

TOWNSHIP OF UPPER SAUCON  
LEHIGH COUNTY, PENNSYLVANIA

ORDINANCE NO. 108-B

UPPER SAUCON TOWNSHIP  
ACT 167 - STORMWATER MANAGEMENT ORDINANCE

ARTICLE 1 - GENERAL PROVISIONS

SECTION 101. SHORT TITLE

This Ordinance shall be known and may be cited as the "Upper Saucon Township Act 167 Stormwater Management Ordinance".

SECTION 102. STATEMENT OF FINDINGS

The Upper Saucon Township Board of Supervisors finds that:

- A. Inadequate management of accelerated runoff of stormwater resulting from development throughout a watershed increases flood flows and velocities, contributes to erosion and sedimentation, changes the natural hydrologic patterns, destroys aquatic habitat, elevates aquatic pollutant concentrations and loadings, overtaxes the carrying capacity of streams and storm sewers, greatly increases the cost of public facilities to carry and control stormwater, undermines floodplain management and flood control efforts in downstream communities, reduces groundwater recharge, and threatens public health and safety.
- B. A comprehensive program of stormwater management, including reasonable regulation of development and activities causing accelerated erosion and loss of natural infiltration, is fundamental to the public health, safety and welfare and the protection of the people of the municipality and all of the people of the Commonwealth, their resources and the environment.
- C. Stormwater can be an important resource by providing groundwater recharge for water supplies and baseflow of streams, which also protects and maintains surface water quality.
- D. Public education on the control of pollution from stormwater is an essential component in successfully addressing stormwater.
- E. Federal and state regulations require certain municipalities to implement a program of stormwater controls. These municipalities are required to obtain a permit for stormwater discharges from their separate storm sewer systems under the National Pollutant Discharge Elimination System (NPDES).
- F. Non-stormwater discharge to municipal separate storm sewer systems can contribute to pollution of Waters of the Commonwealth by the municipality.

- G. Clear delineations are necessary with respect to the requirements for ownership and maintenance responsibilities for permanent stormwater management facilities/BMPs.
- H. Requiring individual homeowners to maintain Soil Amendments as BMPs on smaller residential lots is not feasible.

SECTION 103. PURPOSE

The purpose of this Ordinance is to promote the public health, safety and welfare within the Saucon Creek Watershed by minimizing the damages and maximizing the benefits described in Section 102 of this Ordinance by provisions designed to:

- A. Manage stormwater runoff impacts at their source by regulating activities which cause such problems.
- B. Utilize and preserve the desirable existing natural drainage systems.
- C. Encourage infiltration of stormwater, where appropriate, to maintain groundwater recharge, to prevent degradation of surface and groundwater quality and to otherwise protect water resources.
- D. Maintain the existing flows and quality of streams and watercourses in the municipality and the Commonwealth.
- E. Preserve and restore the flood carrying capacity of streams.
- F. Provide for proper maintenance of all permanent stormwater management BMPs that are implemented in the municipality.
- G. Provide review procedures and performance standards for stormwater planning, design and management.
- H. Manage stormwater impacts close to the runoff source which requires a minimum of structures and relies on natural processes.
- I. Meet legal water quality requirements under state law, including regulations at 25 Pa. Code Chapter 93.4a to protect and maintain "existing uses" and maintain the level of water quality to support those uses in all streams and to protect and maintain water quality in "special protection" streams.
- J. Prevent scour and erosion of streambanks and streambeds.
- K. Provide standards to meet the NPDES permit requirements.
- L. Provide criteria and standards for the ownership and maintenance of permanent stormwater management facilities/BMPs.

SECTION 104. STATUTORY AUTHORITY

Upper Saucon Township is empowered to regulate these activities by the authority of the Act of October 4, 1978, P.L. 864 (Act 167). 32 P.S. Section 680.1, et seq., as amended, the "Stormwater Management Act", Act 247, the Pennsylvania Municipalities Planning Code of July 31, 1968, P.L. 805; 53 P.S. §10101, as reenacted and amended, and the Second Class Township Code, as amended.

SECTION 105. APPLICABILITY

- A. This Ordinance shall apply to areas of Upper Saucon Township. Where a Regulated Activity as defined by the Ordinance extends beyond the borders of the municipality and discharge of stormwater runoff enters the municipality, this Ordinance shall apply.
- B. This Ordinance shall only apply to permanent stormwater management facilities constructed as part of any of the activities listed in this section. Stormwater management and erosion and sedimentation control during construction involved with any of these activities are specifically not regulated by this Ordinance, but shall continue to be regulated under existing laws and ordinances.
- C. The following activities are defined as Regulated Activities and shall be governed by this Ordinance:
  - 1. Land development.
  - 2. Subdivision.
  - 3. Construction of new or additional impervious surfaces (driveways, parking lots, etc.).
  - 4. Construction of new buildings or additions to existing buildings.
  - 5. Diversion or piping of any natural or man-made stream channel.
  - 6. Installation of stormwater systems or appurtenances thereto.
  - 7. Regulated Earth Disturbance Activities.
  - 8. Other than that included in 105.D.1 through 7, any Earth Disturbance Activities or any activities that involve the alteration or development of land in a manner that may affect stormwater runoff onto adjacent property.

SECTION 106. EXEMPTIONS

- A. Impervious Cover - Any proposed Regulated Activity, except those defined in Section 105.C.5. through 105.C.8., which would create 10,000 square feet or less of additional impervious cover is exempt from the Drainage Plan preparation provisions of this Ordinance. The date of the Municipal Ordinance adoption of the original Saucon Creek

Act 167 Stormwater Management Ordinance (October 26, 1993), and the date of the adoption of this Ordinance for the Little Lehigh Creek, Tohickon Creek and Cooks Creek/Delaware River North Act 167 Stormwater Management Watersheds shall be the starting point from which to consider tracts as "parent tracts" in which future subdivisions and respective impervious area computations shall be cumulatively considered. For development taking place in stages, the entire development plan must be used in determining conformance with these criteria. Impervious cover shall include, but not be limited to, additional indoor living spaces, decks, patios, garages, driveways, storage sheds and similar structures, any roof, parking or driveway areas and any new streets and sidewalks constructed as part of or for the proposed Regulated Activity. Areas proposed to be gravel, crushed stone, etc. and areas existing as gravel, crushed stone, hard packed soil, etc. shall be assumed to be impervious for the purpose of comparison to the exemption criteria. Porous paving systems may be considered pervious at the discretion of the municipality depending upon the type of system utilized, the type of use proposed and a demonstrated ability to properly maintain the same in a porous condition. All of the impervious cover added incrementally to a site above the initial 10,000 square feet shall be subject to the provisions of this Ordinance. If a site has previously received an exemption and additional development is proposed such that the total impervious cover on the site exceeds 10,000 square feet, the total impervious cover constructed on the site since October 26, 1993 must meet the provisions of this Ordinance.

- B. Prior Drainage Plan Approval - Any Regulated Activity for which a Drainage Plan was previously prepared as part of a subdivision or land development proposal that received preliminary plan approval from the municipality prior to the effective date of this Ordinance is exempt from the Drainage Plan preparation provisions of this Ordinance, except as cited in Section 106.D., provided that the approved Drainage Plan included design of stormwater facilities to control runoff from the site currently proposed for Regulated Activities consistent with ordinance provisions in effect at the time of approval and the approval has not lapsed under the Municipalities Planning Code. If significant revisions are made to the Drainage Plan after both the preliminary plan approval and the effective date of this Ordinance, preparation of a new Drainage Plan, subject to the provisions of this Ordinance, shall be required. Significant revisions would include a change in control methods or techniques, relocation or redesign of control measures or changes necessary because soil or other conditions are not as stated on the original Drainage Plan.
- C. Activities associated with 105.C.8 shall be exempt from the Drainage Plan preparation requirements of the Ordinance if the Developer documents to the satisfaction of the municipality no detrimental impacts to adjacent properties. Agricultural plowing and tilling as may be covered by Section 105.C.8 are exempt from the provisions of this ordinance.
- D. These exemptions shall not relieve the applicant from implementing such measures as are necessary to protect health, safety, property, and State Water Quality Requirements. These measures include adequate and safe conveyance of stormwater on the site and as it leaves the site. These exemptions do not relieve the applicant from the

responsibility to secure required permits or approvals for activities regulated by any other applicable code, rule, act or ordinance.

- E. No exemptions shall be provided for regulated activities as defined in Sections 105.D.5. through 105.D.7.

SECTION 107. COMPATIBILITY WITH OTHER ORDINANCE AND/OR LEGAL REQUIREMENTS

- A. Approvals issued pursuant to this Ordinance do not relieve a person of the responsibility to secure required permits or approvals for activities regulated by any other applicable code, rule, act or ordinance.
- B. To the extent that this Ordinance or another Ordinance imposes more rigorous or stringent requirements, the more rigorous or stringent requirement shall control.
- C. Nothing in this Ordinance shall be construed to affect any other stormwater regulations or requirements that do not conflict with provisions of this Ordinance.
- D. In the event of a conflict between the water quality requirements of this Ordinance and any other legal requirements, the water quality requirements of this Ordinance shall control.

SECTION 108. DUTY OF PERSONS ENGAGED IN THE DEVELOPMENT OF LAND

- A. Notwithstanding any provisions of this Ordinance, including exemption and waiver provisions, any landowner and any person engaged in the alteration or development of land which may affect stormwater runoff characteristics shall implement such measures as are necessary to prevent injury to health, safety or other property. Such measures shall include such actions as are required to manage the rate, volume, direction and quality of resulting stormwater runoff in a manner which otherwise protects health and property from injury and damage.
- B. Municipality review and approval of the drainage plan or the subsequent observation and approval of stormwater management facilities, shall not constitute land development on behalf of or by the municipality or otherwise cause the municipality to be engaged in the alteration or development of land. By submitting an application under this Ordinance, the Developer hereby agrees to indemnify, defend, and hold harmless the municipality and all its agents, servants, employees, officials and consultants of and from any and all claims, demands, causes of action or suite which arise out of or relate to the review, approval, construction or observation of the Developer's drainage plan and stormwater management facilities.

SECTION 109. PUBLIC RECORDS AND WAIVER OF COPYRIGHT

- A. By making a submission under this Ordinance, the Developer acknowledges and agrees that all documents and other information submitted to the municipality or its consultants pursuant hereto constitute public records within the meeting of the Pennsylvania Right

to Know Law, Act 3 of 2008, as amended, and are subject to review and reproduction upon request in accordance with that Law and applicable municipality ordinances and resolutions.

- B. To the extent that any documents or materials constitute public records but are subject to copyright protection pursuant to applicable law, the Developer and all of its agents, employees and consultants, by filing such documents with the municipality pursuant to this Ordinance, shall be deemed to have waived all copyright protection and damages related hereto. This waiver of copyright protection shall relate only to the reproduction and use of such documents in connection with the review, analysis, or approval of a plan and the use of the information contained within such documents for the purpose of review and analysis of the impact of the plan to other property.
- C. By making a submission under this Ordinance, the Developer hereby agrees to indemnify, defend and hold harmless the municipality and all its agents, servants, employees, officials and consultants of and from any and all claims, damages, suits or causes of actions arising out of violations or allegations of violations of copyright law.

#### SECTION 110. UNSWORN FALSIFICATION TO AUTHORITIES

All statements made, whether written or oral, to the municipality in connection with any submission pursuant to this Ordinance, shall be true and correct to the best of the knowledge, information and belief of the applicant or its agents and consultants, and with the understanding that any false statement is subject to the penalties of 18 Pa. C.S.A. Section 4904, relating to "Unsworn Falsification to Authorities".

## ARTICLE 2 - DEFINITIONS

### SECTION 201. INTERPRETATION

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

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

### SECTION 202. DEFINITIONS

- A. The following words and phrases when used in this ordinance shall have the meanings given to them in this subsection unless the context clearly indicates otherwise:
  - 1. Accelerated Erosion - The removal of the surface of the land through the combined action of human activities and natural processes, at a rate greater than would occur because of the natural process alone.
  - 2. Best Management Practice (BMP) - Activities, facilities, measures or procedures used to manage stormwater quantity and quality impacts from the Regulated Activities listed in Section 105, to meet State Water Quality Requirements, to promote groundwater recharge and to otherwise meet the purposes of this Ordinance. Soil Amendments on individual residential lots shall not constitute a BMP under this Ordinance.
  - 3. Best Management Practice Operations and Maintenance Plan - Documentation, included as part of a Drainage Plan, detailing the proposed BMPs, how they will be operated and maintained and who will be responsible.
  - 4. Bioretention - Densely vegetated, depressed features that store stormwater and filter it through vegetation, mulch, planting soil, etc. Ultimately stormwater is evapotranspirated, infiltrated, or discharged. Optimal bioretention areas mimic natural forest ecosystems in terms of species diversity, density, distribution, use of native plants, etc.
  - 5. Capture/Reuse - Stormwater management techniques such as cisterns and rain barrels which direct runoff into storage devices, surface or sub-surface, for later re-use, such as for irrigation of gardens and other planted areas.

6. Cistern - An underground reservoir or tank for storing rainwater.
7. Closed Depression -A topographically low area or basin of various size and shape with no positive external drainage and with an unbroken ground surface.
8. Concentrated Drainage Discharge - Stormwater runoff leaving a property via a point source.
9. Conservation District - The Lehigh County Conservation District, as applicable.
10. Constructed Wetlands - Constructed wetlands are similar to wet ponds (see below) and consist of a basin which provides for necessary stormwater storage as well as a permanent pool or water level, planted with wetland vegetation. To be successful, constructed wetlands must have adequate natural hydrology (both runoff inputs as well as soils and water table which allow for maintenance of a permanent pool of water). In these cases, the permanent pool must be designed carefully, usually with shallow edge benches, so that water levels are appropriate to support carefully selected wetland vegetation.
11. Culvert - A pipe, conduit or similar structure including appurtenant works which carries surface water.
12. Dam - An artificial barrier, together with its appurtenant works, constructed for the purpose of impounding or storing water or another fluid or semifluid or a refuse bank, fill or structure for highway, railroad or other purposes which does or may impound water or another fluid or semifluid.
13. DEP - The Pennsylvania Department of Environmental Protection.
14. Design Storm - The depth and time distribution of precipitation from a storm event measured in probability of occurrence (e.g., 100-yr. storm) and duration (e.g. 24-hour), and used in computing stormwater management control systems.
15. Detention Basin - A basin designed to retard stormwater runoff by temporarily storing the runoff and releasing it at a predetermined rate.
16. Developer - A person, partnership, association, corporation or other entity, or any responsible person therein or agent thereof, that undertakes any Regulated Activity of this Ordinance.
17. Development Site (Site) - The specific tract of land for which a Regulated Activity is proposed.
18. Diffused Drainage - See Sheet Flow.
19. Direct Recharge (D-RE) BMP - A BMP which directs runoff to an underground infiltration surface. Examples include

infiltration trenches, seepage beds, and drywells such that nearly all runoff becomes recharge to groundwater.

