempted according to Section 502 or the activity qualifies as a Small Project.
- B. No regulated activities shall commence until the Township issues unconditional written approval of a SWM Site Plan or Stormwater Permit.
- C. SWM Site Plans approved by the Township, in accordance with Section 505, shall be on site throughout the duration of the regulated activity.
- D. The Township 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. The Township shall maintain a record of consultations with DEP pursuant to this paragraph. Where an NPDES permit for stormwater discharges associated with construction activities is required, issuance of an NPDES permit shall constitute satisfaction of consultation with DEP.
- E. For all regulated activities, erosion and sediment control and stormwater management BMPs shall be designed, implemented, operated, and maintained to meet the purposes and requirements of this Ordinance and to meet all requirements under Title 25 of the Pennsylvania Code and the Clean Streams Law. Various BMPs and their design standards are listed in the *Erosion and Sediment Pollution Control Program Manual* (E&S Manual)⁹, No. 363-2134-008 (March 2012), as amended and updated, and the BMP Manual.
- F. Developers have the option to propose a Regional Stormwater Management Plan or participate in a Regional Stormwater Management Plan developed by others. A Regional Stormwater Management Plan may include offsite volume and rate control, as appropriate and supported by a detailed design approved by the Township in accordance with Section 301.D. A Regional Stormwater Management Plan must meet all of the volume and rate control standards required by this Ordinance for the area defined by the Regional Stormwater Management Plan, but not necessarily for each individual Development Site. Appropriate agreements must be established to ensure the requirements of this ordinance and the requirements of the Regional Stormwater Management Plan are met.

- G. Unless prohibited by the East Lampeter Township Zoning Ordinance or any Ordinance which regulates construction and development within the areas of East Lampeter Township subject to flooding, and any other applicable requirements of the Floodplain Management Act, stormwater management facilities located in the floodplain are permitted when designed and constructed in accordance with the provisions of the BMP Manual, regulatory requirements and the requirements of this ordinance.
- H. Impervious areas:
1. The measurement of impervious area shall include all of the impervious areas in the total proposed development even if development is to take place in stages or phases.
 2. For development taking place in stages or phases, the entire development plan must be used in determining conformance with this Ordinance.
 3. Any areas designed to initially be gravel or crushed stone shall be assumed to be impervious.
- I. 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. Protect and/or improve the function of floodplains, wetlands, and wooded areas.
 - b. Protect and/or improve native plant communities including those within the riparian corridor.
 - c. Protect and/or improve natural drainageways from erosion.
 - d. Minimize thermal impacts to waters of this Commonwealth.
 - e. Disconnect impervious surfaces by directing runoff to pervious areas, wherever possible.
- J. The design of all stormwater management facilities over karst shall include an evaluation of measures to minimize adverse effects.

- K. Infiltration BMPs shall 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. Infiltration BMPs shall include pretreatment BMPs unless shown to be unnecessary.
- L. Infiltration BMPs intended to receive runoff from developed areas shall be selected based on suitability of soils and Development Site conditions and shall be constructed on soils that have the following characteristics:
 - 1. A minimum depth of 24 inches between the bottom of the facility and the limiting zone, unless it is demonstrated to the satisfaction of the Township that the selected BMP has design criteria which allow for a smaller separation.
 - 2. A stabilized infiltration rate sufficient to accept the additional stormwater load and drain completely as determined by field tests conducted by the Applicant's professional designer.
 - a. The stabilized infiltration rate is to be determined in the same location and within the same soil horizon as the bottom of the infiltration facility.
 - b. The stabilized infiltration rate is to be determined as specified in the BMP Manual.
- M. The calculation methodology to be used in the analysis of volume and peak rates of discharge shall be as required in Section 305.
- N. A planting plan is required for all vegetated stormwater BMPs.
 - 1. Native or Naturalized/Non-invasive Vegetation suitable to the soil and hydrologic conditions of the Development Site shall be used unless otherwise specified in the BMP Manual.
 - 2. Invasive Vegetation may not be included in any planting schedule. (See Invasive Plants in Pennsylvania by the Department of Conservation and Natural Resources (DCNR))
 - 3. The limit of existing, native vegetation to remain shall be delineated on the plan along with proposed construction protection measures.

4. Prior to construction, a tree protection zone shall be delineated at the Dripline of the tree canopy. All trees scheduled to remain during construction shall be marked; however, where groups of trees exist, only the trees on the outside edge need to be marked. A 48 inch high snow fence or 48 inch high construction fence mounted on steel posts located 8 feet on center shall be placed along the tree protection boundary. No construction, storage of material, temporary parking, pollution of soil, or regrading shall occur within the tree protection zone.
5. All planting shall be performed in conformance with good nursery and landscape practice. Plant materials shall conform to the standards recommended by the American Association of Nurseryman, Inc. in the American Standard of Nursery Stock.
 - a. Planting designs are encouraged to share planting space for optimal root growth whenever possible.
 - b. No staking or wiring of trees shall be allowed without a maintenance note for the stake and/or wire removal within one year of planting.
- O. Areas proposed for infiltration BMPs shall be protected from sedimentation and compaction during the construction phase to maintain maximum infiltration capacity. Staging of earthmoving activities and selection of construction equipment should consider this protection.
- P. Infiltration BMPs shall not be constructed nor receive runoff from disturbed areas until the entire contributory drainage area to the infiltration BMP has achieved final stabilization.
- Q. A minimum ten (10) foot wide access easement shall be provided for all stormwater facilities with tributary areas equal or greater than 1000 sq. ft. and not located within a public right-of-way. Easements shall provide for ingress and egress to a public right-of-way.
- R. The Township may require additional stormwater control measures for stormwater discharges to special management areas including but not limited to:
 1. Water bodies listed as "impaired" on Pennsylvania's Clean Water Act 303(d)/305(b) Integrated List.

2. Any water body or watershed with an approved Total Maximum Daily Load (TMDL).
 3. Critical areas with sensitive resources (e.g., state designated special protection waters, cold water fisheries, carbonate or other groundwater recharge areas highly vulnerable to contamination, drainage areas to water supply reservoirs, source water protection zones, etc.)
- S. Roof drains and sump pumps shall be tributary to infiltration or vegetative BMPs. Use of catchment facilities for the purpose of reuse is also permitted.
- T. Non-structural BMPs shall be utilized for all regulated activities unless proven to be impractical.

Section 302. VOLUME CONTROLS

Volume control BMPs are intended to maintain existing hydrologic conditions for small storm events by promoting groundwater recharge and/or evapotranspiration as described in this section. Runoff volume controls shall be implemented using the *Design Storm Method* described in Subsection 302.A. below, or through continuous modeling approaches or other means as described in the BMP Manual. Small Projects may use the method described in Subsection 302.B. to design volume control BMPs.

- A. The *Design Storm Method* 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 storm event.
 2. For modeling purposes:
 - a. Existing (predevelopment) non-forested pervious areas must be considered meadow in good condition.
 - b. When the existing project site contains impervious area, twenty percent (20%) of existing impervious area to be disturbed shall be considered meadow in good condition in the model for existing conditions.
 - c. The maximum loading ratio for volume control facilities in Karst areas shall be 3:1 impervious drainage area to infiltration area and 5:1 total drainage area to infiltration area. The maximum loading

ratio for volume control facilities in non-Karst areas shall be 5:1 impervious drainage area to infiltration area and 8:1 total drainage area to infiltration area. A higher ratio may be approved by the Township if justification is provided. Hydraulic depth may be used as an alternative to an area based loading ratio if the design hydraulic depth is shown to be less than the depth that could result from the maximum area loading ratio

- B. Volume Control for Small Projects
 - 1. At least the first one inch (1") of runoff from new impervious surfaces or an equivalent volume shall be permanently removed from the runoff flow – i.e. it shall not be released into the surface Waters of this Commonwealth. Removal options include reuse, evaporation, transpiration and infiltration.
- C. A detailed geologic evaluation of the Development Site shall be performed in areas of carbonate geology to determine the design parameters of recharge facilities. A report shall be prepared in accordance with Section 405.A of this Ordinance.
- D. Storage facilities, including normally dry, open top facilities, shall completely drain the volume control storage over a period of time not less than 24 hours and not more than 72 hours from the end of the design storm. Any designed infiltration at such facilities is exempt from the minimum 24 hour standard, i.e. may infiltrate in a shorter period of time, provided that none of this water will be discharged into Waters of this Commonwealth.
- E. Any portion of the volume control storage that meets the following criteria may also be used as rate control storage;
 - 1. Volume control storage that depends on infiltration is designed according to the infiltration standards in Section 301.
 - 2. The volume control storage which will be used for rate control is that storage which is available within 24 hours from the end of the design storm based on the stabilized infiltration rate and/or the evapo-transpiration rate.
- F. Volume control storage facilities designed to infiltrate shall avoid the least permeable Hydrologic Soil Group(s) at the Development Site.

Section 303. RATE CONTROLS

Rate control for large storms, up to the 100-year event, is essential to protect against immediate downstream erosion and flooding.

A. Match Pre-development Hydrograph

Applicants shall provide infiltration facilities or utilize other techniques which will allow the post-development 100 year hydrograph to match the pre-development 100 year hydrograph, along all parts of the hydrograph, for the Development Site. To match the pre-development hydrograph, the post development peak rate must be less than or equal to the pre-development peak rate, and the post development runoff volume must be less than or equal to the pre-development volume for the same storm event. A shift in hydrograph peak time of up to five minutes and a rate variation of up to 5% at a given time may be allowable to account for the timing affect of BMPs used to manage the peak rate and runoff volume. "Volume Control" volumes as given in Section 302 above may be used as part of this option.

B. Where the pre-development hydrograph cannot be matched, one of the following shall apply:

1. For areas not covered by a release rate map from an approved Act 167 Plan:

Post development discharge rates shall not exceed the predevelopment discharge rates for the 2, 10, 25, 50, and 100-year 24-hour storm events*. 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 predevelopment 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.

* A 24 hour SCS type II storm or an IDF Curve Rational Method storm. See Table III-1 in Section 305.

2. For areas covered by a release rate map from an approved Act 167 Plan:

For the 2, 10, 25, 50, and 100-year storm events*, the post development peak discharge rates will follow the applicable approved release rate maps for the Conestoga River Act 167 Watershed and the Mill Creek Act 167 Watershed.

*A 24 hour SCS type II storm or an IDF Curve Rational Method storm. See Table III-1 in Section 305.

- C. Normally dry, open top, storage facilities shall completely drain the rate control storage over a period of time less than or equal to 24 hours from the peak 100 year water surface design elevation.
- D. A variety of BMPs should be employed and tailored to suit the Development Site. The following is a partial listing of BMPs which can be utilized in SWM systems for rate control where appropriate:
 - 1. Decreased impervious surface coverage
 - 2. Routed flow over grass
 - 3. Grassed channels and vegetated strips.
 - 4. Bio-retention areas (rain gardens)
 - 5. Concrete lattice block or permeable surfaces
 - 6. Seepage pits, seepage trenches or other infiltration structures
 - 7. Rooftop detention
 - 8. Parking lot detention
 - 9. Cisterns and underground reservoirs
 - 10. Amended soils
 - 11. Retention basins
 - 12. Detention basins
 - 13. Other methods as may be found in the BMP Manual.
- E. Small Projects are not required to provide for Rate Control.

Section 304. STORMWATER MANAGEMENT PERFORMANCE STANDARDS

- A. Runoff from impervious areas shall be drained to pervious areas within the Development Site, unless the site has 85% or more impervious cover and is a Redevelopment¹⁰, in which case the portion of the site that discharges to pervious areas shall be maximized.
- B. Stormwater runoff from a Development Site to an adjacent property shall flow directly into a natural drainageway, watercourse, or into an existing storm sewer system, or onto adjacent properties in a manner similar to the runoff characteristics of the pre-development flow.
- C. Stormwater flows onto adjacent property shall not be created, increased, decreased, relocated, or otherwise altered without written notification of the adjacent property owner(s) by the developer. Such stormwater flows shall be subject to the requirements of this Ordinance, including the establishment of a drainage easement. Copies of all such notifications shall be included in SWM Site Plan submissions.
- D. Existing on-site natural and man-made SWM facilities shall be used to the maximum extent practicable.
- E. Stormwater runoff shall not be transferred from one sub-watershed to another unless they are sub-watersheds of a common watershed that join together within the perimeter of the Development Site and the effect of the transfer does not alter the peak discharge onto adjacent lands.
- F. Minimum floor elevations for all structures that would be affected by a basin, other temporary impoundments, or open conveyance systems where ponding may occur shall be two (2) feet above the 100-year water surface elevation. If basement or underground facilities are proposed, detailed calculations addressing the effects of stormwater ponding on the structure and water-proofing and/or flood-proofing design information shall be submitted for approval.
- G. All stormwater conveyance facilities (excluding detention, retention, and wetland basin outfall structures) shall be designed to convey a 25 year storm event*. All stormwater conveyance facilities (excluding detention, retention, and wetland basin outfall structures) conveying water originating from offsite shall be designed to convey a 50 year storm event*. Safe conveyance of the 100-year runoff event* to appropriate peak rate control BMPs must be demonstrated in the design.