20. Drainage Easement - An interest in land, the purpose of which is to convey stormwater.
21. Drainage Plan - The documentation of the proposed stormwater quantity and quality management controls to be used for a given development site, including a BMP Operations and Maintenance Plan, the contents of which are established in Section 403.
22. Earth Disturbance Activity - Construction or other human activity which disturbs the surface of the land, including, but not limited to, land 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 and the moving, depositing, stockpiling or storing of soil, rock or earth materials.
23. Erosion - The removal of soil particles by the action of water, wind, ice, or other geological agents.
24. Evapotranspiration (ET) BMP - A BMP which provides opportunity for runoff evaporation and transpiration by vegetation. Examples include bioretention, irrigation, and surface infiltration basins.
25. Existing Uses - Those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards. (25 Pa. Code Chapter 93.1)
26. Fill - Man-made deposits of natural soils or rock products and waste materials.
27. Filter Strip - See Vegetated Buffers.
28. Freeboard - The incremental depth in a stormwater management structure, provided as a safety factor of design, above that required to convey the design runoff event.
29. Groundwater Recharge - Replenishment of existing natural underground flow system or aquifer.
30. Hardship Waiver Request - A written request for a waiver alleging that the provisions of this Ordinance inflict unnecessary hardship upon the applicant. A Hardship Waiver does not apply to and is not available from the water quality provisions of this Ordinance.
31. Hydrologic Engineering Center - Hydrologic Modeling System (HEC-HMS) - The computer-based hydrologic modeling technique developed by the U.S. Army Corps of Engineers and adapted to the watersheds for the Act 167 Plan. The model was "calibrated" to reflect actual flow values by adjusting key model input parameters.

32. Hot Spot Land Uses - A Land Use or activity that generates higher concentrations of hydrocarbons, trace metals or other toxic substances than typically found in stormwater runoff. These land uses are listed in Appendix F.
33. Hydrologic Soil Group (HSG) - Soils are classified into four HSGs (A, B, C and D) as noted in TR-55, to indicate the minimum infiltration rates, which are obtained for bare soil after prolonged wetting. The Natural Resources Conservation Service (NRCS) of the US Department of Agriculture defines the four groups and provides a list of most of the soils in the United States and their group classification. The soils in the area of the development site may be identified from a soil survey report that can be obtained from local NRCS offices or conservation district offices. Soils become less permeable as the HSG varies from A to D.
34. Impervious Surface (Impervious Cover) - A surface which prevents the percolation of water into the ground.
35. Infiltration Practice - A practice designed to direct runoff into the ground, which may include french drains, seepage pits, seepage trenches, bioretention areas, vegetated swales, etc.
36. Land Development - (i) The improvement of one lot or two or more contiguous lots, tracts or parcels of land for any purpose involving (a) a group of two or more buildings, or (b) the division or allocation of land or space between or among two or more existing or prospective occupants by means of, or for the purpose of streets, common areas, leaseholds, condominiums, building groups or other features; (ii) a subdivision of land; (iii) Development in accordance with Section 503 (1.1) of the Pennsylvania Municipalities Planning Code.
37. "Local" Runoff Conveyance Facilities - Any natural channel or manmade conveyance system which has the purpose of transporting runoff from the site to the mainstem.
38. Mainstem (main channel) - Any stream segment or other conveyance used as a reach in the Saucon Creek hydrologic model.
39. Manning Equation (Manning formula) - A method 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. "Open channels" may include closed conduits so long as the flow is not under pressure.
40. Maryland Stormwater Design Manual - A stormwater design manual written by the Maryland Department of the Environment and the Center for Watershed Protection. As of January 2004, the Manual can be obtained through the following web site:  
[www.mde.state.md.us](http://www.mde.state.md.us).

41. Minimum Disturbance/Minimum Maintenance Practices (MD/MM) - A site design practice in which careful limits are placed on site clearance prior to development allowing for maximum retention of existing vegetation (woodlands and other), minimum disturbance and compaction of existing soil mantle and minimum site application of chemicals post-development. Typically, MD/MM includes disturbance setback criteria from buildings as well as related site improvements such as walkways, driveways, roadways, and any other improvements. These criteria may vary by community context as well as by type of development being proposed. Additionally, MD/MM also shall include provisions (e.g., deed restrictions, conservation easements) to protect these areas from future disturbance and from application of fertilizers, pesticides, and herbicides.
42. Municipality - Township of Upper Saucon, Lehigh County, Pennsylvania.
43. NPDES - National Pollutant Discharge Elimination System.
44. NRCS - Natural Resource Conservation Service - U.S. Department of Agriculture. (Formerly the Soil Conservation Service.)
45. Oil/Water Separator - A structural mechanism designed to remove free oil and grease (and possibly solids) from stormwater runoff.
46. Outfall - "Point source" as described in 40 CFR § 122.2 at the point where the municipality's storm sewer system discharges to surface waters of the Commonwealth, including any man-made discharge to a stream.
47. Peak Discharge - The maximum rate of flow of stormwater runoff at a given location and time resulting from a specified storm event.
48. PENNDOT - Pennsylvania Department of Transportation.
49. Person - An individual, partnership, corporation, limited liability company, limited liability partnership, firm, company, association, governmental entity other than the municipality, trustee, receiver, assignee, or similar representative.
50. Point Source - Any discernible, confined and discrete conveyance, including, but not limited to, any pipe, ditch, channel, tunnel or conduit from which stormwater is or may be discharged, as defined in State regulations at 25 Pa. Code § 92.1.
51. Public Water Supplier - A person who owns or operates a public water system.
52. Public Water System - A system which provides water to the public for human consumption which has at least 15 service connections or regularly serves an average of at least 25

individuals daily at least 60 days out of the year. (See 25 Pa. Code Chapter 109)

53. Rational Method - A method of peak runoff calculation using a standardized runoff coefficient (rational 'c'), acreage of tract and rainfall intensity determined by return period and by the time necessary for the entire tract to contribute runoff. The rational method formula is stated as follows:  $Q = ciA$ , where "Q" is the calculated peak flow rate in cubic feet per second, "c" is the dimensionless runoff coefficient (see Appendix B), "i" is the rainfall intensity in inches per hour, and "A" is the area of the tract in acres.
54. Reach - Any of the natural or man-made runoff conveyance channels used for watershed runoff modeling purposes to connect the subareas and transport flows downstream.
55. Regulated Activities - See Section 105.C
56. Regulated Earth Disturbance Activities - Earth disturbance activity involving one acre or more, or an earth disturbance activity on any portion, part, or during any stage, of a larger common plan of development that involves 1 acre or more of earth disturbance activity over the life of the project.
57. Release Rate - The percentage of the pre-development peak rate of runoff for a development site to which the post-development peak rate of runoff must be controlled to avoid peak flow increases throughout the watershed.
58. Return Period - The average interval in years over which an event of a given magnitude can be expected to recur. For example, the twenty-five (25) year return period rainfall or runoff event would be expected to recur on the average once every twenty-five years.
59. Road Maintenance - Earth disturbance activities within the existing road cross-section such as grading and repairing existing unpaved road surfaces, cutting road banks, cleaning or clearing drainage ditches and other similar activities.
60. Runoff - That part of precipitation which flows over the land.
61. SCS Method - A method of runoff computation developed by NRCS which is based upon relating soil type and land use/cover to a runoff parameter called a Curve Number. Also known as Soil-Cover-Complex Method.
62. Sediment Traps/Catch Basin Sumps - Chambers which provide storage below the outlet in a storm inlet to collect sediment, debris and associated pollutants, typically requiring periodic clean out.
63. Seepage Pit/Seepage Trench - An area of excavated earth filled with loose stone or similar material and into which surface water is directed for infiltration into the ground.

64. Separate Storm Sewer System - A conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels or storm drains) primarily used for collecting and conveying stormwater runoff.
65. Sheet Flow - Stormwater runoff flowing in a thin layer over the ground surface.
66. Special Geologic Feature Buffer - A required isolation distance from a special geologic feature to a proposed BMP needed to reduce the risk of sinkhole formation due to stormwater management activities.
67. Special Geologic Features - Carbonate bedrock features, including but not limited to closed depressions, existing sinkholes, fracture traces, lineaments, joints, faults, caves, pinnacles and geologic contacts between carbonate and non-carbonate bedrock which may exist and must be identified on a site when stormwater management BMPs are being considered, and land with steep slopes (greater than 15%).
68. Spill Prevention and Response Program - A program that identifies procedures for preventing and, as needed, cleaning up potential spills and makes such procedures known and the necessary equipment available to appropriate personnel.
69. State Water Quality Requirements - As defined under State regulations -- protection of designated and existing uses (See 25 Pa. Code Chapters 93 and 96)--including:
  - a. Each stream segment in Pennsylvania has a "designated use," such as "cold water fishes" or "potable water supply," which are listed in Chapter 93. These uses must be protected and maintained, under State regulations.
  - b. "Existing uses" are those attained as of November 1975, regardless whether they have been designated in Chapter 93. Regulated Earth Disturbance activities must be designed to protect and maintain existing uses and maintain the level of water quality necessary to protect those uses in all streams, and to protect and maintain water quality in special protection streams.
  - c. Water quality involves the chemical, biological and physical characteristics of surface water bodies. After Regulated Earth Disturbance activities are complete, these characteristics can be impacted by addition of pollutants such as sediment, and changes in habitat through increased flow volumes and/or rates as a result of changes in land surface area from those activities. Therefore, permanent discharges to surface waters must be managed to protect the stream bank, streambed and structural integrity of the waterway, to prevent these impacts.

70. Storage Indication Method - A method of routing or moving an inflow hydrograph through a reservoir or detention structure. The method solves the mass conservation equation to determine an outflow hydrograph as it leaves the storage facility.
71. Storm Sewer - A system of pipes or other conduits which carries intercepted surface runoff, street water and other wash waters, or drainage, but excludes domestic sewage and industrial wastes.
72. Stormwater - The surface runoff generated by precipitation reaching the ground surface.
73. Stormwater Filters - Any number of structural mechanisms such as multi-chamber catch basins, sand/peat filters, sand filters, and so forth which are installed to intercept stormwater flow and remove pollutants prior to discharge. Typically, these systems require periodic maintenance and clean out.
74. Stormwater Management Facilities - Controls and measures (e.g., storm sewers, BMP's, berms, terraces, bridges, dams, basins, infiltration systems, swales, watercourses, and floodplains) used to affect a stormwater management plan.
75. Stormwater Management Plan - The plan for managing stormwater runoff within differing watersheds as adopted by the respective Counties as required by the Act of October 4, 1978, P.L. 864, (Act 167), as amended, and known as the "Stormwater Management Act".
76. Stream - A watercourse.
77. Subarea - The smallest unit of watershed breakdown for hydrologic modeling purposes for which the runoff control criteria have been established in the Stormwater Management Plan.
78. Subdivision - The division or redivision of a lot, tract or parcel of land by any means into two 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: provided, however, that the subdivision by lease of land for agricultural purposes into parcels of more than ten acres, not involving any new street or easement of access or any residential dwelling, shall be exempted.
79. Surface Waters of the Commonwealth - Any and all rivers, streams, creeks, rivulets, impoundments, ditches, watercourses, storm sewers, lakes, dammed water, wetlands, ponds, springs and all other bodies or channels of conveyance of surface water, or parts thereof, whether natural or artificial, within or on the boundaries of this Commonwealth.
80. Swale - A low-lying stretch of land which gathers or carries surface water runoff. See also Vegetated Swale.

81. Trash/Debris Collectors - Racks, screens or other similar devices installed in a storm drainage system to capture coarse pollutants (trash, leaves, etc.).
82. Vegetated Buffers - Gently sloping areas that convey stormwater as sheet flow over a broad, densely vegetated earthen area, possibly coupled with the use of level spreading devices. As water quality BMPs, vegetated buffers serve to filter pollutants from runoff and promote infiltration. Vegetated buffers should be situated on minimally disturbed soils, have low-flow velocities and extended residence times. Vegetated buffers may be, but are not restricted to, use in riparian (streamside) conditions.
83. Vegetated Roofs - Vegetated systems installed on roofs that generally consist of a waterproof layer, a root-barrier, drainage layer (optional), growth media, and suitable vegetation. Vegetated roofs store and eventually evapotranspire the collected rooftop rainfall; overflows may be provided for larger storms.
84. Vegetated Swales - Vegetated earthen channels designed to convey and possibly treat stormwater. As water quality BMPs, these are broad, shallow, densely vegetated, earthen channels designed to treat stormwater through infiltration, evapotranspiration, and sedimentation. Swales should be gently sloping with low flow velocities to prevent erosion. Check dams may be added to enhance performance.
85. Watercourse - Any channel of conveyance of surface water having defined bed and banks, whether natural or artificial, with perennial or intermittent flow.
86. Water Quality Inserts - Any number of commercially available devices that are inserted into storm inlets to capture sediment, oil, grease, metals, trash, debris, etc.
87. Water Quality Volume (WQv) - The increase in runoff volume on a development site associated with a 2-year, 24-hour storm event.
88. Watershed - The entire region or area drained by a river or other body of water, whether natural or artificial.
89. Wet Detention Ponds - A basin that provides for necessary stormwater storage as well as a permanent pool of water. To be successful, wet ponds must have adequate natural hydrology (both runoff inputs as well as soils and water table which allow for maintenance of a permanent pool of water) and must be able to support a healthy aquatic community so as to avoid creation of mosquito and other health and nuisance problems.

## ARTICLE 3 - STORMWATER MANAGEMENT REQUIREMENTS

### SECTION 301. GENERAL REQUIREMENTS

- A. All stormwater management facilities shall be designed and the drainage plan prepared and certified by individuals registered in the Commonwealth of Pennsylvania and qualified to perform such duties.
- B. All Regulated Activities in the municipality shall be subject to the stormwater management requirements of this Ordinance.
- C. Storm drainage systems shall be provided to permit unimpeded flow in natural watercourses except as modified by stormwater detention facilities, recharge facilities, water quality facilities, pipe systems or open channels consistent with this Ordinance.
- D. The existing locations of concentrated drainage discharge onto adjacent property shall not be altered without written approval of the affected property owner(s).
- E. Areas of existing diffused drainage discharge onto adjacent property shall be managed such that, at minimum, the peak diffused flow does not increase in the general direction of discharge, except as otherwise provided in this Ordinance. If diffused flow is proposed to be concentrated and discharged onto adjacent property (including flows from detention basin emergency spillways), the developer must document that there are adequate downstream conveyance facilities to safely transport the concentrated discharge to the point of pre-development flow concentration, to the stream reach or otherwise prove that no harm will result from the concentrated discharge. Areas of existing diffused drainage discharge shall be subject to any applicable release rate criteria in the general direction of existing discharge whether they are proposed to be concentrated or maintained as diffused drainage areas.
- F. Where a site is traversed by watercourses, there shall be provided drainage easements conforming substantially with the line of such watercourses. The width of any such easement shall be adequate to provide for unimpeded flow of the 100-year storm runoff and to provide a freeboard allowance of one-half (0.5) foot above the design water surface level. The easement limits shall be based on the higher of specific 100-year flood profiles (elevations) identified in the Flood Insurance Study by FEMA, or elevations from HEC-RAS modeling (or other modeling methods as approved by the municipality) utilizing flow rate calculations made in conformance with Section 309. The terms of the easement shall be enforceable by the municipality and prohibit excavation, the placing of fill or structures, and any alterations which may adversely affect the flow of stormwater within any portion of the easement. It shall be the obligation of the landowner to perform periodic maintenance of the easement to ensure the proper runoff conveyance is maintained. The terms of such easements shall be identified by notes on the Drainage Plan and Record Plan as applicable. Watercourses for which the 100-year floodplain is

formally defined by the municipality are also subject to the applicable municipality floodplain regulations.

- G. Post-construction BMPs, and storm drainage facilities and appurtenances shall be designed, installed, operated and maintained to meet the requirements of the Clean Streams Law and implementing regulations, including the established practices in 25 Pa. Code Chapter 102 and the specifications of this ordinance as to prevent accelerated erosion in watercourse channels and at all points of discharge.
- H. No Earth Disturbance activities associated with any Regulated Activities shall commence until approval by the municipality of a Drainage Plan which demonstrates compliance with the requirements of this Ordinance.
- I. Any direct recharge infiltration BMP's shall be reviewed and approved by the municipality's Geotechnical Consultant.

#### SECTION 302. PERMIT REQUIREMENTS AND APPROVALS BY GOVERNMENT ENTITIES

No Regulated Activities shall commence until all necessary permits and approvals by government entities are obtained.

#### SECTION 303. EROSION AND SEDIMENT CONTROL DURING REGULATED EARTH DISTURBANCE ACTIVITIES

- A. No Regulated Earth Disturbance Activities within the municipality shall commence until review by the municipality of an Erosion and Sediment Control Plan and NPDES Plan for construction activities. Written approval by DEP or Lehigh County Conservation District may satisfy this requirement.
- B. Approval by the Lehigh County Conservation District of an Erosion and Sedimentation Control Plan is required for any Earth Disturbance Activity of 5,000 square feet or more, or when requested by the municipality, for sites draining to an Exceptional Value or High Quality Watershed, and not otherwise included under a previously approved and active NPDES Permit.
- C. No Regulated Activities within the municipality shall commence until erosion and sedimentation control facilities are in place.
- D. Evidence of any necessary permit(s) for Regulated Earth Disturbance Activities from the appropriate DEP regional office or Lehigh County Conservation District must be provided to the municipality before the commencement of an Earth Disturbance Activity.
- E. A copy of the Erosion and Sediment Control Plan and any permit, as required by DEP regulations, shall be available at the project site at all times.

SECTION 304. POST CONSTRUCTION WATER QUALITY CRITERIA

- A. No Regulated Earth Disturbance activities within the municipality shall commence until approval by the municipality of a Drainage plan which demonstrates compliance with this Ordinance. This Ordinance provides standards to meet NPDES Permit requirements associated with construction activities and MS4 permit requirements.
- B. The Water Quality Volume (WQv) shall be captured and treated with evapotranspiration and/or direct recharge BMPs. The WQv shall be calculated as the difference in runoff volume from pre-development to post-development for the 24-hour, 2-year return period storm. This may be calculated using either the SCS or Rational Method using the 2-year rainfall depth as noted in Section 309.E. The effect of closed depressions on the site shall be considered in this calculation. The WQv shall be captured and treated in a manner consistent with the standards outlined in Section 305 of the Ordinance.
- C. The WQv shall be calculated for each post-development drainage direction on a site for sizing BMPs. Site areas having no impervious cover and no proposed disturbance during development may be excluded from the WQv calculations and do not require treatment.
- D. If an applicant is proposing to use a BMP that ponds water on the land surface and may receive direct sunlight, the discharge from that BMP must be treated by infiltration, a vegetated buffer, filter strip, bioretention, vegetated swale or other BMP that provides a thermal benefit.
- E. Sites where applicants intend to use infiltration BMPs must meet the following criteria:
  - 1. Depth to bedrock below the invert of the BMP greater than or equal to 2 feet;
  - 2. Depth to seasonal high water table below the invert of the BMP greater than or equal to 2 feet; except for infiltration of residential roof runoff where the seasonal high water table must be below the invert of the BMP.
  - 3. Soil permeability (as measured using the standards listed in Appendix C of the Pennsylvania Stormwater Best Management Practices Manual, latest edition) greater than or equal to 0.1 inches/hour and less than or equal to 10 inches per hour;
  - 4. Setback distances or buffers as follows:
    - a. 100 feet from water supply wells.
    - b. 20 feet downgradient or 100 feet upgradient from building foundation. A reduction of the 20 foot downgradient setback may be permitted based on the municipality's geotechnical consultant review of soil type and profile, depth of infiltration, and managed drainage area.
    - c. 50 feet downgradient or 100 upgradient from septic system drainfields. A reduction of the 100 foot upgradient

setback may be permitted based on the municipality's geotechnical consultant review of soil type and profile, depth of infiltration, and managed drainage area.

- d. 100 feet from the rim of sinkholes, closed depressions and disappearing streams and 50 feet from lineaments, fracture traces or surface or subsurface pinnacles.
- F. For proposed infiltration BMPs, the developer shall conduct a Site Investigation and Testing as outlined in Appendix C of the Pennsylvania Stormwater Best Management Practices Manual, latest edition. This Testing must be performed and evaluated by the developer's qualified geotechnical professional. The soil depth, percolation rate and proposed loading rate, each weighted as described in Section 309, along with the buffer from special geologic features shall be compared to the Recommendation Chart for Infiltration Stormwater Management BMPs in Carbonate Bedrock in Appendix D and reviewed by the municipality's Geotechnical Consultant to determine if the site is recommended for infiltration.
- G. Site areas proposed for infiltration shall be delineated in the field and protected from disturbance and compaction except as necessary for construction of infiltration BMPs.
- H. Infiltration BMPs shall be designed to infiltrate water when the ground surface is frozen.
- I. If infiltration of the entire WQv is not proposed, the remainder of the WQv shall be treated by acceptable BMPs for each discharge location. Acceptable BMPs are listed in Appendix F.
- J. Stormwater runoff from Hot Spot land uses shall be pretreated. Guidance regarding acceptable methods of pre-treatment is located in Appendix F.
- K. The use of infiltration BMPs is prohibited on Hot Spot land use areas.
- L. Stormwater infiltration BMPs shall not be placed in or on a special geologic feature(s). Additionally, stormwater runoff shall not be discharged into existing sinkholes or water-filled quarries.
- M. Infiltration systems may not receive runoff until the entire tributary drainage area to the infiltration system has received final stabilization.
- N. Applicants shall request, in writing, Public Water Suppliers to provide the Zone I Wellhead Protection radius, as calculated by the method outlined in the Pennsylvania Department of Environmental Protection Wellhead Protection regulations, for any public water supply well within 400 feet of the site. In addition to the setback distances specified in Section 304.E, infiltration is prohibited in the Zone I radius as defined and substantiated by the Public Water Supplier in writing. If the applicant does not receive a response from the Public Water Supplier, the Zone I radius is assumed to be 100 feet.

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

SECTION 305. EXISTING WATER BALANCE PRESERVATION STANDARDS

- A. The entire WQv as calculated in Section 304.B of this Ordinance shall be captured and treated by either direct recharge (D-RE) or evapotranspiration (ET) BMPs.
- B. Lawn area up to a maximum of 33% of the entire site area may be allowed to bypass water quality BMPs. As much proposed impervious area as practical shall be directed to water quality BMPs.
- C. Existing impervious area that is not proposed to be treated by D-RE BMPs should be excluded from all water balance calculations.
- D. A maximum of 30% of the total annual rainfall for a site may be directly recharged to groundwater using direct recharge (D-RE) BMPs, for runoff from impervious areas.
  - 1. For development sites with greater than 33% proposed impervious cover:
    - a. If all impervious cover is directed to ET BMPs to capture the full 2-year event, the D-RE standard is met.
    - b. Up to 33% of the site as impervious cover may be directed to D-RE BMPs designed to capture the full 2-year event. All remaining impervious cover shall be directed to ET BMPs designed to capture the remainder of the WQv.
    - c. For ET and/or D-RE BMPs designed for runoff from impervious areas designed to capture less than the full 2-year event, Appendix C shall be used to assure that the maximum D-RE standard is met.
  - 2. For development sites with less than 33% proposed impervious cover, all proposed impervious and the entire WQv may be directed to D-RE BMPs.
  - 3. The maximum 30% D-RE standard applies on an overall site basis, rather than in each drainage direction.

SECTION 306. STORMWATER MANAGEMENT DISTRICTS

- A. Mapping of Stormwater Management Districts - To implement the provisions of the Upper Saucon Township Stormwater Management Ordinance, the municipality is hereby divided into Stormwater Management Districts consistent with the Saucon Creek Release Rate Map presented in the Stormwater Management Plan. The boundaries of the Stormwater Management Districts are shown on an official map which is available for inspection at the municipal office. A copy of the

official map at a reduced scale is included in Appendix A for general reference.

- B. Description of Stormwater Management Districts - The 10-, 25-, and 100-year post-development peak runoff must be controlled to the stated percentage of the pre-development peak. Release Rates associated with the 10- through 100-year events vary from 50% to 100% depending upon location in the watershed.
- C. Any areas of the municipality outside the Saucon Creek Watershed (Little Lehigh Creek, Perkiomen Creek, Tohickon Creek, Cooks Creek/Delaware River North) are subject to the release rate criteria for their respective watershed as identified in their Act 167 stormwater management plan as adopted by Lehigh or Bucks County.

SECTION 307. STORMWATER MANAGEMENT DISTRICT IMPLEMENTATION PROVISIONS

- A. Applicants shall provide a comparative pre- and post-construction stormwater management hydrograph analysis for each direction of discharge and for the site overall to demonstrate compliance with the provisions of this Ordinance.
- B. Any stormwater management controls required by this Ordinance and subject to a dual release rate criteria shall meet the applicable release rate criteria for each of the 10-, 25- and 100-year return period runoff events consistent with the calculation methodology specified in Section 309.
- C. The exact location of the Stormwater Management District boundaries as they apply to a given development site shall be determined by mapping the boundaries using the two-foot topographic contours provided as part of the Drainage Plan. The District boundaries as originally drawn coincide with topographic divides or, in certain instances, are drawn from the intersection of the watercourse and a physical feature such as the confluence with another watercourse or a potential flow obstruction (e.g. road, culvert, bridge, etc.). The physical feature is the downstream limit of the subarea and the subarea boundary is drawn from that point up slope to each topographic divide along the path perpendicular to the contour lines.
- D. Any downstream capacity analysis conducted in accordance with this Ordinance shall use the following criteria for determining adequacy for accepting increased peak flow rates:
  - 1. Natural or man-made channels or swales must be able to convey the increased runoff associated with a 2-year return period event within their banks at velocities consistent with protection of the channels from erosion.
  - 2. Natural or man-made channels or swales must be able to convey the increased 25-year return period runoff without creating any hazard to persons or property.
  - 3. Culverts, bridges, storm sewers or any other facilities which must pass or convey flows from the tributary area must be

designed in accordance with DEP Chapter 105 regulations (if applicable) and, at minimum, pass the increased 25 year return period runoff.

- E. For a proposed development site located within one release rate category subarea, the total runoff from the site shall meet the applicable release rate criteria. For development sites with multiple directions of runoff discharge, individual drainage directions may be designed for up to a 100% release rate provided that the total runoff from the site is controlled to the applicable release rate and no increase in runoff volume is proposed in the 100% release rate direction.
- F. For a proposed development site located within two or more release category subareas, the peak discharge rate from any subarea shall be the pre-development peak discharge for that subarea multiplied by the applicable release rate.
- G. No portion of a site may be regraded to redirect runoff onto adjacent property (i.e., modify the pre-development drainage area) unless runoff peak flow rate and volume controls are proposed which limit post-development peak flow rates to the required release rate criteria and volume discharges to pre-development levels.
- H. Within a release rate category area, for a proposed development site which has areas draining to a closed depression on the site, the design release from the site will be the lesser of (a) the applicable release rate flow assuming no closed depression or (b) the existing peak flow actually leaving the site. In cases where (b) would result in an unreasonably small design release, the design discharge of less than or equal to the release rate will be determined by the available downstream conveyance capacity to the main channel calculated using Section 307.D. and the minimum orifice criteria.
- I. Off-site areas which drain through a proposed development site are not subject to release rate criteria when determining allowable peak runoff rates. However, on-site drainage facilities shall be designed to safely convey off-site flows through the development site using the capacity criteria in Section 307.D. and the detention criteria in Section 308. In addition to the criteria in Section 307.D, on-site conveyance systems designed to carry runoff to a detention basin must be able to transport the basin's 100-year tributary flow either in-system, in-gutter or overland.
- J. For sites proposed to be developed in phases, all detention facilities shall be designed to meet the applicable release rate(s) applied to all site areas tributary to the proposed facility discharge direction. All site tributary areas will be assumed as developed, regardless of whether all site tributary acres are proposed for development at that time. An exception shall be sites with multiple detention facilities in series where only the downstream facility must be designed to the stated release rate.
- K. Where the site area to be impacted by a proposed development activity differs significantly from the total site area, only the proposed impact area shall be subject to the release rate criteria. The impact area includes any proposed cover or grading changes.

- L. Development proposals which, through groundwater recharge or other means, do not increase the rate of runoff and do not increase the volume of runoff discharged from the site compared to the pre-development condition are not subject to the release rate provisions of this Ordinance.
- M. Regional Detention Alternatives - For certain areas within the study area, it may be more cost-effective to provide one control facility for more than one development site than to provide an individual control facility for each development site. The initiative and funding for any regional runoff control alternatives are the responsibility of prospective developers. The design of any regional control basins must incorporate reasonable development of the entire upstream watershed. The peak outflow of a regional basin would be determined based on the required release rate at the point of discharge.

SECTION 308.      STORMWATER MANAGEMENT FACILITIES

A. Collection/Conveyance Facilities - Stormwater Management

Collection/Conveyance facilities shall be designed as follows:

- 1. In any stormwater management district, storm sewer piping, swales and inlet systems shall be designed for a 25-year return period storm, or a 100-year return period storm where the system is required to convey 100-year storm flows to a detention facility. Bridges and culverts along or across roadways shall be designed to convey the 100-year return period storm. Flows from offsite upstream areas shall be determined in accordance with the procedure identified in Section 301.E, conditioned on documentation being provided to document 100-year storm runoff is safely conveyed through the site.
- 2. Storm sewer pipes, culverts, manholes, inlets, endwalls, and end-sections proposed for dedication, or located along streets, shall conform to the requirements of the Upper Saucon Township Standard Construction Documents and PennDOT, Bureau of Design, *Standards for Roadway Construction, Publication No. 72*, in effect at the time the design is submitted, as modified by the Upper Saucon Township Standard Construction Documents.
- 3. Capacities - The capacities of the pipes, gutters, inlets, culverts, outlet structures, and swales shall consider all possible hydraulic conditions. The following are minimum design standards:
  - a. Grass swales and roadside gutters shall consider both the channel velocity and stability based upon a low degree of retardant ("n" of 0.03), and the channel capacity based upon a high degree of retardant ("n" of 0.05).
  - b. The velocity to be used in the design of any piped stormwater conveyance system shall be based on the maximum velocity obtainable. The capacity shall be based

upon 100-year storm conditions. In all cases where drainage is collected by a headwall or catch basin where inlet or outlet control may govern, the pipe shall be designed as a culvert, as outlined in *Hydraulic Engineering Design Series No. 5*, latest edition of the U.S. Department of Transportation Federal Highway Administration, Washington, DC. The allowable headwater should be determined by the specific entrance conditions and sound engineering. The capacities of pipes shall be computed from the Manning Equation. The design of culverts shall not create excessive headwater depths.