* A 24 hour SCS Type II storm or an IDF Curve Rational Method storm.

- H. Erosion protection shall be provided along all open channels, and at all points of discharge. Flow velocities from any storm sewer may not result in erosion of the receiving channel.

Section 305. CALCULATION METHODOLOGY

- A. Any stormwater runoff calculations involving drainage areas greater than 200 acres and time of concentration (Tc) greater than 60 minutes, including on- and off-site areas, shall use generally accepted calculation techniques based on the NRCS soil-cover complex method.
- B. Stormwater runoff from all Development Sites shall be calculated using either the modified rational method, a soil-cover-complex methodology, or other method acceptable to the Municipality. Table III-1 summarizes acceptable computation methods. It is assumed that all methods will be selected by the design professional based on the individual limitations and suitability of each method for a particular Development Site.

TABLE III-1 ACCEPTABLE COMPUTATION METHODOLOGIES FOR STORMWATER MANAGEMENT PLANS		
METHOD	METHOD DEVELOPED BY	APPLICABILITY
TR-20 (or commercial computer package based on TR-20)	USDA NRCS	Applicable where use of full hydrology computer model is desirable or necessary.
WinTR-55 (or commercial computer package based on TR-55)	USDA NRCS	Applicable for land development plans within limitations described in TR-55.
HEC-1 / HEC-HMS	US Army Corps of Engineers	Applicable where use of full hydrologic computer model is desirable or necessary.
Rational Method (or commercial computer package based on Rational Method)	Emil Kuichling (1889)	For development sites less than 200 acres, Tc<60 min. or as approved by the Municipality.

EFH2	USDA NRCS	Applicable in rural and undeveloped areas subject to the Program Limits.
Other Methods	Varies	Other methodologies approved by the Municipality.

- C. If the SCS method is used, Antecedent Moisture Condition 1 is to be used in areas of carbonate geology, and Antecedent Moisture Condition 2 is to be used in all other areas. A type II distribution shall be used in all areas.
- D. If the Rational Method is used, the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 data (see item “B” above) or PennDOT Publication 584 “PennDOT Drainage Manual,” 2008 Edition, or latest, shall be used to determine the rainfall intensity in inches per hour based on the information for the 5 through 60 minute duration storm events.
- E. Hydrographs may be obtained from NRCS methods such as TR-55, TR20, or from use of the “modified” or “unit hydrograph” rational methods. If “modified” or “unit hydrograph” rational methods are used, the ascending leg of the hydrograph shall have a length equal to three times the time of concentration ($3 \times T_c$) and the descending leg shall have a length equal to 7 times the time of concentration ($7 \times T_c$) to approximate an SCS Type II hydrograph.¹¹
- F. Runoff calculations shall include a hydrologic and hydraulic analysis indicating volume and velocities of flow and the grades, sizes, and capacities of water carrying structures, sediment basins, retention and detention structures and sufficient design information to construct such facilities. Runoff calculations shall also indicate both pre-development and post-development rates for peak discharge of stormwater runoff from all discharge points.
- G. For the purpose of calculating pre-development peak discharges, all runoff coefficients, both on-site and off-site, shall be based on actual land use assuming summer or good land conditions. Post-development runoff coefficients for off-site discharges used to design conveyance facilities shall be based on actual land use assuming winter or poor land conditions.
- H. Criteria and assumptions to be used in the determination of stormwater runoff and design of management facilities are as follows:
 - 1. Runoff coefficients shall be based on the information contained in Appendix NO. 6 and NO. 7 if the actual land use is listed in those

Appendices. If the actual land use is not listed in these Appendices, runoff coefficients shall be chosen from other published documentation, and a copy of said documentation shall be submitted with the SWM Site Plan.

2. A sample worksheet for calculating T_c is provided in Appendix NO. 10. Times of concentration (T_c) shall be based on the following design parameters:
 - a. Sheet flow: The maximum length for each reach of sheet or overland flow before shallow concentrated or open channel flow develops is one hundred fifty (150) feet. Flow lengths greater than one hundred (100) feet shall be justified based on the actual conditions at each Development Site. Sheet flow may be determined using the nomograph in Appendix NO. 09, or the Manning's kinematic solution shown in the Sheet Flow section of Worksheet No. 1 in Appendix NO. 10.
 - b. Shallow concentrated flow: Travel time for shallow concentrated flow shall be determined using Figure 3-1 from TR-55, Urban Hydrology for small watersheds, as shown in Appendix NO. 11.
 - c. Open Channel flows: At points where sheet and shallow concentrated flows concentrate in field depressions, swales, gutters, curbs, or pipe collection systems, the travel times to downstream end of the Development Site between these design points shall be based upon Manning's Equation and/or acceptable engineering design standards as determined by the Municipal Engineer.
 3. The developer may use stormwater credits for Non-Structural BMPs in accordance with the BMP Manual. The allowable reduction will be determined by the Municipality.
 4. Peak rate control is not required for off-site runoff. Off-site runoff may be by-passed around the site provided all other discharge requirements are met. If offsite runoff is routed through rate control facilities, runoff coefficients for off-site discharges used to design those rate control facilities shall be based on actual land use assuming winter or poor land conditions.
- I. Times of Concentration shall be calculated based on the methodology recommended in the respective model used. Times of Concentration for channel

and pipe flow shall be computed using Manning's equation. Supporting documentation and calculations must be submitted for review and approval.

Section 306. RIPARIAN CORRIDORS

- A. In order to protect and improve water quality, a Riparian Corridor Easement shall be created and recorded as part of any subdivision or land development that encompasses a Riparian Corridor.
- B. Except as otherwise required by Chapter 102, the Riparian Corridor Easement shall be measured to be the greater of the limit of the 100 year floodplain or 35 feet from the top of streambank (on each side).
- C. Minimum Management Requirements for Riparian Corridors.
 - 1. Existing native vegetation shall be protected and maintained within the Riparian Corridor Easement.
 - 2. Whenever practicable invasive vegetation shall be actively removed and the Riparian Corridor Easement shall be planted with native trees, shrubs and other vegetation to create a diverse native plant community appropriate to the intended ecological context of the site.
- D. The Riparian Corridor Easement shall be enforceable by the municipality and shall be recorded in the Lancaster County Recorder of Deeds Office, so that it shall run with the land and shall limit the use of the property located therein. The easement shall allow for the continued private ownership and shall count toward the minimum lot area as required by Zoning, unless otherwise specified in the municipal Zoning Ordinance.
- E. Any permitted use within the Riparian Corridor Easement shall be conducted in a manner that will maintain the extent of the existing one-hundred-year floodplain, improve or maintain the stream stability, and preserve and protect the ecological function of the floodplain.
- F. The following conditions shall apply when public and/or private recreation trails are permitted within Riparian Corridors:
 - 1. Trails shall be for non-motorized use only.
 - 2. Trails shall be designed to have the least impact on native plant species and other sensitive environmental features.

- G. Septic drainfields and sewage disposal systems shall not be permitted within the Riparian Corridor Easement and shall comply with setback requirements established under 25 Pa Code Chapter 73.

SECTION 307. STORMWATER MANAGEMENT FACILITY DESIGN STANDARDS

- A. Above ground storage facilities. Above ground storage facilities consist of all stormwater facilities which store, infiltrate/evaporate/transpire, clean or otherwise affect stormwater runoff and the top of which is exposed to the natural environment. Above ground storage facilities are located above the finished ground elevation. Above ground storage facilities do not include stormwater management facilities designed for conveyance or cisterns.

1. Design criteria. Above ground storage facilities shall comply with the design criteria in the following table:

Above-ground storage facility design criteria			
	Facility Depth		
	Less than 2 feet	2 feet to 8 feet	Greater than 8 feet
(a) Embankment Geometry			
[1] Top width (minimum)	2 feet	5 feet	8 feet
[2] Interior side slope (maximum)	2 : 1	3 : 1	5 : 1
[3] Exterior side slope (maximum)	2 : 1	3 : 1	3 : 1
(b) Embankment construction			
[1] Key trench	Not required	Required	Required
[2] Pipe collar	Not required	Required	Required
[3] Compaction density	Not required	Required	Required
(c) Internal Construction			
[1] Dewatering feature	N/A	Required	Required
[2] Pretreatment elements	Not required*	Required	Required
(d) Outlet Structure			
[1] Pipe size (minimum)	6 inches	12 inches	15 inches
[2] Pipe material	SLHDPE, PVC, RCP	SLHDPE, RCP	RCP
[3] Anticlogging devices	Required	Required	Required
[4] Antivortex design	Not required	Required	Required
[5] Watertight joints in piping?	No	Yes	Yes
(e) Spillway Requirements			
[1] Spillway freeboard (minimum)	Not required	3 inches	6 inches
[2] Width (minimum)	Not required	10 feet	20 feet
[3] Width (maximum)	Not required	50 feet	50 feet
[4] Spillway channel design	Not required	Required	Required

Above-ground storage facility design criteria			
	Facility Depth		
	Less than 2 feet	2 feet to 8 feet	Greater than 8 feet
[5] Routing of 100 year storm	Permitted	Permitted	Permitted

*Pretreatment required for infiltration BMPs unless shown to be unnecessary.

N/A = Not applicable

SLHDPE = Smooth lined high density polyethylene pipe; PVC = Polyvinyl chloride;

RCP = Reinforced concrete pipe

2. Facility depth.

- a. For the purposes of the design criteria, the facility depth is defined to be the depth between the bottom invert of the lowest orifice and the invert of the spillway. If there is no spillway, the top of the berm shall be used. For basins with no orifices or outlet structure, the bottom elevation of the basin shall be used.
- b. Facilities with a facility depth greater than eight feet (8 feet) shall not be permitted in residential areas.
- c. Facilities with a facility depth greater than 15 feet require a dam permit from DEP.

3. Embankment construction.

- a. Impervious core/key trench. An impervious core/key trench, when required, shall consist of a cutoff trench (below existing grade) and a core trench (above existing grade). A key trench may not be required wherever it can be shown that another design feature, such as the use of an impermeable liner, accomplishes the same purpose.
 - i. Materials. Materials used for the core shall conform to the Unified Soil Classification GC, SC, CH, or CL and must have at least 30% passing the No. 200 sieve.
 - ii. Dimensions.
 - (a) The dimensions of the core shall provide a minimum trench depth of two (2) feet below existing grade, minimum width of four (4) feet and side slope of 1H:1V or flatter.

- (b) The core should extend up both abutments to the 10 year water surface elevation or six (6) inches below the emergency spillway elevation, whichever is lower.
 - (c) The core shall extend four (4) feet below any pipe penetrations through the impervious core. The core shall be installed along or parallel to the centerline of the embankment.
 - iii. Compaction.
 - (a) Compaction requirements shall be the same as those for the embankment to assure maximum density and minimum permeability.
 - (b) The core shall be constructed concurrently with the outer shell of the embankment.
 - (c) The trench shall be dewatered during backfilling and compaction operations.
- b. Pipe collars. All pipe collars, when required, shall be designed in accordance with Chapter 7 of the DEP E&S Manual. The material shall consist of concrete or otherwise non-degradable material around the outfall barrel and shall be watertight.
- c. Embankment fill material. The embankment fill material shall be taken from an appropriate borrow area which shall be free of roots, stumps, wood, rubbish, stones greater than 6 inches, frozen or other objectionable materials.
- d. Embankment compaction. When required, embankments shall be compacted by sheepsfoot or pad roller. The loose lift thickness shall be nine (9) inches or less, depending on roller size, and the maximum particle size is six (6) inches or less (two-thirds of the lift thickness). Five passes of the compaction equipment over the entire surface of each lift is required. Embankment compaction to visible non-movement is also required.