4. Minimum Pipe Size - Storm water management pipe collection and conveyance systems which are to be dedicated to the municipality shall have a minimum diameter of eighteen inches (18"), and shall be installed on sufficient slope to provide a minimum velocity of three feet (3') per second (3 fps) during 100-year storm flows.
5. Pipe sizes with nominal diameters greater than seventy-two inches (72") shall require structural design submittals for review and approval.
6. All culvert structures shall require submission of construction drawings, to assure compliance to HS-25 loading, and flow design capacity.
7. All storm sewer pipes and culverts shall be laid to a minimum depth specified by the pipe manufacturer.
8. Endwalls and end-sections shall be used where storm water runoff enters or leaves the storm sewer horizontally from a natural or man-made channel.
9. Inlets shall be placed on both sides of the street at low spots, and at points such that one traffic lane of at least 10 feet in width in each direction of travel shall be provided free from stormwater. Inlets shall normally be along the curb line at or beyond the curb radius points. At intersections, the depth of flow across the through streets shall not exceed one and one-half inches (1½"). Inlets shall be depressed two inches (2") below the grade of the gutter or ground surface. Manholes may be substituted for inlets at locations where inlets are not required to handle surface runoff.
10. Manholes shall not be spaced more than four hundred feet (400') apart for pipes that are less than thirty-six inch (36") diameter and six hundred feet (600') apart for all pipes of greater than thirty-six inch (36") diameter. Additionally, manholes shall be placed at points of abrupt changes in the horizontal or vertical direction of storm sewers and all convergence of two (2) or more storm water lines. Inlets may be substituted for manholes where they will serve a useful purpose.

11. Curves in pipes or box culverts, without an inlet or manhole, are prohibited. Tee joints, elbows and wyes are also prohibited.
12. Grass-lined channels shall be designed with a minimum slope of 2% and shall be designed to accommodate design velocities without erosion.
13. The capacities of open channels shall be computed from the Manning equation.
14. Flow velocities from any storm sewer may not result in a deflection of the receiving channel.
15. Energy dissipaters shall be provided at all storm sewer outlets and shall be designed in accordance with PA DEP, Office of Water Management, *Erosion and Sediment Pollution Control Program Manual*, latest edition.
16. Protective grating must be provided at all open pipe inlet and outlets to prevent clogging and unauthorized access to storm water facilities.
17. Storm facilities shall be contained in an easement. It shall be the obligation of the landowner to perform periodic maintenance of the easement and facilities to ensure that the proper runoff conveyance is maintained. The terms of such easements shall be identified by notes on the Drainage Plan and Record Plan as applicable.

#### B. Detention and Retention Basins.

1. Permanent detention and retention basins shall be designed to store the stormwater runoff of the 100-year post-development storm event minus the water discharged, if any, from the basin by any primary and/or secondary outlets.
2. Wet Detention Ponds designed to have a permanent pool shall assume that the permanent pool volume below the primary outlet is full at the beginning of design event routing for the purposes of evaluating peak outflows. All wet Detention Ponds shall be subject to review by the municipality's Geotechnical Consultant.
3. The minimum circular orifice diameter for controlling discharge rates from detention facilities shall be three (3) inches. Designs where a lesser size orifice would be required to fully meet release rates shall be acceptable provided that as much of the site runoff as practical is directed to the detention facilities. The minimum 3-inch diameter does not apply to the control of the WQv.
4. Basins which are not designed to release all storm water shall be specifically identified as retention basins or wet pond basins. All other basins shall be designed to provide a minimum bottom slope of 2% in order to drain the facility.

5. An outlet structure must be provided to permit draining the basin to a completely dry position within twenty-four (24) hours, unless approved as a wet pond.
6. Discharge structures shall be designed to eliminate the possibility of blockage during operation (i.e., trash racks).
7. All outlet structures and emergency spillways shall include a satisfactory means of dissipating the energy of flow at its outlet to assure conveyance of flow, without endangering the safety and integrity of the basin and the downstream drainage area.
8. All above-ground stormwater detention facilities shall provide a minimum 0.5 feet of freeboard above the maximum pool elevation associated with the 2- through 100-year runoff events, or an additional ten percent of the 100-year storage volume as freeboard volume, whichever is greater. All below-ground stormwater detention and infiltration facilities shall have an additional ten percent of the 100-year storage volume available within the storage medium, as well as a minimum of 0.5 feet of freeboard. The freeboard shall be measured from the maximum pool elevation to the invert of the emergency spillway for above-ground facilities, and from the maximum pool elevation to the lowest overflow elevation for below-ground facilities. The 2- through 100-year storm events shall be controlled by the primary outlet structure. An emergency spillway for each above-ground basin shall be designed to pass the 100-year return frequency storm peak basin inflow rate with a minimum 0.5 foot freeboard measured to the top of basin. The freeboard criteria shall be met considering any offsite areas tributary to the basin as developed, as applicable. Exceptions to the freeboard requirements are as follows:

- a. Bioretention BMPs with a ponded depth less than or equal to 0.5 feet are exempt from the freeboard requirements.
- b. Small detention basins, with a ponded depth less than or equal to 1.5 feet or having a depth to the top of the berm less than or equal to 2.5 feet, may provide twenty percent additional storage volume measured from the maximum ponded depth to the invert of the emergency spillway in lieu of the above requirements.

The depth of the emergency spillway must be sufficient to pass either two times the 100-year peak or the 100-year peak with 0.2' of freeboard to the top of berm, whichever is greater.

- c. Small infiltration basins, with a ponded depth less than or equal to 1.5 feet or having a depth to the top of the berm less than or equal to 2.5 feet, may provide twenty percent additional storage volume measured from the maximum ponded depth to the top of the berm in lieu of the above requirements. In this case, an emergency spillway is only necessary if runoff in excess of the

basin volume would cause harm to downstream owners. If a spillway is necessary, it must be sufficiently sized to pass the 100-year peak inflow.

9. If a detention facility is considered to be a dam as per DEP Chapter 105, the design of the facility must be consistent with the Chapter 105 regulations, and may be required to pass a storm greater than the 100-year event.
10. All detention basins and/or retention basins to be dedicated to the municipality shall include:
  - a. Fencing or other acceptable devices that restrict access. Fencing shall be constructed according to the Upper Saucon Township Standard Construction Documents;
  - b. "No trespassing" signs; and
  - c. A minimum 12-foot wide ramp at a maximum 10 percent slope. The ramp shall be near the basin access to permit access to the bottom of basins for maintenance.
11. Detention basins and/or retention basins which are designed with earth embankments shall incorporate the following minimum standards:
  - a. The maximum water depth shall not exceed six feet (6').
  - b. The minimum top width of berm shall be ten feet (10').
  - c. The inside and outside side slopes shall not be steeper than three (3) horizontal to one (1) vertical.
  - d. A key trench of compacted, relatively impervious material shall be installed at a depth of at least two feet (2'), or extending down to stable subgrade, whichever is deeper. Minimum bottom widths for the key trench shall be four feet (4'). Maximum side slopes for the key trench shall be one (1) horizontal to one (1) vertical. A compacted impervious core at least eight feet (8') wide at the top, having a maximum side slope of one (1) horizontal to one (1) vertical, shall extend for the full length of the embankment, and the top elevation shall be set at the 25-year design water surface elevation.
  - e. All pipes and culverts through basin embankments shall be reinforced concrete and have properly spaced concrete cutoff collars or anti-seep collars designed in accordance with PA DEP, Office of Water Management, *Erosion and Sediment Pollution Control Program Manual*, latest edition.
  - f. Minimum finished floor elevations for all buildings that adjoin a basin, other temporary impoundments, or open conveyance systems, shall be two feet (2') above the water surface of a one hundred (100) year storm event. If a basement is proposed below the bottom elevation of

the basin, it shall have structural capacity to retain expected hydrostatic pressure, and detailed calculations addressing the effects of storm water ponding on the building, and waterproofing, and/or floodproofing design information consistent with the floodplain standards in the Township Zoning Ordinance shall be submitted.

12. Retention basins must provide enough capacity to store the entire runoff volume created by a 100-year, 24-hour storm event.
13. Below-ground Stormwater Detention.
  - a. Materials - All materials used in underground detention facilities shall be corrosion resistant consisting of reinforced concrete, aluminized corrugated metal pipe, corrugated high density polyethylene pipe, or similar approved material.
  - b. Capacity - Underground detention facilities shall be sized such that the 100-year design storm may be routed through the facility with no damage to the surface property.
  - c. Accessibility and Maintainability - Underground detention facilities shall be designed to be readily accessible for periodic inspection and maintenance from the surface without the need to perform confined space entry. Pre-treatment to remove sediments before entrance of the underground detention facility should be considered to improve water quality and/or improve maintainability.
  - d. Storage Volume - Routing calculations must be used to demonstrate that the storage volume is adequate. See Section 308.B.8 for freeboard requirements.
  - e. Overburden Support - Underground detention vaults and tanks must meet structural requirements for overburden support and traffic loading if applicable.

#### SECTION 309. CALCULATION METHODOLOGY

- A. Stormwater runoff from all development sites shall be calculated using either the rational method or the soil-cover-complex methodology. The following requirements apply:
  1. For drainage areas of less than 100 acres, the Rational Method shall be used.
  2. For drainage areas of 100 acres or more, the SCS Method shall be used.
- B. Infiltration BMP loading rate percentages in the Recommendation Chart for Infiltration Stormwater BMPs in carbonate bedrock in Appendix D shall be calculated as follows:

$$\frac{\text{Area tributary to infiltration BMP}}{\text{Base area of infiltration BMP}} \times 100\%$$

The area tributary to the infiltration BMP shall be weighted as follows:

- All disturbed areas to be made impervious: weight at 100%
- All disturbed areas to be made pervious: weight at 50%
- All undisturbed pervious areas: weight at 0%
- All existing impervious areas: weight at 100%

- C. The design of any detention basin intended to meet the requirements of this Ordinance shall be verified by routing the design storm hydrograph through the proposed basin using the storage indication method or other methodology demonstrated to be more appropriate. For basins designed using the Rational Method, the design hydrograph for routing shall be the Universal Rational Hydrograph or as otherwise permitted by the municipality.
- D. BMPs designed to store or infiltrate runoff and discharge to surface runoff or pipe flow shall be routed using the storage indication method.
- E. BMPs designed to store or infiltrate runoff and discharge to surface runoff or pipe flow shall provide storage volume for the full WQV below the lowest outlet invert.
- F. Runoff calculations using the SCS method shall use the Natural Resources Conservation Service Type II 24-hour rainfall distribution. The 24-hour rainfall depths for the various return periods to be used consistent with this Ordinance may be taken from NOAA Atlas 14, Volume 2 Version 2.1, 2004 or the PennDOT Intensity - Duration Frequency Field Manual ("PDT-IDF") (May 1986) for Region 4. The following values are taken from the PDT-IDF Field Manual:

<b>Return Period</b>	<b>24-Hour Rainfall Depth</b>
1-year	2.40 inches
2-year	3.00 inches
5-year	3.60 inches
10-year	4.56 inches
25-year	5.52 inches
50-year	6.48 inches
100-year	7.44 inches

A graphical and tabular presentation of the Type II-24 hour distribution is included in Appendix B.

- G. Runoff calculations using the Rational Method shall use rainfall intensities consistent with appropriate times of concentration and return periods and NOAA Atlas 14, Volume 2.1, 2004 or the Intensity-Duration-Frequency Curves as presented in Appendix B.
- H. Runoff Curve Numbers (CN's) to be used in the SCS method shall be based upon the matrix presented in Appendix B.
- I. Runoff coefficients for use in the Rational Method shall be based upon the table presented in Appendix B.

- J. All time of concentration calculations shall use a segmental approach which may include one or all of the flow types below:
1. Sheet Flow (overland flow) calculations shall use either the NRCS average velocity chart (Figure 3-1, Technical Release-55, 1975) or the modified kinematic wave travel time equation (equation 3-3, NRCS TR-55, June 1986). If using the modified kinematic wave travel time equation, the sheet flow length shall be limited to 50 feet for designs using the Rational Method and limited to 150 feet for designs using the Soil-Cover-Complex method.
  2. Shallow Concentrated Flow travel times shall be determined from the watercourse slope, type of surface and the velocity from Figure 3-1 of TR-55, June 1986.
  3. Open Channel Flow travel times shall be determined from velocities calculated by the Manning Equation. Bankfull flows shall be used for determining velocities. Manning 'n' values shall be based on the table presented in Appendix B.
  4. Pipe Flow travel times shall be determined from velocities calculated using the Manning Equation assuming full flow and the Manning 'n' values from Appendix B.
- K. If using the Rational Method, all pre-development calculations for a given discharge direction shall be based on a common time of concentration considering both on-site and any off-site drainage areas. If using the Rational Method, all post-development calculations for a given discharge direction shall be based on a common time of concentration considering both on-site and any off-site drainage areas.
- L. When conditions exist such that a proposed detention facility may experience a tailwater effect, the basin shall be analyzed without any tailwater effect for all storm events for comparison against the required Release Rates. An additional routing of the 100-year storm with the full tailwater effect shall be performed to check that the basin has sufficient storage to contain the 100-year tributary flow with a tailwater.
- M. The Manning Equation shall be used to calculate the capacity of watercourses. Manning 'n' values used in the calculations shall be consistent with the table presented in Appendix B or other appropriate standard engineering 'n' value resources. Pipe capacities shall be determined by methods acceptable to the municipality.
- N. The Pennsylvania DEP, Chapter 105, Rules and Regulations, apply to the construction, modification, operation or maintenance of both existing and proposed dams, water obstructions and encroachments throughout the watershed. Criteria for design and construction of stormwater management facilities according to this Ordinance may not be the same criteria that are used in the permitting of dams under the Dam Safety Program.

ARTICLE 4  
DRAINAGE PLAN REQUIREMENTS

SECTION 401. GENERAL REQUIREMENTS

For any of the Regulated Activities under this Ordinance, prior to the final approval of subdivision and/or land development plans, or the issuance of any permit, or the commencement of any Regulated Earth Disturbance Activity, the owner, subdivider, developer or his agent shall submit a Drainage Plan and receive municipal approval of the Plan.

SECTION 402. EXEMPTIONS

Exemptions from the Drainage Plan Requirements are as specified in Section 106.

SECTION 403. DRAINAGE PLAN CONTENTS

The following items shall be included in the Drainage Plan:

A. General

1. General description of project.
2. General description of proposed permanent stormwater controls.
3. The name and address of the project site, the name and address of the owner of the property and the name of the individual or firm preparing the Drainage Plan.