4. Internal construction.

- a. Bottom slope. The minimum bottom slope of facilities not designed for infiltration shall be one percent (1%). A flatter slope may be used if an equivalent dewatering mechanism is provided.
- b. Dewatering features. When required, dewatering shall be provided through the use of underdrain, surface device, or alternate approved by the Township Engineer. If the facility is to be used for infiltration, the dewatering device should be capable of being disconnected and only be made operational if the basin is not dewatering within the required timeframe.
- c. Pretreatment elements. When required, pretreatment elements shall consist of forebays, or alternate approved by the Township Engineer, to keep silt to a smaller portion of the facility for ease of maintenance.
- d. Infiltration basins. Within basins designed for infiltration, existing native vegetation shall be preserved, if possible. For existing unvegetated areas or for infiltration basins that require excavation, a planting plan shall be prepared in accordance with § 301.N and the BMP Manual which is designed to promote infiltration.

5. Outlet configuration.

- a. For facilities with a depth of two (2) feet or greater, a type D-W endwall or riser box outlet structure shall be provided.
- b. For facilities with a depth less than two (2) feet, no outlet structure is required.
- c. All discharge control devices with appurtenances shall be made of reinforced concrete and stainless steel. Bolts/fasteners shall be stainless steel.

6. Spillway.

- a. Material. The spillway shall be designed to provide a non-erosive, stable condition when the project is completed.

- b. Non-emergency use. Use of the spillway to convey flows greater than the 50-year design storm is permitted.
 - c. Emergency use. The spillway shall be designed to convey the 100-year peak inflow.
 - d. When required, freeboard shall be measured from the top of the water surface elevation for emergency use.
7. Breach analysis. The Township may require a breach analysis based on site-specific conditions and concern of threat for downstream property. When required, the breach analysis shall be conducted in accordance with the NRCS methodology, the US Army Corps of Engineers methodology (HEC-1) or other methodologies as approved by the Township.
- B. Subsurface storage facilities. Subsurface storage facilities consist of all stormwater facilities which store, infiltrate/evaporate/transpire, clean or otherwise affect stormwater runoff and the top of which is not exposed to the natural environment. Subsurface facilities are located below the finished ground elevation. Subsurface facilities do not include stormwater management facilities designed for conveyance.
1. Design criteria. Subsurface storage facilities shall comply with the design criteria in the following table:

Subsurface storage facility design criteria		
	Facility Type	
	Infiltration and Storage	Storage without Infiltration
(a) Facility Geometry		
[1] Depth from surface (maximum)	2 feet less than limiting zone	N/A
[2] Loading ratio (maximum)	Per BMP Manual*	N/A
(b) Distribution System Requirements		
[1] Pipe size (minimum)	4 inches	4 inches
[2] Pretreatment	Required	Required
[3] Loading/balancing	Required	Not required
[4] Observation/access ports	Required	Required

*Unless otherwise determined by professional geologic evaluation.

2. Distribution system requirements.
 - a. Pretreatment requirements. The facility shall be designed to provide a method to eliminate solids, sediment, and other debris from entering the subsurface facility.
 - b. Loading/balancing. The facility shall be designed to provide a means of evenly balancing the flow across the surface of the facility to be used for infiltration.
 - c. Observation/access ports.
 - i. For facilities with the bottom less than five (5) feet below the average grade of the ground surface, a clean-out shall be an acceptable observation port.
 - ii. For facilities with the bottom five (5) feet or more below the average grade of the ground surface, a manhole or other means acceptable to the Township shall be provided for access to and monitoring of the facility.
 - iii. The number of access points shall be sufficient to flush or otherwise clean out the system.
3. Materials.
 - a. Pipe material. Distribution system piping may be PVC, SLHDPE, or RCP.
 - b. Stone for infiltration beds. The stone used for infiltration beds shall be clean washed, uniformly graded coarse aggregate (AASHTO No. 3 or equivalent approved by the Township). The void ratio for design shall be assumed to be 0.4.
 - c. Backfill material. Material consistency and placement depths for backfill shall be (at a minimum) per all applicable pipe manufacturer's recommendations, further providing it should be free of large (not exceeding 6 inches in any dimension) objectionable or detritus material. Select non-aggregate material should be indigenous to the surrounding soil material for non-vehicular areas. Backfill within vehicular areas shall comply with this section unless otherwise specified in governing municipal road/street or subdivision and land development ordinances. Furthermore, if the design concept includes the migration of

runoff through the backfill to reach the infiltration facility, the material shall be well drained, free of excess clay or clay like materials and generally uniform in gradation.

- d. Lining material. Non-woven geotextiles shall be placed on the sides and top of subsurface infiltration facilities. No geotextiles shall be placed on the bottom of subsurface infiltration facilities.

4. Cover.

- a. When located under pavement, the top of the subsurface facility shall be a minimum of three (3) inches below the bottom of pavement subbase.
- b. Where located under vegetative cover, the top of the subsurface facility shall be a minimum of 12 inches below the surface elevation or as required to establish vegetation.

- 5. Subsurface facilities shall be designed to safely convey and/or bypass flows from storms exceeding the design storm.

- C. Conveyance Facilities. Conveyance facilities consist of all stormwater facilities which carry flow, which may be located either above or below the finished grade. Conveyance facilities do not include stormwater management facilities which store, infiltrate/evaporate/transpire, or clean stormwater runoff.

- 1. Design criteria. Conveyance facilities shall comply with the design criteria in the following table:

Conveyance facility design criteria			
Location	Within public street right-of-way	Outside public street right-of-way	
Loading	All	Vehicular loading	Non-vehicular loading
(a) Pipe design			
[1] Material	SLHDPE, RCP	PVC, SLHDPE, RCP	PVC, SLHDPE, RCP
[2] Slope (minimum)	0.5%	0.5%	0.5%
[3] Cover	1 foot to stone subgrade	1 foot to stone subgrade	1 foot to surface
[4] Diameter (minimum)	15 inches	15 inches	8 inches
[5] Street crossing angle	75° to 90°	N/A	N/A
[6] Access/maintenance port frequency (maximum)	400 feet	400 feet	600 feet
(b) Inlet design			

[1] Material	Concrete	Concrete	N/A
[2] Grate depression	2 inches	2 inches	1 inch minimum
(c) Manhole design			
[1] Material	Concrete	Concrete	Concrete
(d) Swale design			
[1] Freeboard (minimum)	6 inches	N/A	6 inches
[2] Velocity (maximum)	Stability check	N/A	Stability check
[3] Slope (minimum)	1%	N/A	1%
[4] Side slopes (residential area)	4 : 1 max	N/A	4 : 1 max
[5] Side slopes (non-residential area)	4 : 1 max	N/A	3 : 1 max
[6] Bottom width to flow depth ratio	12 : 1	N/A	12 : 1
(e) Outlet design			
[1] End treatment	Headwall/endwall	N/A	Headwall/ endwall or flared end section
[2] Energy dissipater	Required	N/A	Required

N/A = Not applicable or no criteria specified

SLHDPE = Smooth lined high density polyethylene pipe; PVC = Polyvinyl chloride;

RCP = Reinforced concrete pipe

2. Conveyance pipes, culverts, manholes, inlets and endwalls within the public street right-of-way or proposed for dedication shall conform to the requirements of PennDOT Standards for Roadway Construction, Publication No. 72M. Conveyance pipes, culverts, manholes, inlets and endwalls which are otherwise subject to vehicular loading shall be designed for the HS-25 loading condition.
3. Conveyance pipes.
 - a. Backfill requirements. Backfill material. Material consistency and placement depths for backfill shall be (at a minimum) per all applicable pipe manufacturer's recommendations, further providing it should be free of large (not exceeding 6 inches in any dimension) objectionable or detritus material. Select non-aggregate material should be indigenous to the surrounding soil material for non-vehicular areas. Backfill within vehicular areas shall comply with this section unless otherwise specified in governing municipal road/street or subdivision and land development ordinances.

- b. Inlets or manholes shall be placed at all points of changes in the horizontal or vertical directions of conveyance pipes. Curved pipe sections are prohibited.
- c. Access/maintenance ports. An access/maintenance port is required may either be an inlet or manhole.
- d. Watertight joints shall be provided where pipe sections are joined, except for perforated pipe installed as pavement base drain.
- e. The street crossing angle shall be measured between the pipe centerline and the street centerline.
- f. Elliptical pipe of an equivalent cross-sectional area may be substituted in lieu of circular pipe where cover or utility conflict conditions exist.
- g. The roughness coefficient (Manning “n” values) used for conveyance pipe capacity calculations should be determined in accordance with PennDOT Publication 584, PennDOT Drainage Manual, or per the manufacturer’s specifications.

4. Inlets.

- a. All pipes must enter inlets completely through one of the sides. No corner entry of pipes is permitted.
- b. Within the public street right-of-way, the gutter spread based on the 25-year storm shall be no greater than one half of the travel lane and have a maximum depth of three inches (3 inches) at the curb line. A parking lane shall not be considered as part of the travel lane. In the absence of pavement markings separating a travel lane from the parking lane, the parking lane shall be assumed to be seven feet (7 feet) wide if parking is permitted on the street.
- c. Flow depth within intersections. Within intersections of streets, the maximum depth of flow shall be one and one-half inches (1 ½ inches) based on the 25-year storm.
- d. Curbed streets.
 - i. Inlets in streets shall be located along the curb line.

- ii. Top units shall be PennDOT Type “C”. The hood shall be aligned with the adjacent curb height.
- iii. All inlets placed in paved areas shall have heavy duty bicycle-safe grating consistent with PennDOT Publication 72M, latest edition. A note to this effect shall be added to the SWM Site Plan or inlet details therein.
- iv. Inlets, junction boxes, or manholes greater than five feet (5 feet) in depth shall be equipped with ladder rungs and shall be detailed on the SWM Site Plan.

5. Swales.

- a. A swale shall be considered as any man-made ditch designed to convey stormwater directly to another stormwater management facility or surface waters.
- b. Inlets within swales shall have PennDOT Type “M” top units or equivalent approved by the Township engineer.
- c. Swale capacities and velocities shall be computed using the Manning equation using the following design parameters:
 - i. Vegetated swales.
 - (a) The first condition shall consider swale stability based upon a low degree of retardance (“n” = 0.03);
 - (b) The second condition shall consider swale capacity based upon a higher degree of retardance (“n” = 0.05); and
 - (c) All vegetated swales shall have a minimum slope of 1% unless otherwise approved by the Township Engineer.
 - ii. The “n” factors to be used for paved or riprap swales or gutters shall be based upon accepted engineering design practices, as approved by the Township Engineer.

- d. All swales shall be designed to maximize infiltration and concentrate low flows to minimize siltation and meandering, unless geotechnical conditions do not permit infiltration.
- 6. Culverts. In addition to the material requirements in this section, culverts designed to convey Waters of the Commonwealth may be constructed with either a corrugated metal arch or a precast concrete culvert.
- 7. Level spreaders.
 - a. Shall discharge at existing grade onto undisturbed vegetation.
 - b. Discharge at a depth not exceeding 3.0 inches for a 50-year, 24-hour design storm.
- 8. Energy dissipaters. Energy dissipaters shall be designed in accordance with the requirements in the DEP E&S Manual.
- 9. End treatments.
 - a. Where the connecting pipe has a diameter 18 inches or greater, headwalls and endwalls shall be provided with a protective barrier device to prevent entry of the storm sewer pipe by unauthorized persons. Such protection devices shall be designed to be removable for cleaning.
 - b. Headwalls and endwalls shall be constructed of concrete.
 - c. Flared end sections shall be of the same material as the connecting pipe and be designed for the size of the connecting pipe.
- D. SWM Facilities which qualify as a dam per DEP regulations or facilities deemed a potential threat to the life, safety or welfare of the general public shall be

subject to the following requirements:

1. Facilities which qualify as a dam per DEP regulation shall obtain the required permit through DEP and design the facility in accordance with DEP standards.
2. Additional requirements and analysis may be required by the township to prove that the proposed facility has been designed to limit the potential risk to the life, safety or welfare of the general public.