B. Map(s) of the Project Area Showing:

1. The location of the project relative to highways, municipalities or other identifiable landmarks.
2. Existing contours at intervals of two (2) feet. In areas of steep slopes (greater than 15%), five-foot contour intervals may be used. Off-site drainage areas impacting the project including topographic detail.
3. Streams, lakes, ponds or other bodies of water and watercourses within the project area.
4. Other physical features including existing drainage swales, wetlands, closed depressions, sinkholes, steep slopes (greater than 15%) and areas of natural vegetation to be preserved.
5. Locations of proposed underground utilities, sewers and water lines. The locations of all existing and proposed utilities, sanitary sewers and water lines within 50 feet of property lines of the project site.

6. An overlay showing soil types and boundaries based on the Lehigh or Bucks County Soil Survey, as applicable, latest edition. Any hydric soils present on the site should be identified as such.
7. An overlay showing geologic types and boundaries and any special geologic features present on the site.
8. Proposed changes to land surface and vegetative cover.
9. Proposed man-made features including, structures, roads, paved areas and buildings.
10. Final contours at intervals of two (2) feet. In areas of steep slopes (greater than 15%), five-foot contour intervals may be used.
11. Stormwater Management District boundaries applicable to the site.
12. Clear identification of the location and nature of permanent stormwater facilities and BMPs.
13. If provided in lieu of right of entry, an adequate access easement around all stormwater BMPs that would provide municipal ingress to and egress from a public right-of-way.
14. A schematic showing all tributaries contributing flow to the site and all existing man-made features beyond the property boundary that would be affected by the project.
15. The location of all public water supply wells within 400 feet of the project and all private water supply wells within 100 feet of the project.

#### C. Stormwater Management Controls and BMPs

1. All storm sewer systems, stormwater management controls and BMPs shall be shown on a map and described, including:
  - a. Groundwater recharge methods such as seepage pits, beds or trenches. When these structures are used, the locations of on-lot sewage disposal areas and wells shall be shown.
  - b. Other control devices or methods such as roof-top storage, semi-pervious paving materials, grass swales, parking lot ponding, vegetated strips, detention or retention ponds, storm sewers, etc.
2. All calculations, assumptions and criteria used in the design of the storm sewer system, stormwater management controls and BMPs shall be shown.
3. All site testing data used to determine the feasibility of infiltration on a site.

4. All details and specifications for the construction of the storm sewer system, stormwater management controls and BMPs.
- D. A BMP Operations and Management Plan describing how each permanent stormwater BMP will be continually operated and maintained and the identity of the person(s) responsible for operations and maintenance. A statement shall be included, signed by the landowner, acknowledging that the stormwater BMPs are fixtures that cannot be altered or removed without approval by the municipality.

#### SECTION 404. DRAINAGE PLAN SUBMISSION

- A. For Regulated Activities specified in Sections 105.C.1. and 105.C.2.:
1. The Drainage Plan shall be submitted to the municipality as part of the Preliminary Plan submission for the subdivision or land development.
  2. Two (2) copies of the Drainage Plan shall be submitted by the developer to the Lehigh Valley Planning Commission as part of the Preliminary Plan submission, except for Drainage Plans involving less than 10,000 square feet of additional impervious cover.
- B. For Regulated Activities specified in Sections 105.C.3. and 105.C.4., the Drainage Plan shall be submitted to the municipality as part of any permit required by the Zoning Ordinance.
- C. For Regulated Activities specified in Sections 105.C.5., 105.C.6. and 105.C.7.; one (1) copy of the Drainage Plan shall be submitted by the developer to the Lehigh Valley Planning Commission for coordination with the DEP permit application process under Chapter 105 (Dam Safety and Waterway Management), Chapter 106(Flood Plain Management) of DEP's Rules and Regulations and the NPDES regulations.
- D. Earthmoving for all regulated activities under Section 105.C shall be conducted in accordance with the current federal and State regulations relative to the NPDES and DEP 25 PA Code Chapter 102 regulations.

#### SECTION 405. DRAINAGE PLAN REVIEW

- A. The municipality shall review the Drainage Plan, including the BMP Operations and Maintenance Plan, for consistency with this Ordinance and with any permits issued by DEP. The municipality shall also review the Drainage Plan against any additional storm drainage provisions contained in the municipal subdivision and land development or zoning ordinance, as applicable.
- B. The municipality shall notify the applicant in writing whether the Drainage Plan, including the BMP Operations and Maintenance Plan is approved, consistent with timeframes as established by the current Pennsylvania Municipalities Planning Code, as amended.
- C. The municipality shall not approve any subdivision or land development (Regulated Activities 105.C.1. and 105.C.2.) or zoning permit

application (Regulated Activities 105.C.3. and 105.C.4.) if the Drainage Plan has been found to be inconsistent with the Stormwater Management Plan.

- D. The municipality may in its sole discretion require an "As-Built Survey" of all stormwater BMPs and an explanation of any discrepancies with the Drainage Plan.

#### SECTION 406. MODIFICATION OF DRAINAGE PLANS

When it shall become necessary to modify an approved Drainage Plan as a result of a change in control methods or techniques or the relocation or redesign of control measures or which is necessary because of outside agency approvals, or soil or other conditions are not as stated on the Drainage Plan (all as determined by the municipality), the applicant shall resubmit to the municipality for review a modified Drainage Plan in accordance with Sections 404 and Section 405 above.

#### SECTION 407. HARDSHIP WAIVER PROCEDURE

- A. The municipality shall hear requests for waivers where it is alleged that the provisions of this Ordinance inflict unnecessary hardship upon the applicant. The waiver request shall be in writing and accompanied by the requisite fee based upon a fee schedule adopted by the municipality. A copy of the waiver request shall be provided to each of the following: municipality, municipal engineer, municipal solicitor and Lehigh Valley Planning Commission.
- B. The request shall fully and specifically document the nature of the alleged hardship and the grounds supporting the request.
- C. A waiver shall be granted where the applicant proves all of the following:
  - 1. That there are unique physical circumstances or conditions, including irregularity of lot size or shape, or exceptional topographical or other physical conditions peculiar to the particular property, and that the unnecessary hardship is due to such conditions, and not the circumstances or conditions generally created by the provisions of this Ordinance in the Stormwater Management District in which the property is located;
  - 2. That because of such physical circumstances or conditions, there is no possibility that the property can be developed in strict conformity with the provisions of this Ordinance and that the authorization of a waiver is therefore necessary to enable the reasonable use of the property;
  - 3. That such unnecessary hardship has not been created by the applicant;
  - 4. That the waiver, if authorized, will represent the minimum waiver that will afford relief and will represent the least modification possible of the regulation in issue; and

5. That financial hardship is not the criteria for granting of a waiver.
- D. In granting any waiver, the municipality may attach such conditions and safeguards as it may deem necessary to implement the purposes of Act 167 and this Ordinance. A waiver shall not relieve the applicant of its obligation to manage the quantity, velocity, direction and quality of resulting stormwater runoff so as to prevent injury to health, safety or other property.
- E. For Regulated Activities described in Sections 105.C.1. and 105.C.2., the Board of Supervisors of Upper Saucon Township shall hear and decide requests for hardship waivers on behalf of the municipality in accordance with the local agency hearing procedures adopted by the Board of Supervisors.
- F. For regulated activities in Sections 105.C.3., 105.C.4., 105.C.5. and 105.C.6., the Zoning Hearing Board shall hear and decide requests for hardship waivers on behalf of the municipality.
- G. For regulated activities in Section 105.C.7. and 105.C.8. not covered in Sub-Sections D and E above, the Zoning Hearing Board shall hear and decide requests for hardship waivers on behalf of the municipality.
- H. No waiver shall be granted from the water quality provisions of this Ordinance.

ARTICLE 5  
INSPECTIONS

SECTION 501. SCHEDULE OF INSPECTIONS

- A. DEP or its designees (e.g. County Conservation District) normally ensure compliance with any permits issued, including those for stormwater management. In addition to DEP compliance programs, the municipality or its designee may inspect all phases of the construction, operations, maintenance and any other implementation of stormwater BMPs.
- B. During any stage of the Regulated Earth Disturbance activities, if the municipality or its designee determines that any BMPs are not being implemented in accordance with this Ordinance, the municipality may in accordance with Article 9, suspend or revoke any existing permits or other approvals issued by the municipality until the deficiencies are corrected.

ARTICLE 6  
FEES AND EXPENSES

SECTION 601. GENERAL

Applicants under this Ordinance are subject to prevailing fees charged by the municipality for Subdivisions/Land Developments or Individual Lot Grading Plans as applicable.

ARTICLE 7  
STORMWATER BMP OPERATIONS AND MAINTENANCE

SECTION 701. GENERAL REQUIREMENTS

A. The Plan for the project site shall establish responsibilities for the ownership and continuing operation and maintenance of all permanent stormwater BMPs as follows:

1. Ownership at Discretion of Municipality.

Ownership of permanent stormwater BMPs shall be at the option of the municipality.

2. Ownership by the Municipality.

Where an approved Plan provides for the dedication of permanent stormwater BMPs to the municipality on a separate lot, the BMPs shall be operated and maintained by the municipality. Nothing contained herein shall require the municipality to accept dedication of the BMP until the municipality determines that it is constructed and operates in accordance with the requirements of the approved plan and any other requirements of the municipality.

3. Ownership by Persons other than the Municipality.

Where an approved Plan provides for ownership of a permanent stormwater BMP by a Person other than the municipality, then the operation and maintenance of the permanent stormwater BMP shall be the responsibility of that Person or other approved entity in accordance with an agreement prepared pursuant to Section 703.

B. Operation and Maintenance Responsibilities.

All operation and maintenance responsibilities shall be detailed in the Plan, and shall be subject to the approval of the municipality. Where an approved plan provides for ownership by the municipality, the responsibility to properly operate and maintain the BMP shall be the applicant's until acceptance of an offer of dedication by the municipality. The municipality reserves the right to accept or reject the operation and maintenance responsibility for any or all of the permanent stormwater BMPs.

SECTION 702. MUNICIPAL STORMWATER BMP OPERATION AND MAINTENANCE FEE

A. Upon acceptance by the municipality of an offer of dedication, the applicant shall pay to the municipality a maintenance fee for each stormwater BMP. The purpose of the fee shall be to defray costs of insurance, operations, maintenance, inspection and repair activities. The amount shall be determined by calculating the present value of the estimated annual costs for operation, maintenance, repair, inspection

and insurance for a period of 50 years, as calculated by the municipality.

- B. If a BMP is proposed that also serves as a recreation facility (e.g. ball field, lake), the municipality may in its sole discretion adjust the amount due accordingly.

SECTION 703. OPERATIONS, MAINTENANCE, WAIVER AND INDEMNITY AGREEMENT FOR STORMWATER BMPS NOT OWNED BY THE MUNICIPALITY

- A. Each person installing a privately owned stormwater BMP shall execute an operations, maintenance, waiver and indemnity agreement with the municipality covering all stormwater BMPS that are to be privately owned. The agreement shall conform substantially to the Model attached hereto as Appendix E.
- B. Other terms shall be included in the agreement where deemed appropriate by the municipality in its sole discretion to be reasonable or necessary to guarantee the satisfactory operation and maintenance of all permanent stormwater BMPS and to protect the public health, safety and general welfare.
- C. The agreement shall be subject to the review and approval of the municipality.
- D. The agreement and the obligations thereunder shall constitute covenants running with the land, and it shall be the obligation of every owner, grantor or transferor of property covered in whole or in part by the agreement to provide a copy of the agreement to every subsequent owner, grantee or transferee.

SECTION 704. ACCESS

- A. Where an approved plan proposes municipal ownership of a BMP, the BMP shall be located on a separate lot with deeded access to a public street.
- B. Where an approved plan provides for private ownership, operation and maintenance of a permanent BMP, the municipality shall have a right-of-entry. The right-of-entry shall extend to duly authorized employees or representatives of the municipality and other governmental agencies. The purpose of the right-of-entry shall be to inspect, investigate or ascertain whether maintenance is being properly provided by the private entity.

SECTION 705. RECORDING

- A. Where the municipality has approved a Land Development, the Drainage Plan shall be considered part of the record plan and shall be deemed incorporated into the record plan by reference in accordance with the applicable provisions of the Subdivision and Land Development Ordinance.

- B. The municipality may require in its sole discretion that the BMP Operations and Maintenance Plan be recorded with the record plan in accordance with the applicable provisions of the Subdivision and Land Development Ordinance.
- C. The Section 703 Agreement shall be recorded in accordance with the applicable provisions of the Subdivision and Land Development Ordinance.
- D. Where the requirement to install BMPs is not due to a Land Development, the applicant shall record all documents deemed appropriate by the municipality.
- E. All recording costs shall be paid by the applicant.

ARTICLE 8  
PROHIBITIONS

SECTION 801. PROHIBITED DISCHARGES

- A. No person shall allow or cause to allow stormwater discharges into the municipality's separate storm sewer system which are not composed entirely of stormwater except as provided in subsection B below or as allowed under a State or Federal permit.
- B. Based upon a finding that it does not significantly contribute to pollution to surface waters of the Commonwealth, the municipality may allow discharges from the following sources or activities:
1. Fire fighting activities,
  2. Potable water sources including dechlorinated water line and fire hydrant flushings,
  3. Irrigation drainage,
  4. Routine external building washdown which does not use detergents or other compounds,
  5. Air conditioning condensate,
  6. Individual residential car washing,
  7. Springs,
  8. Crawl space pumps,
  9. Uncontaminated water from foundation or from footing drains,
  10. Riparian habitats and wetlands,
  11. Lawn watering,
  12. Pavement washwaters 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,
  13. Dechlorinated swimming pool discharges, and
  14. Uncontaminated groundwater.
- C. In the event that the municipality determines that any discharge allowed pursuant to Section 801.B. significantly contribute to pollution of waters of the Commonwealth or is so notified by DEP, the municipality shall notify the responsible person to cease the discharge.
- D. Upon notice provided by the municipality under Section 801.C., the discharger shall cease the discharge within a time period specified by the municipality.

- E. Nothing in this Section shall affect a discharger's responsibilities under state or federal law.

SECTION 802. PROHIBITED CONNECTIONS

The following connections are prohibited, except as provided in Section 801.B. above:

- A. Any drains or conveyances, whether on the surface or subsurface, which allow any non-stormwater discharge including sewage, process wastewater and wash water to enter the separate storm sewer system and any connections to the storm drain system from indoor drains and sinks; and
- B. Any drains or conveyances connected from a non-residential land use to the separate storm sewer system which have not been documented in plans, maps or equivalent records and approved by the municipality.

SECTION 803. ROOF DRAINS

- A. Roof drains shall discharge to infiltration areas or vegetative BMPs.
- B. Unless approved by the municipality, roof drains shall not be connected to streets, sanitary or storm sewers or roadside ditches.

SECTION 804. ALTERATION OF BMPS

No person shall install, create, modify, remove, fill, landscape or otherwise alter or place any structure or vegetation in any stormwater BMP or within a drainage easement without the written approval of the municipality. A note which indicates this requirement shall be included on the plan(s) to be recorded. In addition, the developer shall impose covenants and restrictions upon subsequent owners, transferees and occupants in a form satisfactory to the municipality to carry out the intent of this Section.