Section 308. WETLANDS

No development or earthmoving activities shall involve uses, activities or improvements which would entail encroachment into, the regrading of, or the placement of fill in wetlands in violation of State or Federal regulations.

Section 309. EASEMENTS

- A. The developer shall reserve easements where storm water management facilities, floodplains or wetlands are existing or proposed, whether located within or beyond the boundaries of the project site. If storm water management facilities, floodplains or wetlands are to be installed or created beyond the boundary of the property, the developer shall provide the Township with all necessary easements, in a form acceptable to the Township Solicitor, clearly demonstrating that the developer has the right to install storm water management facilities on such adjoining property and/or create floodplains or wetlands upon such adjoining property.
- B. Easements shall have a minimum width of twenty (20) feet and shall be adequately designed to provide area for (a) the collection and discharge of water, (b) the maintenance, repair and reconstruction of all storm water management facilities, (c) the passage of machinery for such work, and (d) the preservation of floodplains and wetlands. The easements shall clearly identify who has the right of access and the responsibility of maintenance.
- C. Storm water management facilities shall be centered within the easement.
- D. To the fullest extent possible, easements shall be centered on or be adjacent to lot lines.

- E. Nothing shall be placed, planted, set, or put within the area of an easement that would adversely affect the function of the easement or conflict with the easement agreement.

**ARTICLE IV. INFORMATION TO BE INCLUDED ON OR WITH STORMWATER
MANAGEMENT SITE PLANS**

Section 401. GENERAL REQUIREMENTS

- A. The SWM Site Plan shall consist of a narrative and all applicable calculations, maps, plans and supplemental information necessary to demonstrate compliance with this Ordinance.
- B. All landowners of land included in the SWM Site Plan shall be required to execute all applications and final documents.
- C. All SWM Site Plans shall be prepared by a Qualified Person.
- D. Where the regulated activity constitutes subdivision or land development as hereinabove defined, the SWM Site Plan shall be submitted with and form an integral part of the plans required under the Municipal Subdivision and Land Development Ordinance.

Section 402. DRAFTING STANDARDS

- A. The Plan should be clearly and legibly drawn.
- B. If the Plan is prepared in two (2) or more drawing sheets, a key map showing the location of the sheets and a match line shall be placed on each sheet.
- C. Each sheet shall be numbered to show the relationship to the total number of sheets in the Plan (e.g. Sheet 1 of 5).
- D. Drawings or maps of the project area shall be drawn at 1" = 50' or larger scale (i.e. 1" = 40', 1" = 30', etc.) and shall be submitted on a minimum 24-inch x 36-inch sheets.
- E. SWM Site Plans shall be prepared in a form that meets the requirements for recording for the Office of the Recorder of Deeds of Lancaster County.
- F. The total Development Site boundary and size with distances marked to the nearest foot and bearings to the nearest degree.

Section 403. SWM SITE PLAN INFORMATION

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

- A. The date of the SWM Site Plan and latest revision, graphic scale, written scale and North arrow.
- B. The name of the development, the name and address of the owner of the property, and the name of the individual or firm preparing the Plan.
- C. The file or project number assigned by the firm that prepared the Plan.
- D. A statement, signed by the landowner, acknowledging the SWM Facilities to be permanent fixtures that cannot be altered or removed unless a revised Plan is approved by the Municipality.
- E. The signature blocks from Appendix 1-3.
- F. For SWM facilities located off-site;
 - 1. A note on the Plan referencing a recorded Stormwater Operation and Maintenance (O & M) Agreement that indicates the location and responsibility for maintenance of the off-site facilities.
 - 2. All off-site SWM Facilities shall meet the performance standards specified in this Ordinance.
- G. A note informing the owner that the Municipality shall have the right of entry for the purposes of inspecting all stormwater conveyance, treatment, or storage facilities.
- H. A location map, drawn to a scale of a minimum of one inch equals two thousand feet (1" = 2,000'), relating the Plan to municipal boundaries, at least two (2) intersections of road centerline or other identifiable landmarks.
- I. Existing Features
 - 1. In areas of disturbance, contours at intervals of one (1) or two (2) feet. In areas of steep slopes (greater than 15 percent) and areas undisturbed, five-foot contour intervals may be used.

2. The locations of all existing utilities (including on lot disposal systems and wells), sanitary sewers, and water lines and associated easements.
3. Physical features including flood hazard boundaries, wetlands, sinkholes, streams, lakes, ponds and other waterbodies, existing drainage courses, karst features, areas of native vegetation including trees greater than 6" diameter at breast height, woodlands, other environmentally sensitive areas and the total extent of the upstream area draining through the Development Site.
4. An overlay showing soil names and boundaries.
5. All existing man-made features within two hundred (200) feet of the Development Site boundary.

J. Proposed Features

1. Changes to the land surface and vegetative cover, including final proposed contours at intervals of one (1) or two (2) feet in areas of disturbance. In areas of steep slopes (greater than 15 percent) and areas undisturbed, five-foot contour intervals may be used.
2. Proposed structures, roads, paved areas, buildings and other impervious and semi-impervious areas.
3. The location of any proposed on-lot disposal systems, replacement drainfield easements, and water supply wells.
4. A note indicating existing and proposed land use(s).
5. Plan and profile drawings of all proposed SWM facilities, including BMPs, drainage structures, pipes, open channels, and swales.
6. Where pervious pavement is to be installed, pavement material and construction specifications shall be included.
7. The location of all existing and proposed easements, including drainage easements, access easements and riparian corridor easements.
8. A planting plan shall be provided for all vegetated BMPs in accordance with Section 301.N.

- K. The location of all E&S control facilities.
- L. The plans should clearly indicate the need for a pre-construction meeting to be held prior to earth moving activities and recordation of the plan and include personnel from the following:
- East Lampeter Township
 - East Lampeter Township Authority
 - East Lampeter Township Engineer
 - The Lancaster County Conservation District
 - The equitable owner
 - The consulting firm that prepared the plan
 - The excavator
 - Anyone else deemed necessary
- M. A note indicating that all items needing inspection shall be coordinated by the owner and/or contractor. All requests for required inspections by the contractor are to be deemed as approved requests on behalf of the owner.
- N. The actual existing and proposed lot coverage in square feet, in addition to the percentages, should clearly be shown on the data provided on the plan. This should correlate to the design information in the required Post Construction Stormwater Management Report to be used as a benchmark for all future impervious surface changes.
- O. When applicable, notation should be added to the plan stating that “all impervious surfaces to be removed are to be removed full depth, including any stone base” so as to receive credit as a post development condition pervious surface in the stormwater management design. A statement, signed by the owner and any successor, acknowledging that the impervious surfaces to be removed full depth function as the SWM Facilities for this project and cannot be added back or altered or increased unless a revised plan is approved by the Municipality must be provided.

Section 404. ADDITIONAL INFORMATION

- A. General description of the Development Site, including a description of existing natural and hydrologic features and any environmentally sensitive areas.
- B. General description of the overall SWM concept for the project, including a description of permanent SWM techniques, non-structural BMPs to be employed and construction specifications of the materials to be used for structural SWM

facilities. The narrative shall include a description of any treatment trains and how the facilities are meant to function with each other to manage stormwater runoff.

- C. The effect of the project (in terms of runoff volumes, water quality and peak flows) on adjacent properties and on any existing municipal stormwater management facilities that may receive runoff from the Development Site.
- D. Complete hydrologic, hydraulic, and structural computations for all SWM facilities.
- E. Expected project time schedule.
- F. Verification of an approved and proven to be implemented agricultural Erosion and Sediment Control Plan or Conservation Plan and a Manure Management Plan or Nutrient Management Plan for agricultural uses.

Section 405. SUPPLEMENTAL INFORMATION

- A. In areas of carbonate geology, a detailed geologic evaluation prepared by a registered Professional Geologist (PG) must be submitted as part of the SWM Site Plan. The report shall include, but not limited to the following:
 - 1. The location of the following karst features;
 - a. sinkholes
 - b. closed depressions
 - c. lineaments in carbonate areas
 - d. fracture traces
 - e. caverns
 - f. intermittent lakes
 - g. ephemeral disappearing streams
 - h. bedrock pinnacles (surface or subsurface)
 - 2. A plan for remediation of any identified karst features.
 - 3. Impacts of stormwater management facilities on adjacent karst features, and impacts of karst features on adjacent stormwater management facilities.
- B. An E&S Plan, including all approvals, as required by 25 Pa. Code Chapter 102, shall be provided to the municipality prior to unconditional final plan approval.

- C. For any activities that require a DEP Joint Permit Application and are regulated under Chapter 105 or Chapter 106, require a Penn DOT Highway Occupancy Permit, or require any other permit under applicable state or federal regulations, the permit(s) shall be part of the SWM Site Plan and must be obtained prior to unconditional final plan approval.
- D. An Operation and Maintenance (O & M) Plan that addresses the requirements of Section 603. The O&M Plan must be recorded in the Office of the Recorder of Deeds.

ARTICLE V.

PLAN PROCESSING PROCEDURES

Section 501. SMALL PROJECTS.

- A. A Small Project is a regulated activity that, measured on a cumulative basis from the date of enactment of this Ordinance, creates new impervious areas of more than 500 sq. ft. residential use and 1000 sq. ft. agricultural use and less than (2,500 sq. ft. residential use and 5,000 sq. ft. agricultural use) or involve removal of ground cover, grading, filling, or excavation of an area less than 5,000 sq. ft. and do not involve the alteration of stormwater facilities or watercourses.
- B. Anyone proposing a Small Project, shall submit two (2) copies to the Township and one (1) copy to the Township Engineer of the Small Project Application to the Municipality.
- C. A complete Small Project Application shall include:
 - 1. Small Project Application Form (Appendix 4)
 - 2. Small Project Sketch Plan including the following:
 - a. Name and address of landowner (and/or) developer.
 - b. Date of Small Project Application submission.
 - c. Name of individual and/or firm that prepared the sketch if different than the landowner and/or developer
 - d. Location and square footage of proposed impervious area or land disturbance
 - e. Approximate footprint and location of all structures on adjacent properties if located within 50 feet of the proposed impervious area or land disturbance
 - f. Approximate location of existing stormwater management facilities if present
 - g. Location and description of proposed stormwater management facilities
 - h. Direction of proposed stormwater discharge (e.g. with arrows)

- i. Scale and north arrow
- 3. Filing fee (in accordance with the Municipality's current fee schedule).
- 4. Verification of an approved and proven to be implemented agricultural Erosion and Sediment Control Plan or Conservation Plan and a Manure Management Plan or Nutrient Management Plan for agricultural uses.
- D. The Small Project Application shall be submitted in a format that is clear, concise, legible, neat and well organized.
- E. A zoning permit application shall be completed in addition to the small project application.

Section 502. EXEMPTION FROM PLAN SUBMISSION REQUIREMENTS

- A. The following regulated activities are specifically exempt from the SWM Site Plan preparation and submission requirements articulated in Section 301.A and Articles IV and V of this Ordinance:
 - 1. Agricultural activity (see definitions) provided the activities are performed according to the requirements of 25 Pa. Code Chapter 102.
 - 2. Forest management and timber operations (see definitions) provided the activities are performed according to the requirements of 25 Pa. Code Chapter 102.
 - 3. Conservation Practices being installed as part of the implementation of a Conservation Plan written by an NRCS certified planner.
 - 4. Residential Use: The installation of 500 or fewer square feet of Impervious Surface coverage proposed after the effective date of this Ordinance; provided that the activities meet the criteria of Section 502.C below and are conducted in accordance with all requirements of this Ordinance.
 - 5. Agricultural Use: The installation of 1,000 or fewer square feet of Impervious Surface coverage proposed after the effective date of this Ordinance; provided that the activities meet the criteria of Section 502.C below and are conducted in accordance with all requirements of this Ordinance. The Impervious Surface must be installed on a farm operation that has an approved and proven to be implemented agricultural Erosion

and Sediment Control Plan or Conservation Plan and a Manure Management Plan or Nutrient Management Plan.

6. A Polytunnel (also known as polyhouses, hoophouse or high tunnel) greenhouses under the following conditions:

- The polyethylene covering is only in place over the structure for a maximum of 3 months per year.
- The entire Polytunnel must be moved at a minimum every three years.
- The area under the Polytunnel must not be covered with any impervious surface (ie, stone, asphalt, concrete).
- The total square footage of all Polytunnels on a single property may not exceed 6,000 sq ft. Any property that has a total square footage of all Polytunnels exceeding 6,000 square feet shall be required to submit a stormwater management plan for review and approval.
- An O&M Agreement must be submitted to the Township outlining the above conditions.
- Any structure that does not meet the above requirements must comply with all sections of the Stormwater Management Ordinance.

B. The municipality may deny or revoke any exemption pursuant to this Section at any time for any project that the municipality believes may pose a threat to public health, safety, property or the environment.

C. An Applicant proposing the cumulative installation of Impervious Surface coverage (as noted in Sections 502 A. 4 & 5) may be exempt from the design, plan submittal, and processing requirements of Articles III, IV, and V of this Ordinance if the proposal meets the criteria in the Section 502.C. No person or activity is exempted from compliance with Section 605 and Articles VII, VIII, and IX of this Ordinance. Exemptions do not relieve the applicant of the responsibility to secure required permits or approvals for activities regulated by any other code, law, regulations, or ordinance. Exemptions shall not relieve an applicant from implementing such measures as necessary to meet compliance with any NPDES Permit requirements. Any exemption based on false, misleading, or erroneous information provided by an applicant is void without the necessity of any proceedings for revocation. Any work undertaken or use established pursuant to such permit or other authorization is unlawful.

1. Any Applicant desiring exemption from design, plan submission, and plan processing requirements shall complete an application for exemption in the form set forth in Appendix 4 and pay any applicable filing fee (in accordance with the Municipality's current fee schedule).
2. The Applicant for exemption under this Section 502.C shall provide the municipality with all information necessary for the municipality to determine that:
 - a. There shall be no disturbance of land within Floodplains, Wetlands, Environmentally Sensitive Areas, Riparian Forest Buffers, or slopes greater than 15%.
 - b. No Impervious Surface coverage shall be installed and no grading or excavation shall be conducted within any existing drainage or Stormwater easement created by or shown on any recorded plan.
 - c. The Applicant shall minimize soil disturbance, take steps to minimize Erosion during construction activity, and promptly reclaim all disturbed areas with topsoil and vegetation.
 - d. The Applicant shall take steps that Runoff be directed to Pervious Areas on the subject property. No Runoff shall be directed onto an abutting street or neighboring property.
 - e. The proposed Impervious Surface shall not adversely impact any existing known problem areas or downstream property owners or the quality of Runoff entering any municipal separate Storm Sewer system.
 - f. The proposed Impervious Surface shall not create Erosion.
3. If the proposed activity does not meet all of the criteria set forth in Section 502.C.2 above, the Applicant shall follow the Small Project processing procedure in Section 501.
4. No Applicant and no activity is exempt from complying with any state or federal requirements applicable if the subject property is located in a High Quality (HQ) or Exceptional Value (EV) watershed.

5. No Applicant and no activity shall violate or cause to be violated: the Federal Clean Water Act or any regulation issued thereunder, an NPDES permit, any recorded Stormwater Management or Operations and Maintenance Agreement, or any requirement applicable to a Municipal Separate Storm Sewer System.

D. A zoning permit application shall be completed in addition to the exemption application and required information of Section 502.

Section 503. PRE-APPLICATION MEETING

Applicants are encouraged to schedule a pre-application meeting to review the overall stormwater management concept with Municipal staff/engineer. The pre-application meeting is not mandatory and shall not constitute formal filing of a plan with the Municipality. Topics discussed may include the following;

- Available geological maps, plans and other available data.
- Findings of the site analysis including identification of any environmentally sensitive areas, wellhead protection areas, riparian corridors, hydrologic soil groups, existing natural drainageways, karst features, areas conducive to infiltration to be utilized for volume control, etc.
- Results of infiltration tests.
- Applicable municipal Subdivision and Land Development and/or Zoning ordinance provisions.
- The conceptual project layout, including proposed structural and non-structural BMPs.

Section 504. STORMWATER MANAGEMENT SITE PLAN SUBMISSION

- A. When a Stormwater Management Site Plan is required, the applicant shall submit the following to the Municipality:
- B.
 1. Three (3) copies to the Township and one (1) copy to the Township Engineer of the SWM Site Plan prepared in accordance with the requirements of Article IV of this Ordinance.

2. One (1) copy to the Township and one (1) copy to the Township Engineer of all supplemental data.
 3. All applicable fees (in accordance with the Municipality's current fee schedule).
- C. The SWM Site Plan shall be submitted in a format that is clear, concise, legible, neat and well organized.
 - D. The applicant is responsible for submitting plans to any other agencies such as the Lancaster County Conservation District, PennDOT, DEP, etc. when permits from these agencies are required. Final approval shall be conditioned upon the applicant obtaining all necessary permits.
 - E. Incomplete submissions as determined by the governing body or its designee, shall be returned to the Applicant within 7 days, along with a statement that the submission is incomplete, and stating the deficiencies found. Otherwise, the application shall be deemed accepted for filing as of the date of submission. Acceptance of the application shall not, however, constitute an approval of the plan or a waiver of any deficiencies or irregularities. The applicant may appeal the Municipality's decision not to accept a particular application in accordance with Section 805 of this Ordinance.
 - F. At its sole discretion and in accordance with this Article, when a SWM Site Plan is found to be deficient, East Lampeter Township may either disapprove the submission and require a resubmission, or in the case of minor deficiencies, East Lampeter Township may accept submission of revisions.

Section 505. MUNICIPAL REVIEW

- A. When the regulated activity constitutes a Subdivision or Land Development as defined in the East Lampeter Subdivision and Land Development Ordinance, the SWM Site Plan and Subdivision/Land Development Plan shall be processed concurrently according to the plan processing procedure outlined in Article 300 of the Subdivision and Land Development Ordinance.
- B. When the regulated activity constitutes a Small Project the Municipality shall review and take action on the Small Project Application within forty-five (45) days of filing.

- C. When the regulated activity does not constitute a Subdivision or Land Development or Small Project the Municipal Engineer shall review the SWM Site Plan for conformance with the provisions of this ordinance.
- D. Following receipt of the Municipal Engineer's report and within ninety (90) days following the date of the first regular meeting of the Board of Supervisors after the date the application is filed, the Board of Supervisors will schedule the SWM Site Plan application for action at a regularly scheduled Public Meeting.
- E. Within fifteen (15) days of the meeting at which the SWM Site Plan application is acted upon by the Board of Supervisors, written notice of the Board of Supervisor's action shall be sent to the following individuals:
 - 1. Landowner or his agent.
 - 2. Applicant.
 - 3. Firm that prepared the Plan.
 - 4. Lancaster County Planning Commission.
 - 5. Lancaster County Conservation District.
- F. If the Township disapproves the SWM Site Plan, the Township will state the reasons for the disapproval in writing. The Township also may approve the SWM Site Plan with conditions and, if so, shall provide the acceptable conditions for approval in writing. Such conditional approval shall be contingent upon the applicant's written acceptance of the conditions.

Section 506. REVISION OF PLANS

- A. Revisions to a SWM Site Plan after submission but before Township action shall require a re-submission of the modified SWM Site Plan consistent with Section 504 of this Ordinance and be subject to review as specified in Section 505 of this Ordinance.
- B. For the purposes of review deadlines, each resubmission required under Section 506.A (after submission but before approval) shall constitute a new submission for the purposes of time limits as set forth in the MPC and this ordinance.
- C. Any substantial revisions to a SWM Site Plan after approval shall be submitted as a new plan to the Township, accompanied by the applicable Review Fee.

Section 507. Pre-Construction Meeting and Plan Recordation

- A. The plans should clearly indicate the need for a pre-construction meeting to be held prior to earth moving activities and include personnel from the following:
- East Lampeter Township
 - East Lampeter Township Authority
 - East Lampeter Township Engineer
 - The Lancaster County Conservation District
 - The equitable owner
 - The consulting firm that prepared the plan
 - The excavator
 - Anyone else deemed necessary
- B. Upon approval by the Township, Stormwater Management Plans must be recorded at the Lancaster County Recorder of Deeds office. Proof of recordation must be provided to the Township. Plans will not be released for recording until the above mentioned preconstruction meeting has been conducted with all required parties.

Section 508. AUTHORIZATION TO CONSTRUCT AND TERM OF VALIDITY

Approval of a SWM Site Plan shall be valid for a period not to exceed 2 years. This time period shall commence on the date that the Township approves the SWM Site Plan. If a Certificate of Completion as required by Section 509 of this Ordinance has not been submitted within the specified time period, then the Township may consider the SWM Site Plan disapproved and may revoke any and all permits issued by the Township. SWM Site Plans that are considered disapproved by the Township may be resubmitted in accordance with Section 504 of this Ordinance.

Section 509. CERTIFICATE OF COMPLETION

- A. At the completion of the project, and as prerequisite for the release of the Financial Security, the applicant shall provide Certification of Completion from an Engineer, Landscape Architect, Surveyor or other qualified person verifying that all permanent SWM facilities have been constructed according to the Plans and specifications and approved revisions thereto.
- B. Upon receipt of the Certificate of Completion, and prior to release of the remaining Financial Security the Township shall conduct a final inspection to certify compliance with this Ordinance.

- C. Upon final approval of the stormwater management plan, and prior to construction beginning, the applicant shall submit the plan for recordation in the Office of the Recorder of Deeds. No release of plans for recording will happen until a preconstruction meeting occurs. No construction can begin until the preconstruction meeting happens and the plans are recorded.

Section 510. RECORD PLANS

- A. Upon completion of the plan improvements the applicant shall submit an Record Plan for recordation in the Office of the Recorder of Deeds. The Record Plan must show the final design specifications for all stormwater management facilities and be sealed by a registered professional engineer. The submission of a digital Record Plan to the Township is required, all coordinates as depicted on the plan shall be based on the PA South Zone State Plane Coordinate System (NAD83 for horizontal and NAVD88 for vertical). A .pdf and CAD file are required.
- B. Concurrently with the recordation of the Record Plan, the applicant shall submit the SWM Site Plan for recordation in the Office of the Recorder of Deeds, unless the Site Plan has already been recorded.

ARTICLE VI. OPERATION AND MAINTENANCE (O & M)

Section 601. RESPONSIBILITIES OF DEVELOPERS AND LANDOWNERS

- A. The Landowner, successor and assigns shall maintain all Stormwater Management Facilities in good working order in accordance with the approved O & M Plan.
- B. The Landowner shall convey to the Township easements to assure access for inspections and maintenance, if required.
- C. The Landowner shall keep on file with the Township the name, address and telephone number of the person or company responsible for maintenance activities; in the event of a change, new information will be submitted to the Township within ten (10) days of the change.
- D. Enumerate permanent SWM facilities as permanent real estate appurtenances and record as deed restrictions or easements that run with the land.
- E. The record owner of the Development Site shall sign and record an Operation and Maintenance (O & M) Agreement covering all Stormwater Management Facilities, including riparian buffers and riparian forest buffers, which are to be privately owned. Said agreement, designated as Appendix NO. 5, is attached and made part hereto. The O & M Plan and Agreement shall be recorded as a restrictive covenant agreement that runs with the land.

Section 602. OPERATION AND MAINTENANCE AGREEMENTS

- A. The Operation and Maintenance Agreement shall be subject to the review and approval of the municipal solicitor and governing body.
- B. The Township is exempt from the requirement to sign and record an O & M agreement for municipal projects.

Section 603. OPERATION AND MAINTENANCE (O & M) PLAN CONTENTS

- A. The O & M Plan shall clearly establish the operation and maintenance necessary to ensure the proper functioning of all temporary and permanent stormwater management facilities and erosion and sedimentation control facilities.
- B. The following shall be addressed in the O & M Plan:

1. Description of maintenance requirements, including, but not limited to, the following:
 - a. Regular inspection of the SWM facilities. To assure proper implementation of BMPs, maintenance and care SWM BMPs should be inspected by a qualified person, which may include the landowner, or the owner's designee (including the municipality for dedicated and owned facilities), according to the following minimum frequencies:
 - i. Annually for the first 5 years.
 - ii. Once every 3 years thereafter.
 - iii. During or immediately after the cessation of a 10-year or greater storm.
 - iv. As specified in the O & M Agreement pursuant to Section 602.
 - b. All pipes, swales and detention facilities shall be kept free of any debris or other obstruction and in original design condition.
 - c. Removal of silt from all permanent structures which trap silt or sediment in order to keep the material from building up in grass waterways, pipes, detention or retention basins, infiltration structures, or BMPs, and thus reducing their capacity to convey or store water.
 - d. Re-establishment of vegetation of scoured areas or areas where vegetation has not been successfully established. Selection of seed mixtures shall be subject to approval by the Township.
2. Riparian forest buffer management plan prepared in accordance with 25 Pa. Code Chapter 102 §14(b)(4) if required.
3. Identification of a responsible individual, corporation, association or other entity for ownership and maintenance of both temporary and permanent stormwater management and erosion and sedimentation control facilities.
4. Establishment of suitable easements for access to all facilities.