SECTION 805. VIOLATION OF BMP AGREEMENT

- A. The BMP Agreement shall run with the land and bind the owner and all subsequent owners, transferees and occupants of the land. Any violation of the Agreement is prohibited and shall constitute a violation of this Ordinance.
- B. Unreasonable delays in allowing the municipality access to a BMP pursuant to Section 704.B is a violation of the Ordinance. The failure of any person to grant entry or to undertake any action which impedes entry shall be prohibited and constitute a violation of this Ordinance.

ARTICLE 9  
ADMINISTRATION AND ENFORCEMENT

SECTION 901. PUBLIC NUISANCE

- A. The violation of any provision of this Ordinance is hereby deemed a Public Nuisance.
- B. Each day that an offense continues shall constitute a separate violation.

SECTION 902. NOTICE OF VIOLATION

- A. Whenever the municipality determines that there has occurred a violation of this Ordinance, it may order compliance by issuing a written Notice of Violation to the responsible person(s) or it may proceed to abate the violation.
- B. The Notice of Violation shall include the following:
  - 1. The date of the notice;
  - 2. The name of the owner of record and any other person against whom the municipality intends to take action;
  - 3. The location of the property in violation;
  - 4. The nature of the violation;
  - 5. A statement of required action, which may include the following:
    - a. The performance of monitoring, analyses and reporting;
    - b. The elimination of prohibited connections or discharges;
    - c. Cessation of any violating discharges, practices or operations;
    - d. The abatement or remediation of stormwater pollution or contamination hazards and the restoration of any affected property;
    - e. Payment of a fine to cover professional, legal, administrative and remediation costs;
    - f. The implementation of stormwater BMPs;
    - g. Operation and maintenance of stormwater BMPs, and/or
    - h. Such other action as the municipality deems appropriate to carryout the intent of this Ordinance.
  - 6. Establishment of a time limit for correction of the violation.

- C. Said notice may further advise that should the violator fail to take the required action within the established deadline, the work will be done by the municipality or its designee and the expense thereof, together with all related lien and enforcement fees, legal fees, charges and expenses, shall be charged to the violator.
- D. The failure to comply with a Notice of Violation shall subject the violator to the penalty provisions of this Ordinance. All such penalties shall be deemed cumulative and shall not prevent the municipality from pursuing any and all other remedies available in law or equity.
- E. Where a violator fails either to appeal the Notice of Violation and prevail thereon, or abate the violation within the time frame specified, the occurrence of the violation shall be deemed admitted by the violator. Under such circumstances, the violation shall be deemed to have commenced on the date of the Notice of Violation for the purpose of calculating penalties and costs.

SECTION 903. ENFORCEMENT REMEDIES

- A. Where it appears that there has occurred a violation of any provision of this Ordinance, the municipality shall have the following remedies or any combination thereof:
  - 1. Issuance of a Cease and Desist Order;
  - 2. Suspension of any permits or approvals which have been granted by the municipality relating to the Regulated Activity;
  - 3. Abatement by the municipality and filing of a municipal lien in accordance with the Pennsylvania Municipal Lien Law;
  - 4. Initiation of a civil enforcement proceeding pursuant to Section 904;
  - 5. Commencement of a proceeding in equity.

SECTION 904. PENALTIES

- A. Any person who or which has violated the provisions of the Ordinance shall, upon being found liable therefore in a civil enforcement proceeding commenced by the municipality, pay a judgment of not more than five hundred \$500 dollars plus all court costs, including reasonable attorney's fees incurred by the municipality as a result thereof. No judgment shall commence or be imposed, levied or payable until the date of the determination of a violation by the district justice. If the defendant neither pays nor timely appeals the judgment, the municipality may enforce the judgment pursuant to a separate violation, unless the district justice, determining that there has been a violation, further determines that there was a good faith basis for the person violating this Chapter to have believed that there was no such violation, in which event there shall be deemed to have been only one such violation until the fifth(5<sup>th</sup>) day following

the date of the determination of a violation by the district justice and thereafter each day that a violation continues shall constitute a separate violation.

- B. The court of common pleas, upon petition, may grant an order of stay upon cause shown, tolling the per diem judgment pending a final adjudication of the violation and judgment.
- C. Nothing contained in this Section shall be construed or interpreted to grant any person or entity other than the municipality the right to commence any action for enforcement pursuant to this Section.
- D. District justices shall have initial jurisdiction in proceedings brought under this Section.
- E. In addition, the municipality, through its solicitor, may institute injunctive, mandamus or any other appropriate action or proceeding at law or in equity for the enforcement of this Ordinance. Any court of competent jurisdiction shall have the right to issue restraining orders, temporary or permanent injunctions, mandamus or other appropriate forms of remedy or relief.

#### SECTION 905. REPEALER

Ordinance 108 dated October 26, 1993, and Ordinance 108-A dated November 22, 2005, are hereby specifically repealed. Unless otherwise specifically stated in this Ordinance, all ordinances in conflict with the provisions of this Ordinance are hereby repealed to the extent of such conflict only.

#### SECTION 906. SEVERABILITY

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

#### SECTION 907. APPEALS

Any person aggrieved by any action of the municipality or its designee relevant to the provisions of this Ordinance may appeal using the appeal procedures established in the Pennsylvania Municipalities Planning Code, Section 909.1.

EFFECTIVE DATE

This Ordinance shall be shall become effective five (5) days after enactment by the Board of Supervisors of Upper Saucon Township.

ENACTED this \_\_\_\_ day of \_\_\_\_\_, 2011, by the Board of Supervisors of Upper Saucon Township.

TOWNSHIP OF UPPER SAUCON  
BOARD OF SUPERVISORS

\_\_\_\_\_  
Chairman

\_\_\_\_\_  
Vice Chairman

\_\_\_\_\_  
Supervisor

\_\_\_\_\_  
Supervisor

\_\_\_\_\_  
Supervisor

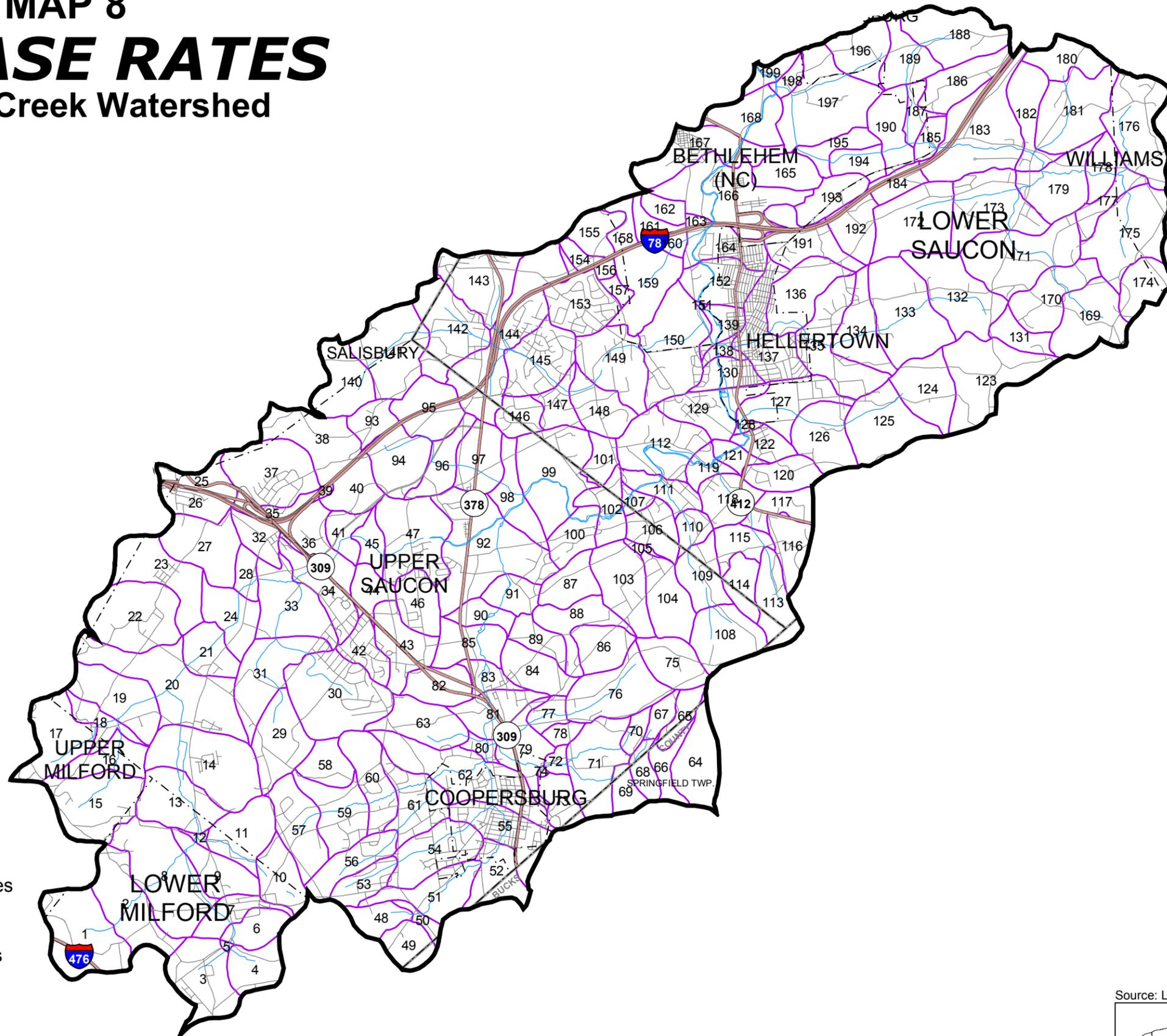
Attest:

\_\_\_\_\_  
Secretary

# MAP 8

## RELEASE RATES

### Saucon Creek Watershed

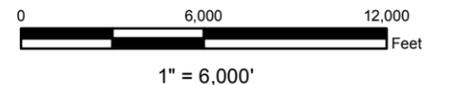


- Subarea Boundaries
- Watershed Boundaries
- County Boundaries
- Municipal Boundaries
- Streams/Rivers
- Major Roads
- Minor/Other Roads

**RELEASE RATE SUMMARY TABLE**  
 Dual Release Rate Categories (30/--) define a 30% Release Rate for the 2-Year storm and the indicated Release Rate for the 10-, 25- and 100-Year storms.

SAUCON CREEK			
Subarea	Release Rate (%)	Subarea	Release Rate (%)
1 - 2	30/90	119	30/100
3 - 5	30/100	120	30/50
6 - 7	30/80	121 - 122	30/100
8	30/90	123 - 124	30/80
9	30/80	125 - 126	30/70
10	30/90	127	30/100
11 - 12	30/80	128 - 130	30/PND*
13 - 14	30/70	131 - 132	30/100
15 - 16	30/90	133	30/80
17 - 18	30/80	134 - 136	30/70
19 - 21	30/70	137	30/100
22 - 23	30/90	138 - 139	30/PND*
24	30/70	140	30/100
25 - 28	30/50	141 - 142	30/80
29	30/70	143	30/90
30	30/80	144	30/70
31	30/60	145 - 146	30/60
32	30/50	147 - 149	30/50
33 - 34	30/60	150	30/100
35 - 47	30/50	151 - 152	30/PND*
48	30/70	153 - 158	30/80
49	30/80	159	30/70
50	30/70	160 - 162	30/60
51 - 54	30/60	163 - 168	30/PND*
55	30/50	169 - 172	30/70
56	30/70	173	30/60
57	30/80	174	30/90
58 - 60	30/70	175 - 178	30/70
61	30/60	179	30/60
62	30/50	180 - 181	30/70
63	30/60	182	30/60
64 - 65	30/80	183 - 184	30/50
66	30/70	185 - 187	30/100
67	30/80	188	30/50
68	30/70	189	30/100
69	30/60	190	30/PND*
70	30/70	191	30/100
71 - 74	30/60	192	30/50
75	30/70	193	30/100
76 - 78	30/60	194 - 195	30/PND*
79 - 111	30/50	196	30/100
112	30/100	197 - 199	30/PND*
113 - 118	30/50		

\*Provisional No Detention Areas do not need detention controls for the 10-, 25- or 100-year storms provided that adequate downstream capacity can be shown for increased peak flows. (See Plan Update for additional details.)

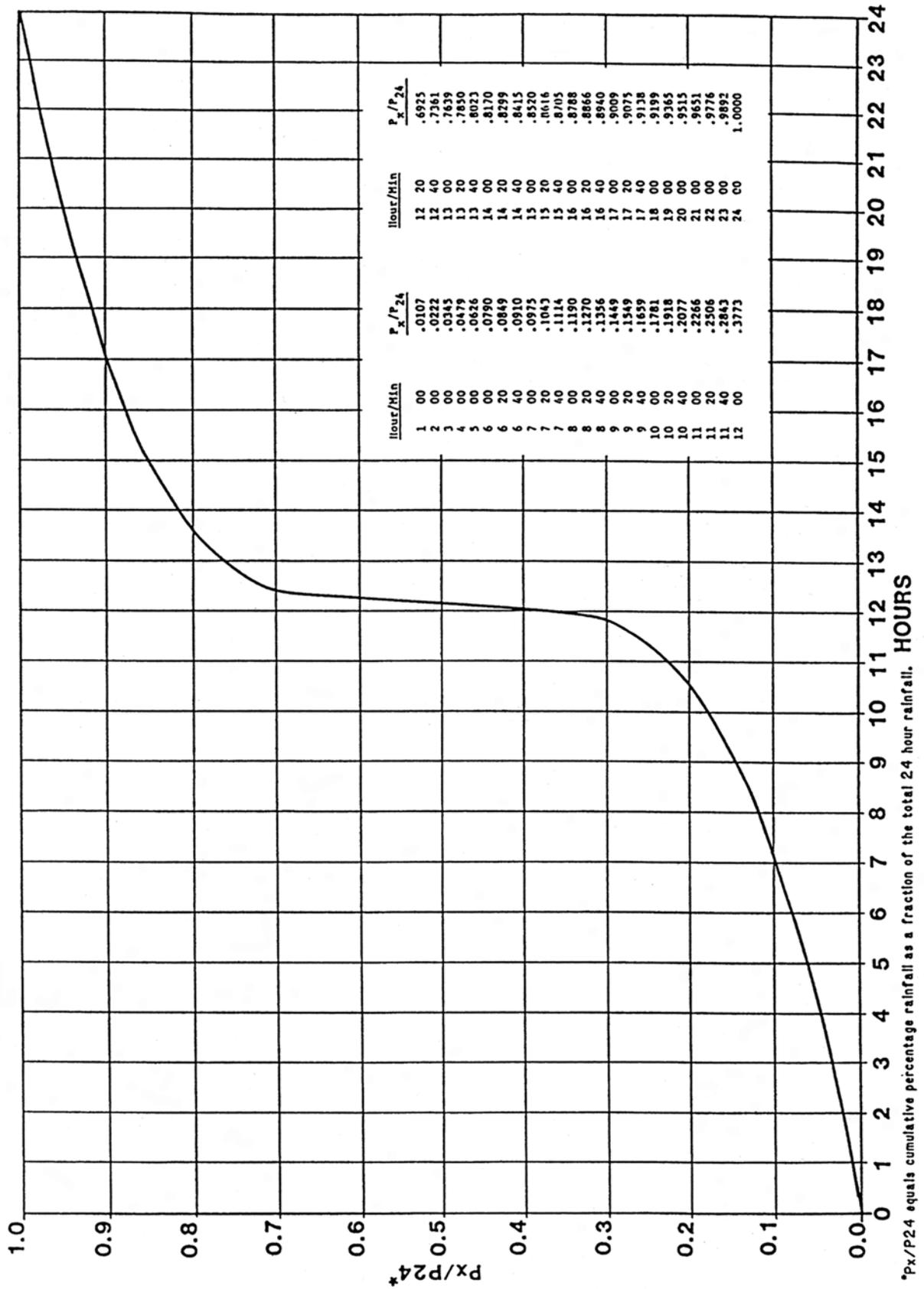


Source: Lehigh Valley Planning Commission



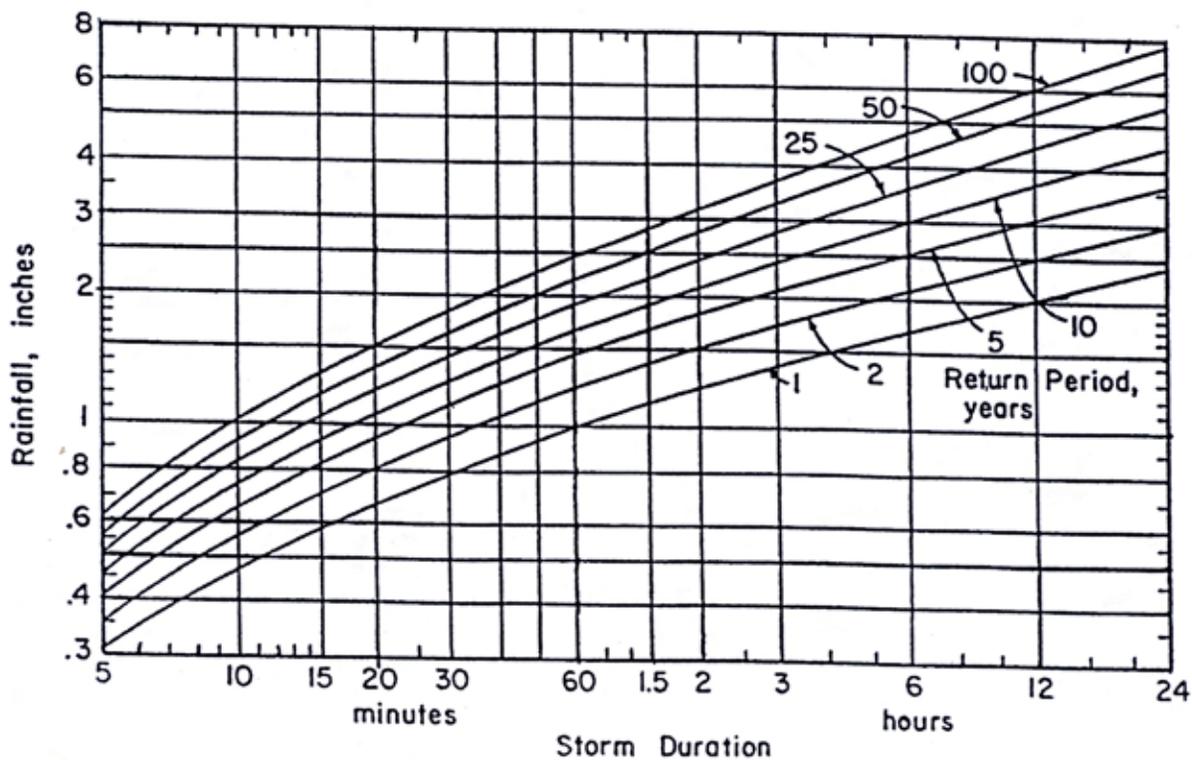
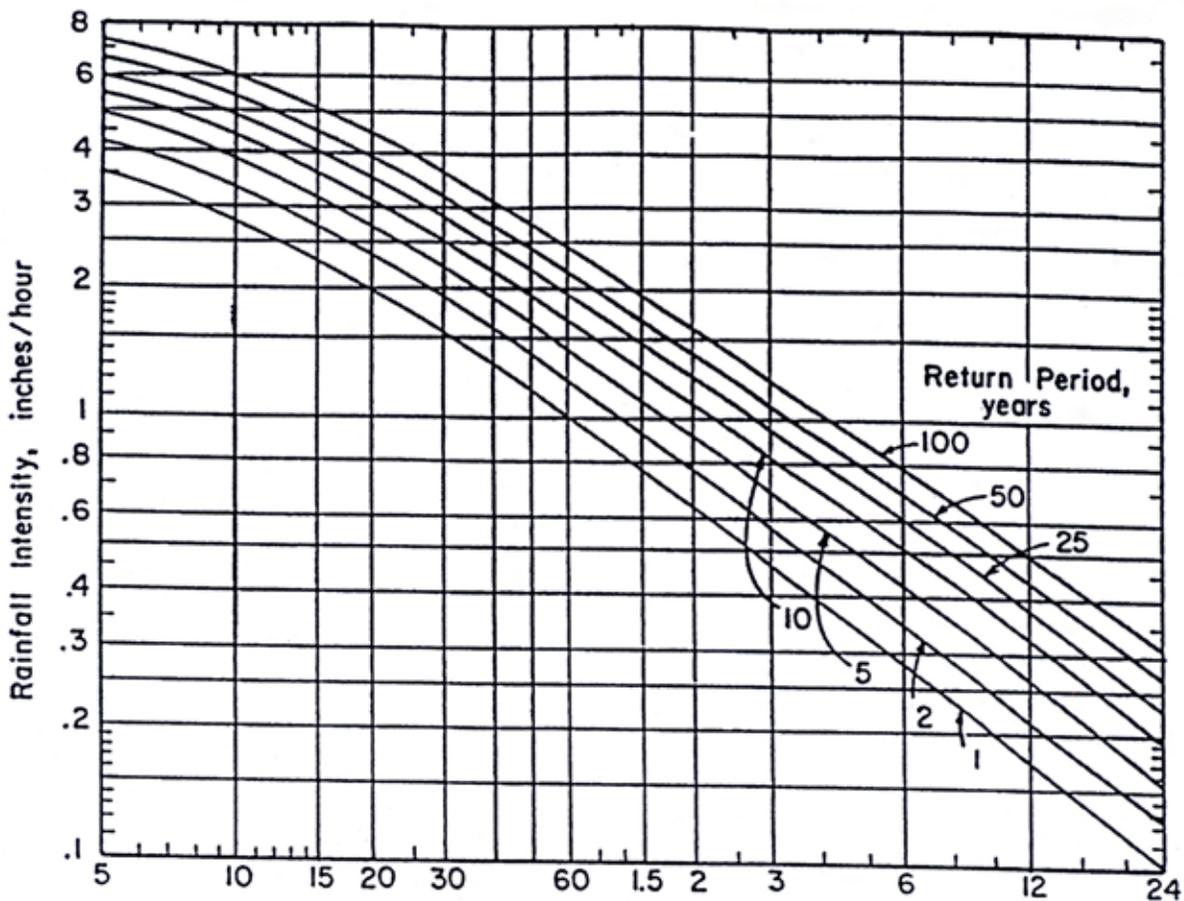
**LEHIGH VALLEY PLANNING COMMISSION**  
 961 Marcon Boulevard, Suite 310  
 Allentown, PA 18109-9368  
 (610) 264-4544

# NRCS TYPE II RAINFALL DISTRIBUTION



\* $P_x/P_{24}$  equals cumulative percentage rainfall as a fraction of the total 24 hour rainfall.

### INTENSITY-DURATION-FREQUENCY CURVES\*



\*Source: Pennsylvania Dept. of Transp. Design Rainfall Curves (1986).

RUNOFF CURVE NUMBERS AND PERCENT IMPERVIOUSNESS VALUES\*

Cover Description	Average percent impervious area	Curve numbers for hydrologic soil group**			
		A	B	C	D
Open space (lawns, parks, golf courses, cemeteries, etc.): Good condition (grass cover greater than 75%) .....		39	61	74	80
Impervious areas: Paved parking lots, roofs, driveways, etc. (excluding right-of-way) .....		98	98	98	98
Streets and roads: Paved; curbs and storm sewers (excluding right-of-way) .....		98	98	98	98
Paved; open ditches (including right-of-way) .....		83	89	92	93
Gravel (including right-of-way) ....		76	85	89	91
Urban districts: Commercial and business .....	85	89	92	94	95
Industrial .....	72	81	88	91	93
Residential districts by average lot size:					
$\frac{1}{8}$ acre or less (townhouses) .....	65	77	85	90	92
$\frac{1}{4}$ acre .....	38	61	75	83	87
$\frac{1}{3}$ acre .....	30	57	72	81	86
$\frac{1}{2}$ acre .....	25	54	70	80	85
1 acre .....	20	51	68	79	84
2 acres .....	12	46	65	77	82
Woods		30	55	70	77
Agriculture		Refer to Table 2-2b in source document (TR55) by crop type and treatment.			

\*Source: Natural Resources Conservation Service Technical Release No. 55, Second Edition, June 1986.

\*\*Hydrologic Soil Group based on the County Soil Survey latest edition.

RUNOFF COEFFICIENTS FOR THE RATIONAL METHOD*												
HYDROLOGIC SOIL GROUP AND SLOPE RANGE**												
LAND USE	A			B			C			D		
	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+
Cultivated <sup>A</sup>	<sup>a</sup> 0.18	0.23	0.28	0.24	0.29	0.33	0.30	0.34	0.38	0.33	0.37	0.41
	<sup>b</sup> 0.23	0.29	0.34	0.30	0.36	0.40	0.36	0.41	0.45	0.39	0.44	0.48
Pasture <sup>B</sup>	0.09	0.13	0.17	0.19	0.24	0.29	0.27	0.31	0.36	0.31	0.35	0.39
	0.12	0.17	0.23	0.24	0.30	0.36	0.33	0.38	0.43	0.37	0.42	0.46
Meadow, Lawn <sup>C</sup>	0.05	0.08	0.12	0.15	0.20	0.24	0.23	0.28	0.32	0.28	0.32	0.36
	0.07	0.12	0.17	0.19	0.25	0.30	0.28	0.34	0.39	0.33	0.39	0.43
Forest, Woods	0.03	0.05	0.08	0.11	0.16	0.20	0.20	0.25	0.29	0.25	0.30	0.34
	0.04	0.08	0.12	0.15	0.21	0.26	0.25	0.31	0.36	0.31	0.37	0.41
Gravel	0.24	0.29	0.33	0.32	0.36	0.40	0.35	0.39	0.43	0.37	0.41	0.44
	0.30	0.36	0.40	0.38	0.43	0.47	0.42	0.46	0.50	0.44	0.48	0.51
Parking, Other Impervious	0.85	0.86	0.87	0.85	0.86	0.87	0.85	0.86	0.87	0.85	0.86	0.87
	0.95	0.96	0.97	0.95	0.96	0.97	0.95	0.96	0.97	0.95	0.96	0.97
Residential, Commercial, Industrial and Other "Developed"	Runoff coefficients should be calculated based upon weighted average of impervious area coefficients and pervious area coefficients from above based upon soil type, slope and the particular development proposal.											

\*Coefficients for all land uses except parking and other impervious cover are based on the Rossmiller Equation for translating NRCS curve numbers into Rational Method 'c' values. The source for the parking and other impervious cover coefficients is RAWLS, W.J., S.L. WONG and R.H. McCUEN, 1981. Comparison of urban flood frequency procedures. Preliminary draft report prepared for the Soil Conservation Service, Beltsville, MD.

\*\*Hydrologic Soil Group based on the county soil survey latest edition.

a - Runoff coefficients for storm recurrence intervals less than 25 years.  
b - Runoff coefficients for storm recurrence intervals of 25 years or more.

<sup>A</sup>Represents average of cultivated land with and without conservation treatment from TR-55, January 1975. These values are consistent with several categories of cultivated lands from TR-55, June 1986.

<sup>B</sup>Represents grasslands in fair condition with 50% to 75% grass cover.

<sup>C</sup>Represents grasslands in good condition with greater than 75% grass cover.

## MANNING 'n' VALUES BY TYPICAL REACH DESCRIPTION

<u>Reach Description</u>	<u>Manning 'n'</u>
Natural stream, clean, straight, no rifts or pools	0.030
Natural stream, clean, winding, some pools and shoals	0.040
Natural stream, winding, pools, shoals, stony with some weeds	0.050
Natural stream, sluggish with deep pools and weeds	0.070
Natural stream or swale, very weedy or with timber under brush	0.100
Concrete pipe, culvert or channel	0.012
Corrugated metal pipe	0.012-0.027*

\*Depending upon type and diameter.