Section 604. MAINTENANCE OF FACILITIES ACCEPTED BY THE TOWNSHIP

- A. The Township reserves the right to accept or reject any proposal to dedicate ownership and operating responsibility of any SWM facilities to the Township.
- B. If SWM facilities are accepted by the Township for dedication, the landowner/developer shall be required to pay a specified amount to the Township Stormwater Maintenance Fund to defray costs of periodic inspections and maintenance expenses. This fee shall be provided to the Township prior to unconditional plan approval. The amount of the deposit shall be determined as follows subject to the approval of the East Lampeter Township Board of Supervisors:
 - 1. The deposit shall cover the estimated costs for maintenance and inspections for twenty-five (25) years. The Township will establish the estimated costs according to the O & M requirements outlined in the approved O & M Plan.
 - 2. The amount of the deposit to the fund shall be converted to present worth of the annual series values.
 - 3. If a storage facility is proposed that also serves as a recreation facility (e.g. ballfield, lake), the Township may reduce or waive the amount of the maintenance fund deposit based upon the value of the land for public recreation purpose.
- C. If at any time a dedicated storage facility is eliminated due to the installation of storm sewers or other storage facility such as a regional detention facility, the unused portion of the maintenance fund deposit will be applied to the cost of abandoning the facility and connecting to the storm sewer system or other facility. Any amount of the deposit remaining after the costs of abandonment are paid will be returned to the depositor.
- D. Inspections and maintenance shall be conducted as necessary to provide for the continued functioning of the facility. Costs of inspections, maintenance and repairs are recoverable from the Township Stormwater Maintenance Fund.

Section 605. MAINTENANCE OF EXISTING FACILITIES/BMPS

- A. SWM facilities existing on the effective date of this Ordinance, which have not been accepted by the Township or for which maintenance responsibility has not been assumed by a private entity such as a homeowners' association shall be

maintained by the individual Landowners. Such maintenance shall include at a minimum those items set forth in Section 603.B.1 above. If the Township determines at any time that any permanent SWM facility has been eliminated, altered, blocked through the erection of structures or the deposit of materials, or improperly maintained, the condition constitutes a nuisance and the Township shall notify the Landowner of corrective measures that are required, and provide for a reasonable period of time, not to exceed 30 days, within which the property owner shall take such corrective action. If the Landowner does not take the required corrective action, the Township may either perform the work or contract for the performance of the work and bill the Landowner for the cost of the work plus a penalty of 10% of the cost of the work. If such bill is not paid by the property owner within 30 days, the Township may file a municipal claim against the property upon which the work was performed in accordance with the applicable laws. The Township shall have the right to choose among the remedies and may use one or more remedies concurrently.

ARTICLE VII. FEES AND EXPENSES

Section 701. GENERAL

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

Section 702. EXPENSES COVERED BY FEES

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

- A. Administrative and clerical costs.
- B. Review of the SWM Site Plan.
- C. Review of the Stormwater Operation and Maintenance Plan and Stormwater Agreement by the Municipal Solicitor/Staff.
- D. Inspections.
- E. Any additional work required to enforce any permit provisions regulated by this Ordinance, correct violations, and assure proper completion of stipulated remedial actions.

ARTICLE VIII. PROHIBITIONS

Section 801. PROHIBITED DISCHARGES AND CONNECTIONS

- A. The following connections are prohibited, except as provided in Section 801.D below.
 - 1. Any drain or conveyance, whether on the surface or subsurface, that allows any non-stormwater discharge including sewage, process wastewater, and wash water to enter a municipal separate storm sewer (if applicable), or waters of this Commonwealth, and any connections to the storm sewer from indoor drains and sinks; and
 - 2. Any drain or conveyance connected from a commercial or industrial land use to the municipal separate storm sewer (if applicable) which has not been documented in plans, maps, or equivalent records, and approved by the Township.
 - 3. Chlorinated pool or fountain discharge.
 - 4. Commercial and industrial air conditioner condensate.
- 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 Section 801.D below and (2) discharges allowed under a state or federal permit.
- C. No person shall place any structure, fill, landscaping or vegetation into a SWM facility or within a drainage easement that will limit or diminish the functioning of the facility in any manner.

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

- Discharges from firefighting activities
- Potable water sources including water line flushing
- Irrigation drainage
- Air conditioning condensate
- Springs
- Water from crawl space pumps
- 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
- Flows from riparian habitats and wetlands
- Uncontaminated water from foundations or from footing drains
- Lawn watering
- De-chlorinated swimming pool discharges
- Uncontaminated groundwater
- Water from individual residential car washing
- Routine external building wash down (which does not use detergents or other compounds)
- Diverted stream flows
- Rising ground waters

E. In the event that the Township or DEP determines that any of the discharges identified in Section 801.D above significantly contribute to pollution of the waters

of this Commonwealth, the Township or DEP will notify the responsible person(s) to cease the discharge.

Section 802. ALTERATIONS OF SWM BMPs

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

ARTICLE IX. ENFORCEMENT AND PENALTIES

Section 901. RIGHT-OF-ENTRY

Upon presentation of proper credentials, duly authorized representatives of the Municipality may enter at reasonable times upon any property within the Municipality to investigate or ascertain the condition of the subject property in regard to any aspect regulated by this Ordinance.

Section 902. ENFORCEMENT

The East Lampeter Township Board of Supervisors is hereby authorized and directed to enforce all of the provisions of this ordinance.

- A. Any permit or approval issued by the Township pursuant to this ordinance may be suspended by the Township for:
 - 1. Noncompliance with or failure to implement any provision of the approved SWM Site Plan or O & M Agreement.
 - 2. A violation of any provisions 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 construction or development that constitutes or creates a hazard, nuisance, pollution or endangers the life or property of others.
- B. A suspended permit may be reinstated by the Township when:
 - 1. The Township has inspected and approved the corrections to the violation that caused the suspension;
 - 2. The Township is satisfied that the violation has been corrected.

Section 903. PENALTIES

- A. It shall be a violation of this Ordinance to commit or to permit any other person to commit any of the following acts:
 - 1. To commence any land disturbance for which this Ordinance requires a permit or plan approval prior to obtaining a permit or plan approval or in

violation of the terms or conditions of any permit or plan approval issued under this Ordinance.

2. To install, repair, modify or alter storm water management facilities prior to obtaining a permit under this Ordinance or in a manner which violates the terms and conditions of any permit or plan approval issued under this Ordinance.
3. To misuse or fail to maintain any storm water management facility installed upon a property.
4. To construct any improvements upon, grade, fill, or take any other action which will impair the proper functioning of any storm water management facility.
5. To place intentionally false information on or intentionally omit information from an application for a permit or plan approval under this Ordinance.
6. To fail to comply with any other provisions of this Ordinance.

B. Enforcement Response

The enforcement officer will be responsible for categorizing and/or tracking the categorization of a violation and/or failure to comply with any provisions of this Ordinance. The enforcement officer determines if a violation is considered repetitive, or a violation that is similar in nature to a previously identified violation. East Lampeter Township has established multiple enforcement levels and corresponding actions as a response for failure to comply and/or a violation of any provision of this Ordinance, including illegal dumping and illicit discharges/connections.

I. Enforcement Levels

1. Enforcement is applied in numerical order of the enforcement plan levels for a violation:

- a. Level 1 – Educational outreach and voluntary compliance encouragement
- b. Level 2 – A Notice of Violation (NOV) is issued
- c. Level 3 – A second NOV is issued and includes a monetary penalty of not less than One Hundred (\$100) dollars and not more than Six Hundred (\$600) dollars (first-time Level 3 enforcement)
- d. Civil Litigation

2. Applications of enforcement levels

- a. First-time violations are provided Level 1 enforcement action. Level 1 enforcement includes direct communication and voluntary compliance encouragement. A date and/or timeframe for completion of actions necessary to correct the violation are established by East Lampeter Township.
- b. Level 2 enforcement is applied for a violation that is repetitive and/or corrective actions have not been undertaken as outlined by East Lampeter Township for a Level 1 enforcement activity.
- c. Level 3 enforcement is undertaken for a violation that is repetitive and/or corrective actions have not been undertaken as outlined by East Lampeter Township through both Level 1 and Level 2 enforcement activities.
- d. Civil Litigation is considered escalated enforcement and undertaken for a violation where corrective actions have not been completed as outlined by East Lampeter Township through Level 3 enforcement activities.

II. Enforcement Responses

1. Enforcement is applied through the following:

- a. **Compliance Order/Letter** - A Compliance Order/Letter is used for Level 1 enforcement actions. The Order/Letter directs the user to achieve or return to compliance by a specified date. This order is most appropriate for a first-time violation, outlines recommended strategies to correct the violation, and encourages actions to correct the violation. The Order/Letter provides the user with an opportunity to correct noncompliance on its own initiative. It may be issued to require a user to implement best management practices, waste minimization, spill prevention programs or erosion control plans. The milestones set in the Compliance Order/Letter are tracked to determine if escalated enforcement actions are needed.
- b. **Notice of Violation (NOV)** – A Notice of Violation (NOV) is used for Level 2 enforcement actions. An NOV is any official communication from East Lampeter Township to the noncompliant user which informs the user that a violation has been recorded. An NOV is an appropriate response to violations that are determined repetitive and/or corrective action milestones outlined in a Compliance Order/Letter have not been met. The NOV provides the user with an opportunity to correct noncompliance on

its own initiative if used for Level 2 enforcement actions, and includes milestones for completion of corrective actions. An NOV documents East Lampeter Township second and final attempt to resolve the noncompliance and, should circumstances require a more stringent approach, the NOV establishes a basis for escalation of enforcement actions to Level 3 enforcement according to the Ordinance in a nonarbitrary manner. The NOV will be either hand-delivered or sent by certified mail (return receipt requested).

c. Notice of Violation (NOV) with monetary penalty– A Notice of Violation (NOV) with monetary penalty is used for Level 3 enforcement actions. An NOV is any official communication from East Lampeter Township to the noncompliant user which informs the user that a violation has been recorded. An NOV with monetary penalty is an appropriate response to violations that are determined repetitive (Level 3 enforcement actions have been previously applied) and/or corrective action milestones outlined in a Compliance Order/Letter (Level 1 enforcement) and NOV (Level 2 enforcement) have not been met. The NOV provides the user with an opportunity to correct noncompliance on its own initiative, but includes a monetary penalty of not less than One Hundred (\$100) dollars and not more than Six Hundred (\$600) dollars when used for first-time Level 3 enforcement actions and includes milestones for completion of corrective actions. An NOV with monetary penalty documents East Lampeter Township the final attempt to resolve the noncompliance and, should circumstances require a more stringent approach, the NOV establishes a basis for escalation of enforcement actions beyond Level 3 enforcement. The NOV with monetary penalty will be either hand-delivered or sent by certified mail (return receipt requested). East Lampeter Township may complete corrective actions if milestones set forth in an NOV with monetary penalty are not met, and pursue escalated enforcement if such corrective actions are completed by East Lampeter Township.

d. Civil Litigation – Civil litigation is used for escalated enforcement beyond Level 3 enforcement actions and/or pursued to recover costs associated with East Lampeter Township completing corrective actions. Civil litigation is the formal process of filing lawsuits against users to secure court ordered action to correct noncompliance and to secure penalties for violations including the recovery of East Lampeter Township costs related to the noncompliance. This process is normally pursued when the required corrective action has not been taken by the user, the penalty to be assessed exceeds that which East Lampeter Township can assess administratively through an NOV with monetary penalty, or when the user

is recalcitrant and unwilling to cooperate. Civil litigation includes enforcement measures which require involvement or approval by the court system, such as injunctive relief and settlement agreements. East Lampeter Township will seek or assess civil penalties in at least the amount of \$600 per day for each violation by a user. East Lampeter Township shall seek judgement for the penalties imposed together with additional daily penalties for continuing violations plus all court costs, including the reasonable attorneys' fees incurred by East Lampeter Township in the enforcement proceedings.

III. Level 3 Enforcement Monetary Escalation

1. An NOV with monetary penalty (Level 3 enforcement) includes an increased monetary penalty for repetitive violations where Level 3 enforcement has been applied previously and the user has completed corrective actions within the milestones set forth in the previous NOV. Escalation of monetary penalties for repetitive violations at Level 3 enforcement is:

- a. second NOV with monetary penalty of not less than One Hundred (\$100) dollars and not more than Six Hundred (\$600) dollars
- b. third and subsequent NOV with monetary penalty of not less than One Hundred (\$100) dollars and not more than Six Hundred (\$600) dollars

Section 904. APPEALS

- A. Any person aggrieved by any administrative action of the Township may appeal to the East Lampeter Township Board of Supervisors within 30 days of that action. Any such appeal shall be governed by the procedures of Article V of the Local Agency Law, 2 Pa. C.S.A. 401 et seq.
- B. Any person aggrieved by any decision of the East Lampeter Township Board of Supervisors may appeal to the Lancaster County Court of Common Pleas, in accordance with Article VII of Local Agency Law, 2 Pa. C.S.A. 701 et seq. the Local Agency Law, within 30 days of that decision.

Section 905. MODIFICATION OF ORDINANCE PROVISIONS

- A. The provisions of this Ordinance not relating to water quality are intended as minimum standards for the protection of the public health, safety, and welfare. The Township reserves the right to modify or to extend them conditionally in individual cases as may be necessary in the public interest; provided, however, that such variation shall not have the effect of nullifying the intent and purpose of this Ordinance, and that the applicant shows that to the satisfaction of the

Township that the applicable regulation is unreasonable, or will cause undue hardship, or that an alternative proposal will allow for equal or better results. The list of such modifications, along with an explanation of and justification for each modification, shall be included on the plan. This section does not apply during an enforcement action.

- B. In granting waivers/modifications for provisions of this Ordinance not relating to water quality, the Township may impose such conditions as will, in its judgment, secure substantially the objectives of the standards and requirements of this Ordinance.

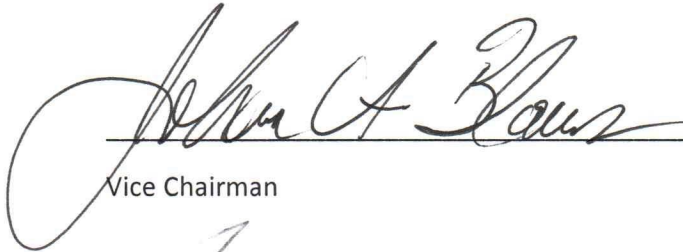
ARTICLE X. REFERENCES

1. 25 Pennsylvania Code, Chapter 102 Erosion and Sediment Control
2. Minnesota Pollution Control Agency
3. Code of Federal Regulations – Title 44: Emergency Management and Assistance, §9.4 Definitions
4. *25 Pa.Code Chapter 105*
5. Based on definition in Wisconsin Department of Natural Resources Administrative Rule NR 151.006.
6. Pennsylvania Department of Environmental Protection. No. 363-0300-002 (December 2006), as amended and updated. *Pennsylvania Stormwater Best Management Practices Manual*. Harrisburg, PA.
7. City of Jacksonville website,
<http://www3.coj.net/Departments/CityFees/Glossary.aspx>
8. Lancaster County Model Subdivision and Land Development Ordinance.
9. Pennsylvania Department of Environmental Protection. No. 363-2134-008 (March 2012), as amended and updated. *Erosion and Sediment Pollution Control Program Manual*. Harrisburg, PA.
10. CSN Technical Bulletin No. 5, Stormwater Design for High Intensity Redevelopment Projects in the Chesapeake Bay Watershed, version 2.0. Chesapeake Stormwater Network, January 5, 2011 – page 43.
11. “Penn State Urban Hydrology Model User Manual” by Thomas A. Seybert, PE, David F. Kibler, PE, and Elizabeth I. White, PE, August 1993 page 70 and VT/PSUHM help screen.
12. 25 Pa. Code, Chapter 71 Administration of Sewage Facilities Planning Program, § 71.1

ENACTED and ORDAINED at a regular meeting of the Board of Supervisors of East Lampeter Township on the 21st day of August, 2017. This Ordinance shall take effect immediately.



Chairman



Vice Chairman



Member

ATTEST:



Ralph M. Hutchison, Secretary

I hereby certify that the foregoing Ordinance was advertised in the Lancaster Newspaper on June 19 & 26, 2017, a newspaper of general circulation in the Municipality and was duly enacted and approved as set forth at a regular meeting of the Board of Supervisors of East Lampeter Township held on 21st day of August, 2017.

APPENDIX

APPENDIX NO. 1

CERTIFICATE FOR APPROVAL BY THE BOARD OF SUPERVISORS

Approved by the East Lampeter Township Board of Supervisors this _____ day of
_____, _____.

APPENDIX NO. 2

CERTIFICATE FOR REVIEW BY THE TOWNSHIP ENGINEER

Reviewed by the East Lampeter Township Engineer on this _____ day of
_____, _____.

APPENDIX NO. 3

STORM DRAINAGE PLAN CERTIFICATION

I hereby certify that, to the best of my knowledge, the storm water management facilities shown and described hereon are designed in conformance with the East Lampeter Township Storm Water Management Ordinance.

_____, 20

APPENDIX 4

Exemption/Small Project Application: Full application and Small Project Guidance Document available at the East Lampeter Township office or on the Township web site (www.eastlampetertownship.org)

Property Owner's Name _____

Address of Property _____

Email Address _____

Phone Number _____

New Impervious Area Associated with this Project _____
(some examples: driveways, buildings, patios, sheds)

***See Small Project Guidance Document for additional instructions**

Acknowledgement - I declare that I am the property owner, or representative of the owner, and that the information provided is accurate to the best of my knowledge. I understand that stormwater may not adversely affect adjacent properties or be directed onto another property without written permission. I also understand that false information may result in a stop work order or revocation of permits. Municipal representatives are also granted reasonable access to the property for review and/ or inspection of this project if necessary.

Signature _____ Date _____

For Township Use:

New Impervious Area Associated with this Project _____

Total New Impervious Area Since Adoption of SWM Plan _____

Stormwater Management Submission Type: _____ Exempt (less than 1,000 sq ft)
 _____ Small Project
 _____ Stormwater Management Plan

APPENDIX NO. 5

**OPERATION AND MAINTENANCE (O & M) AGREEMENT
STORMWATER MANAGEMENT FACILITIES**

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

WITNESSETH

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

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

WHEREAS, the SWM FACILITIES Operation and Maintenance (O & M) Plan approved by the Township (hereinafter referred to as the "O & M Plan") for the property identified herein, which is attached hereto as Appendix A and made part hereof, as approved by the Township, provides for management of stormwater within the confines of the Property through the use of Stormwater Management Best Management Practices (BMPs); and

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

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

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

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

2. The Landowner shall operate and maintain the SWM Facilities as shown on the SWM Plan in good working order in accordance with the specific operation and maintenance requirements noted on the approved O & M Plan.
3. The Landowner hereby grants permission to the Township, its authorized agents and employees, to enter upon the property, at reasonable times and upon presentation of proper credentials, to inspect the SWM Facilities whenever necessary. Whenever possible, the Township shall notify the Landowner prior to entering the property.
4. In the event the Landowner fails to operate and maintain the SWM Facilities per paragraph 2, the Township or its representatives may enter upon the Property and take whatever action is deemed necessary to maintain said SWM Facilities. It is expressly understood and agreed that the Township 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 Township.
5. In the event the Township, 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 Township for all expenses (direct and indirect) incurred, plus a 10% penalty, within 10 days of receipt of invoice from the Township.
6. The intent and purpose of this Agreement is to ensure the proper maintenance of the onsite SWM Facilities 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 township 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 Township.
8. The landowner is required to submit an inspection report to the Township yearly.

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

ATTEST:

WITNESS the following signatures and seals:

(SEAL)

For the Township:

For the Landowner:

ATTEST:

_____ (Township)

County of _____, 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 NO. 6

RUNOFF CURVE NUMBERS "CN" FOR SCS METHOD

RUNOFF CURVE NUMBERS "CN" FOR SCS METHOD												
SOIL GROUP	A			B			C			D		
SLOPE	0- 2%	2- 6%	6% +	0- 2%	2- 6%	6% +	0- 2%	2- 6%	6% +	0- 2%	2- 6%	6%
Land Use												
Cultivated Land	59	61	63	68	70	72	75	77	79	78	80	82
Fallow Fields	37	39	41	59	61	63	72	74	76	78	80	82
Forest/Woodland	41	43	45	63	65	67	68	70	72	75	79	79
Grass Areas												
Good	37	39	41	59	61	63	72	74	76	78	80	82
Poor	66	68	70	77	79	81	84	86	88	87	89	91
Impervious Areas	98	98	98	98	98	98	98	98	98	98	98	98
Weighted Residential												
Lot size 1/8 ac	75	77	79	83	85	87	88	90	92	90	92	94
Lot size 1/4 ac	59	61	63	73	75	77	81	83	85	85	87	88
Lot size 1/3 ac	55	57	59	70	72	74	79	81	83	84	86	88
Lot size 1/2 ac	49	51	53	68	70	72	78	80	82	83	85	87
Lot size 1 ac	45	46	48	66	68	70	77	79	81	82	84	86

APPENDIX NO. 7

RUNOFF COEFFICIENTS “C” FOR RATIONAL FORMULA

RUNOFF COEFFICIENTS “C” FOR RATIONAL FORMULA												
SOIL GROUP	A			B			C			D		
SLOPE	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%
Land Use												
Cultivated Land	0.14	0.18	0.22	0.16	0.21	0.28	0.20	0.25	0.34	0.24	0.29	0.41
Fallow Fields	0.12	0.20	0.30	0.18	0.28	0.37	0.24	0.34	0.44	0.30	0.40	0.50
Forest/Woodland	0.08	0.11	0.14	0.10	0.14	0.18	0.12	0.16	0.20	0.15	0.20	0.25
Grass Areas												
Good conditions	0.10	0.16	0.20	0.14	0.19	0.26	0.18	0.23	0.32	0.22	0.27	0.39
Poor conditions	0.14	0.21	0.30	0.18	0.28	0.37	0.25	0.35	0.44	0.30	0.40	0.50
Impervious Areas	0.95	0.96	0.97	0.95	0.96	0.97	0.95	0.96	0.97	0.95	0.96	0.97
Weighted Residential												
Lot size 1/8 acre	0.33	0.37	0.40	0.35	0.39	0.44	0.38	0.42	0.49	0.41	0.45	0.54
Lot size 1/4 acre	0.30	0.34	0.37	0.33	0.37	0.42	0.36	0.40	0.47	0.38	0.42	0.52
Lot size 1/3 acre	0.28	0.32	0.35	0.30	0.35	0.39	0.33	0.38	0.45	0.36	0.40	0.50
Lot size 1/2 acre	0.25	0.29	0.32	0.28	0.32	0.36	0.31	0.35	0.42	0.34	0.38	0.48
Lot size 1 acre	0.22	0.26	0.29	0.24	0.28	0.34	0.28	0.32	0.40	0.31	0.35	0.46

APPENDIX NO. 8

RAINFALL INTENSITY-DURATION FREQUENCY CHART LANCASTER COUNTY, PENNSYLVANIA

Storm Event	2 yrs	5 yrs	10 yrs	25 yrs	50 yrs	100 yrs
Time of Concentration (Minutes)	Rainfall Intensity (Inches/Hour)					
5	4.63	5.32	6.02	6.70	7.51	8.19
6	4.34	5.02	5.70	6.39	7.22	7.90
7	4.12	4.77	5.42	6.10	6.95	7.62
8	3.92	4.54	5.17	5.85	6.70	7.36
9	3.75	4.35	4.95	5.62	6.47	7.12
10	3.59	4.17	4.75	5.41	6.26	6.90
11	3.45	4.01	4.58	5.22	6.07	6.70
12	3.32	3.87	4.42	5.05	5.88	6.50
13	3.21	3.74	4.27	4.89	5.71	6.33
14	3.10	3.61	4.13	4.74	5.55	6.16
15	3.00	3.50	4.00	4.60	5.40	6.00
16	2.91	3.40	3.89	4.47	5.27	5.85
17	2.83	3.30	3.78	4.35	5.13	5.71
18	2.75	3.21	3.68	4.24	5.01	5.58
19	2.67	3.14	3.58	4.13	4.89	5.46
20	2.60	3.05	3.50	4.03	4.78	5.34
21	2.54	2.97	3.41	3.94	4.68	5.23
22	2.48	2.90	3.33	3.85	4.58	5.12
23	2.42	2.84	3.26	3.77	4.48	5.01
24	2.36	2.77	3.19	3.68	4.39	4.92
25	2.31	2.73	3.15	3.61	4.30	4.83
26	2.26	2.65	3.05	3.53	4.22	4.74
27	2.22	2.60	2.99	3.47	4.14	4.65
28	2.17	2.55	2.93	3.40	4.06	4.57
29	2.13	2.50	2.88	3.33	3.99	4.49
30	2.09	2.45	2.82	3.27	3.92	4.41
31	2.05	2.41	2.77	3.21	3.85	4.34
32	2.01	2.36	2.72	3.16	3.79	4.27
33	1.97	2.32	2.67	3.10	3.72	4.20
34	1.94	2.28	2.63	3.05	3.66	4.14
35	1.91	2.25	2.59	3.00	3.61	4.08
36	1.87	2.21	2.54	2.95	3.55	4.01
37	1.84	2.17	2.50	2.91	3.49	3.96
38	1.81	2.13	2.46	2.86	3.44	3.90

APPENDIX NO. 8 (cont.)

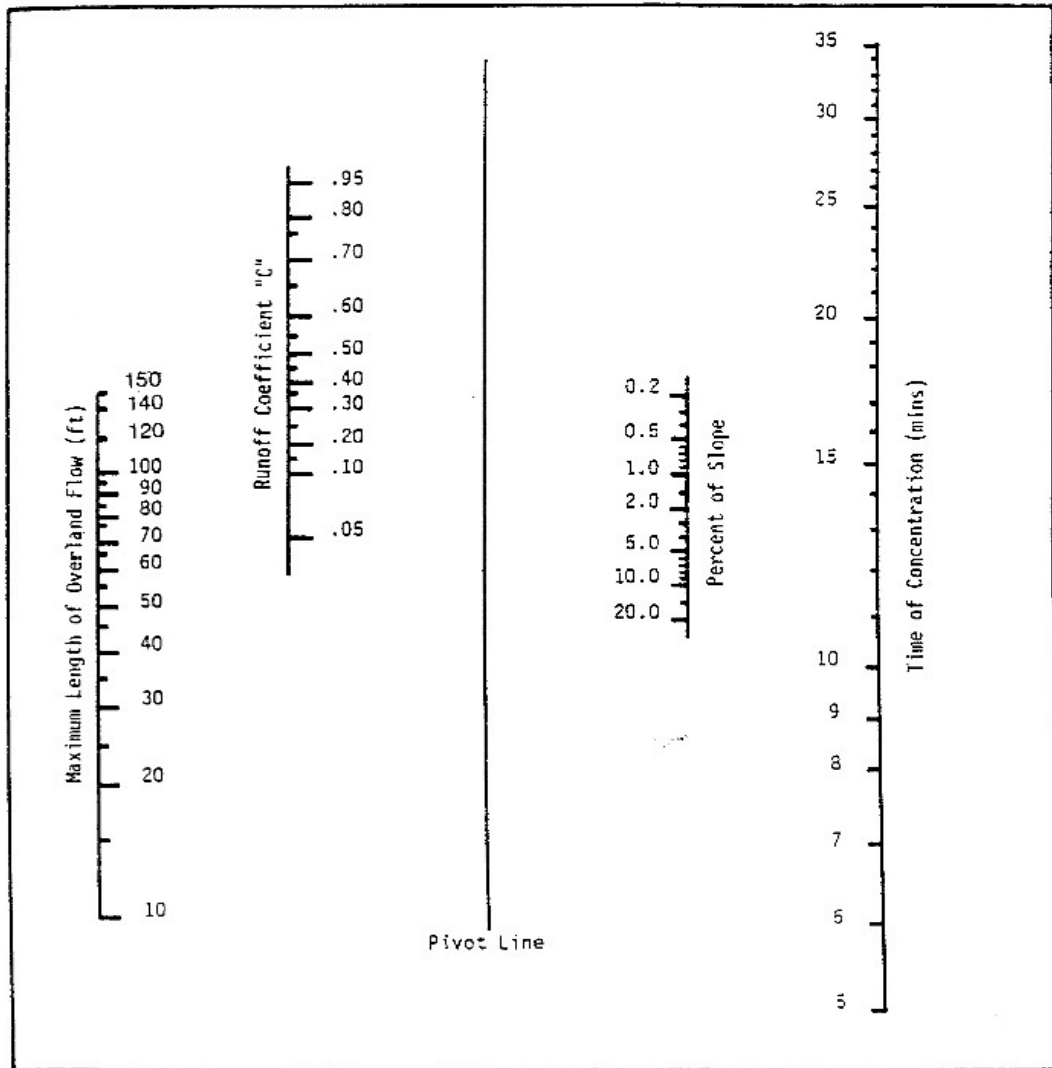
**RAINFALL INTENSITY-DURATION FREQUENCY CHART
LANCASTER COUNTY, PENNSYLVANIA**

Storm Event	2 yrs	5 yrs	10 yrs	25 yrs	50 yrs	100 yrs
Time of Concentration (Minutes)	Rainfall Intensity (Inches/Hour)					
39	1.78	2.11	2.43	2.82	3.39	3.84
40	1.76	2.07	2.39	2.78	3.34	3.79
41	1.73	2.04	2.35	2.73	3.29	3.74
42	1.70	2.01	2.32	2.70	3.25	3.69
43	1.68	1.98	2.29	2.66	3.20	3.64
44	1.66	1.96	2.26	2.62	3.16	3.59
45	1.63	1.92	2.22	2.58	3.12	3.54
46	1.61	1.90	2.19	2.55	3.08	3.50
47	1.59	1.87	2.16	2.52	3.04	3.46
48	1.57	1.85	2.14	2.48	3.00	3.41
49	1.55	1.83	2.11	2.45	2.96	3.37
50	1.53	1.80	2.08	2.42	2.92	3.33
51	1.51	1.78	2.06	2.39	2.89	3.29
52	1.49	1.76	2.03	2.36	2.85	3.26
53	1.47	1.74	2.01	2.33	2.82	3.22
54	1.45	1.72	1.99	2.30	2.78	3.18
55	1.43	1.69	1.96	2.28	2.75	3.15
56	1.41	1.67	1.94	2.25	2.72	3.11
57	1.40	1.65	1.91	2.22	2.69	3.08
58	1.38	1.63	1.89	2.20	2.66	3.05
59	1.37	1.62	1.87	2.17	2.63	3.01
60	1.35	1.60	1.85	2.15	2.60	2.98

APPENDIX NO. 9

NOMOGRAPH FOR DETERMINING SHEET FLOW

(for use with the Rational Method)



APPENDIX NO. 10

Worksheet #1: Time of concentration (T_C) or travel time (T_t)

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present Developed

Circle one: T_c T_t through subarea _____

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T _c only)	Segment ID
--	------------

1. Surface description (table 3-1)
2. Manning's roughness coeff., n (table 3-1)
3. Flow length, L (total L \leq 150 ft) ft
4. Two-yr 24-hr rainfall, P₂ in
5. Land slope, s ft/ft
6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ hr Compute T_t hr

Shallow concentrated flow	Segment ID
---------------------------	------------

7. Surface description (paved or unpaved)
8. Flow length, L ft
9. Watercourse slope, s ft/ft
10. Average velocity, V (figure 3-1) ft/s
11. $T_t = \frac{L}{3600 \cdot V}$ Compute T_t hr

Channel flow	Segment ID
--------------	------------

12. Cross sectional flow area, a ft²
13. Wetted perimeter, P_w ft
14. Hydraulic radius, $r = \frac{a}{P_w}$ Compute r ft
15. Channel slope, s ft/ft
16. Manning's roughness coeff., n
17. $V = \frac{1.49}{n} \frac{r^{2/3} s^{1/2}}{}$ Compute V ft/s
18. Flow length, L ft
19. $T_t = \frac{L}{3600V}$ Compute T_t hr

+ =

20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) hr

*Table 3-1 per latest TR-55, Urban Hydrology for Small Watershed

**150' sheet flow length per latest TR-55 revision

APPENDIX NO. 11

AVERAGE VELOCITIES FOR ESTIMATING TRAVEL TIME FOR SHALLOW CONCENTRATED FLOW

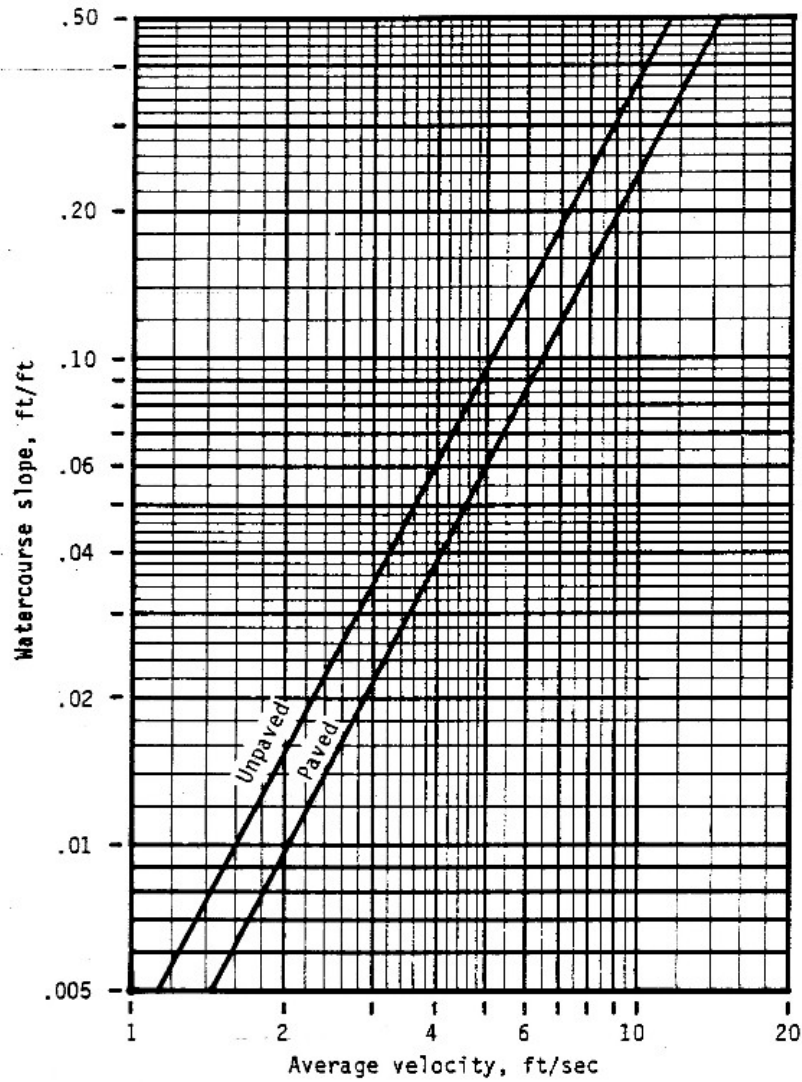


Figure 3-1.—Average velocities for estimating travel time for shallow concentrated flow.

APPENDIX NO. 12

MANNING “n” VALUES FOR PIPES

Manning “n” Values for Pipes	
PIPE MATERIAL	MANNING “n”
Helical corrugated steel/aluminum 2 2/3 x 1 1/2 corrugations diameter (inches)	
15	0.014
18	0.015
21	0.016
24	0.017
27	0.018
30	0.019
36	0.020
42	0.021
48	0.021
Reinforced Concrete All diameters	0.013
Corrugated Polyethylene Smooth lining All diameters	0.012

Note: Arch pipe shall have the Manning “n” of an equal periphery of circular pipe.