## ROUGHNESS COEFFICIENTS (MANNING 'n') FOR SHEET FLOW

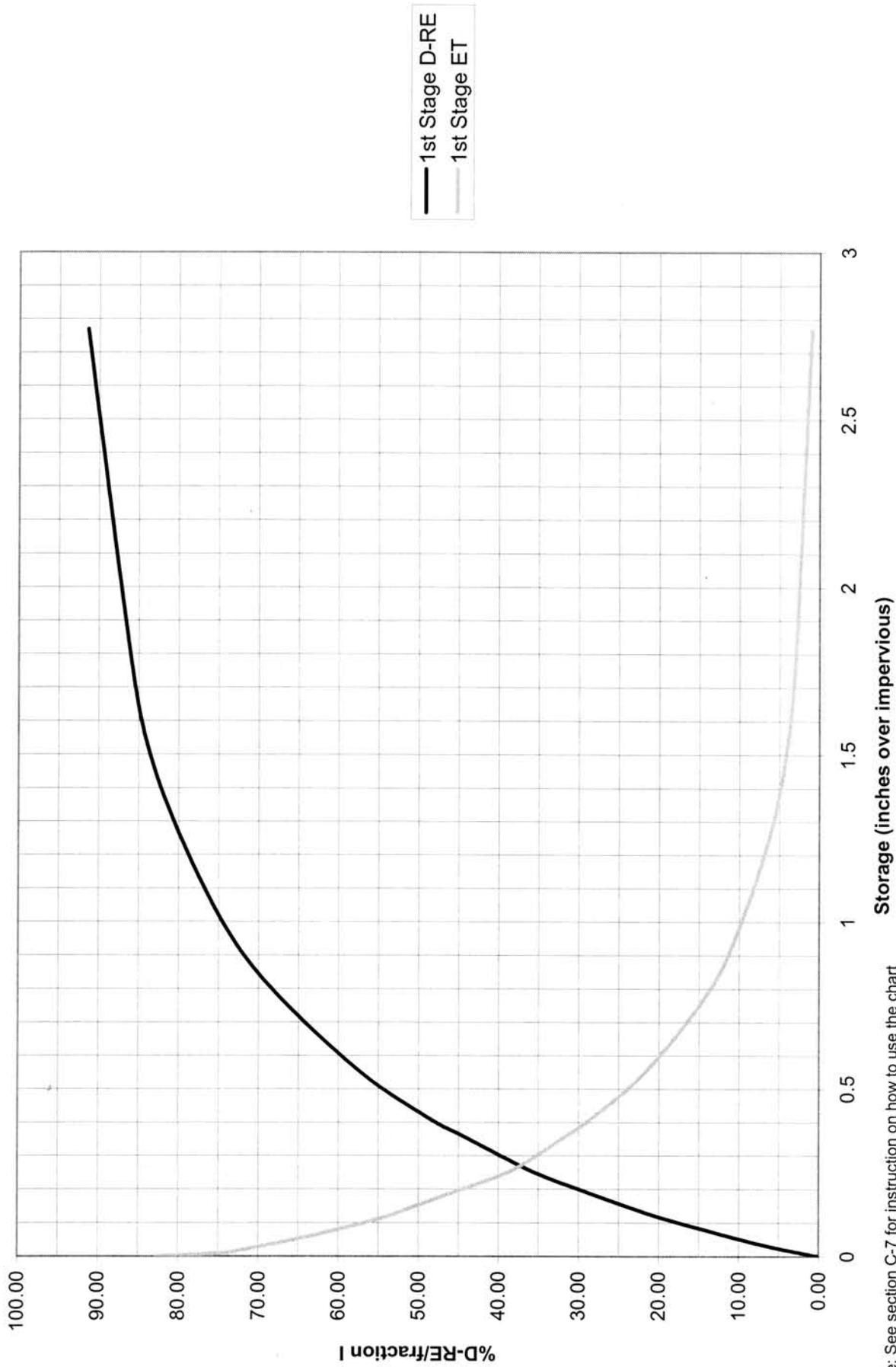
<u>Surface Description</u>	<u>Manning 'n'<sup>1</sup></u>
Smooth surfaces (concrete, asphalt, gravel, or bare soil)	0.011
Fallow (no residue)	0.050
Cultivated soils:	
Residue cover <= 20%	0.060
Residue cover > 20%	0.170
Grass:	
Short grass prairie	0.150
Dense grasses <sup>2</sup>	0.240
Bermuda grass	0.410
Range (natural)	0.130
Woods: <sup>3</sup>	
Light underbrush	0.400
Dense underbrush	0.800

<sup>1</sup>The 'n' values are a composite of information compiled by Engman (1986).

<sup>2</sup>Includes species such as weeping lovegrass, bluegrass, buffalo grass, blue grama grass and native grass mixtures.

<sup>3</sup>When selecting 'n', consider cover to a height of about 0.1 ft. This is the only part of the plant cover that will obstruct sheet flow.

# % Direct Recharge (D-RE) per Fraction Impervious vs. Storage



Note: See section C-7 for instruction on how to use the chart

## PERCENT D-RE PER FRACTION IMPERVIOUS VERSUS STORAGE CURVE USAGE INSTRUCTIONS

The “1st Stage D-RE” curve is based on impervious areas being diverted first to a D-RE BMP designed to capture less than the 2-year event, with the remaining 2-year runoff overflowing into an ET BMP. The “1st stage ET” curve is based on reversing the above. The curves may be used for the whole site, or for pieces of a site to achieve successful designs as follows:

- A. If used for whole site designs, the “fraction I” used is the proposed impervious as a fraction of the entire site. As an example, for a 60% impervious site with all impervious directed to a first stage D-RE BMP, use 30% D-RE with 0.60 fraction I to yield 50% D-RE/fraction I and translate into 0.42 inches of storage over impervious areas. The total first stage D-RE maximum BMP storage is 0.42 inches of depth times the surface area of the impervious cover. Similarly, if a first stage ET BMP followed by a second stage D-RE BMP was used, the minimum ET storage is 0.15 inches over the impervious cover.
- B. If used for pieces of the site smaller than the whole site, the fraction I used is the impervious cover of the part of the site in question as a fraction of the area of the same piece. Each piece may be designed for 30% D-RE if desired, but individual pieces may exceed 30% D-RE provided all BMPs on site are providing less than 30% D-RE in aggregate. In this case, the BMP storage for each piece is used in the chart with the fraction I using the whole site area to determine the contribution of each piece to the 30% D-RE allowable. As an example, still using the 60% impervious site, a piece of the site uses a D-RE BMP first. The piece is half of the total area of the site and is 80% impervious. The BMP is designed for 0.6 inches of runoff from the impervious surfaces. Using 0.6 inches of storage and a fraction I of 0.80, the piece is designed for (%D-RE/Fraction I = 60) 48% D-RE. The impervious cover in this piece has fraction I of 0.4 of the overall site acreage and, therefore, using 0.6 inches of storage and a fraction I of 0.4 yields a D-RE/ fraction I of 60% using the graph which solves to a D-RE of 24%. This means that this piece uses 24% of the allowable 30% D-RE. The remaining piece(s) will need to be designed for 6% or less D-RE. The remaining piece in this example has a fraction I of the overall site of 0.2. Using 6% D-RE and a fraction I of 0.2 yields a D-RE/fraction I of 30%. Entering the graph at that value, the maximum storage for the piece in a first stage D-RE BMP is 0.2 inches over the impervious portion of its tributary area.
- C. If more than two stages of ET and D-RE BMPs are used to control the WQv, the design considerations are as follows:
  1. If the design has a first stage ET BMP draining to additional stage ET BMPs and subsequent D-RE BMP, add the storage volumes of the ET BMPs and use this volume as the first stage ET storage volume.
  2. Similarly, if two or more D-RE BMPs are used first followed by an ET BMP, add the storage volumes of the D-RE BMPs and use this volume as the first stage D-RE storage volume.

3. In designs with more than two ET or D-RE BMPs used in series to control the WQv and rules C.1 and C.2 don't apply, the chart shall be applied conservatively to assure the D-RE standard is not violated. For example, with proposed use of a first stage D-RE BMP, second stage ET BMP, and third stage D-RE BMP, all storage provided shall be assumed to be D-RE for use in the chart. Essentially, any ET BMP applied beyond the first stage will be ignored for purposes of determining compliance with the D-RE standard.

Recommendation Chart for Infiltration Stormwater Management BMPs in Carbonate Bedrock*												
SITE RISK FACTORS		CARBONATE BEDROCK										
Geology Type	Effective Soil Thickness	Special Geologic Features**	2 to 4 Feet			Over 4 Feet to 8 Feet			Over 8 Feet			
	Less than 2 Feet	Low/Med/High Buffer	Low Buffer	Medium Buffer	High Buffer	Low Buffer	Medium Buffer	High Buffer	Low Buffer	Medium Buffer	High Buffer	
	(Unacceptable)	(Unacceptable)	Preliminary	Preliminary	Preliminary	Preliminary	Preliminary	Preliminary	Preliminary	Preliminary	Preliminary	
DESIGN FACTORS	Infiltration Loading Rates (% Increase) ***	0- 100% 300- 500%	0- 100% 300- 500%	0- 100% 300- 500%	0- 100% 300- 500%	0- 100% 300- 500%	0- 100% 300- 500%	0- 100% 300- 500%	0- 100% 300- 500%	0- 100% 300- 500%	0- 100% 300- 500%	0- 100% 300- 500%
PROGRAM SUMMARY GUIDANCE ****			1	1	1	2	2	1	2	1	2	1



RECOMMENDED



NOT RECOMMENDED

\* Source: Developed by Cahill Associates based on information in "Technical Best Management Practice Manual & Infiltration Feasibility Report", November 2002 and input from the LVPC, 2003.

\*\* Special Geologic Feature Buffer widths are as follows:

- Low Buffer is less than 50 feet
- Medium Buffer is 50 feet to 100 feet
- High Buffer is greater than 100 feet

\*\*\* Rates greater than 500% not recommended.

\*\*\*\* Assumes adequately permeable soils and lack of natural constraints as required for all infiltration systems.

1 Infiltration systems may be allowed at the determination of the Engineer and/or Geologist, provided that a Detailed Site Investigation is undertaken which confirms nature of rock, location of Special Geologic Features, and adequacy of the buffer between the SGF and the proposed stormwater system(s).

2 In these Special Geologic Features: Low Buffer situations, infiltration systems may be allowed at the determination of the Engineer and/or Geologist, provided that a Detailed Site Investigation is undertaken and a 25 foot buffer from SGFs is maintained.

Note: Buffers shall be in accordance with this Ordinance and the Upper Saucon Township Zoning Ordinance, as amended. The terms "Engineer" and "Geologist" shall be defined as "Township Geotechnical Consultant".

**Prepared by: Thomas H. Dinkelacker, Esquire**

**Return to: Thomas H. Dinkelacker, Esquire  
Dimmich & Dinkelacker, P.C.  
2987 Corporate Court, Suite 210  
Orefield, PA 18069**

**STORMWATER BEST MANAGEMENT PRACTICES OPERATIONS,  
MAINTENANCE, WAIVER AND INDEMNITY AGREEMENT  
ORDINANCE 108-B**

**THIS AGREEMENT** is made this \_\_\_\_ day of \_\_\_\_, 20\_\_, by, between and among the **TOWNSHIP OF UPPER SAUCON**, a Township of the Second Class organized and existing under and pursuant to the Second Class Township Code and other statutes of the Commonwealth of Pennsylvania, as a municipal and political subdivision of the Commonwealth of Pennsylvania and County of Lehigh, with a mailing address of (and business office at ) 5500 Camp Meeting Road, Center Valley, Lehigh County, Pennsylvania, 18034-0278 (hereinafter, “Township”);

**AND**

\_\_\_\_\_ (hereinafter,  
“Developer”).

**RECITALS**

**WHEREAS**, pursuant to the powers granted to a Second Class Township under the Pennsylvania Second Class Township Code and the Storm Water Management Act, the Township has adopted Ordinance No. 108-B, also known as the “Upper Saucon Township Act 167 Stormwater Management Ordinance” (hereinafter, "Ordinance"); and

**WHEREAS**, the Developer is the owner of a certain tract of land in the Township comprising \_\_\_\_\_ total acres, more or less, located \_\_\_\_\_ in the Township’s \_\_\_\_\_ Zoning District (hereinafter, “Premises”); and

**WHEREAS**, the proposed development of the Premises involves the construction of a \_\_\_\_\_ and certain required improvements, including stormwater management improvements and Best Management Practices (hereinafter, “BMP’s”), all as more particularly set forth and depicted on a certain land development Plan, titled “\_\_\_\_\_” and consisting of \_\_\_\_\_ pages; prepared by \_\_\_\_\_ and dated and last revised on \_\_\_\_\_ and \_\_\_\_\_, respectively; and

**WHEREAS**, pursuant to the Ordinance and the Township’s Subdivision and Land Development Ordinance (hereinafter, “SALDO”), the Developer has submitted to the Township for review and approval a certain Drainage Plan, which includes, among other things, a BMP Operations and Maintenance Plan; and

**WHEREAS**, the Drainage Plan is detailed in the following documents:

- a. \_\_\_\_\_;
- b. \_\_\_\_\_; and
- c. \_\_\_\_\_; (hereinafter, “ Drainage Plan”) and

**WHEREAS**, the BMP Operations and Maintenance Plan is detailed in the following documents:

a. \_\_\_\_\_;

b. \_\_\_\_\_; and

c. \_\_\_\_\_; (hereinafter, "O&M Plan") and

**WHEREAS**, the Drainage Plan and O&M Plan are incorporated herein by reference and made a part hereof; and

**WHEREAS**, the Developer desires to commence the development of the Property and undertake certain "regulated activities" as that phrase is defined in Section 105 of the Ordinance; and

**WHEREAS**, the O & M Plan approved by the Township for the Premises provides for the management of stormwater within the confines thereof through the use of BMP's; and

**WHEREAS**, the Developer acknowledges and agrees that he must construct the BMP's in a good and workmanlike manner in accordance with the Plan, the Drainage Plan and all other applicable laws, regulations and approvals; and

**WHEREAS**, the Developer acknowledges that he, as well as subsequent owners and occupants of all, or portions, of the Premises, must continue to operate, maintain and repair the BMP's in a manner that insures their continued functioning in accordance with the approved Drainage and O&M Plans; and

**WHEREAS**, the Township and the Developer acknowledge and agree that the proper construction, operation, maintenance and repair of the BMP's is a matter of public health, safety, and welfare and necessary for the protection and maintenance of water quality; and

**WHEREAS**, the Township requires, through the Ordinance and the implementation of the Drainage Plan and the O&M Plan, that the BMP's be properly constructed, operated, maintained and repaired on the Premises by the Developer and all subsequent owners and occupants; and

**WHEREAS**, for the purposes of this Agreement, and unless a contrary intention clearly appears, the words and phrases used herein shall have the same definitions as set forth in Section 202 of the Ordinance; and

**WHEREAS**, unless a contrary intention clearly appears, this Agreement shall be interpreted in accordance with Section 201 of the Ordinance, and in any event, in such a manner as to be consistent with the Ordinance and the purpose and intent thereof; and

**WHEREAS**, this Agreement shall be recorded in the Office of the Recorder of Deeds for Lehigh County by the Township at the Developer's expense.

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

**1. BMP Construction.** The BMP's shall be constructed by the Developer in a good and workmanlike manner in accordance with industry standards and the plans and specifications identified in the Plan and the Drainage Plan.

**2. BMP Operation, Maintenance and Repair.** The Developer shall operate, maintain and repair the BMP's in good working order and in accordance with the Plan, the Drainage Plan and the O&M Plan.

**3. Right of Entry.** The Developer hereby grants permission to the Township and its authorized agents and employees, to enter upon the Premises, at reasonable times and upon presentation of proper identification, to inspect the BMP's, whenever the Township deems necessary.

**4. Inspection of BMP's.** The Township may inspect the BMP's as necessary to ensure compliance with this Agreement, the Ordinance and any other plans or approvals relating thereto. The Township may in its sole discretion accept a third party inspection certification as evidence of such compliance.

**5. Correction of Deficiencies.** In the event the Developer fails to operate, maintain or repair the BMP's as required by this Agreement, the Ordinance and any other approvals granted by the Township or

other regulatory authorities, Township representatives may in the exercise of their sole discretion enter upon the Premises and take whatever action is deemed necessary to correct the deficiency. This provision shall not be construed to allow the municipality to erect any permanent structure on the Premises. It is expressly understood and agreed that the Township is under no obligation to maintain or repair the BMP's, and this Agreement shall not be construed to impose any such obligation on the Township.

**6. Recovery of Costs.** In the event the Township, either pursuant to this Agreement, the Ordinance or the provisions of any other approvals or agreements, 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 Developer shall reimburse the municipality for all expenses (direct and indirect) paid or incurred within 10 days of receipt of an invoice from the Township, and if not timely paid, a municipal lien may be placed upon the premises in accordance with applicable law. Additionally, to the extent that the Township requires the services of its engineering, geotechnical, legal or other consultants, the Developer shall reimburse all fees paid or incurred by the Township in connection with such services under the same terms and conditions as stated above.

**7. Creation of Liability.** The intent and purpose of this Agreement is to, among other things, ensure the proper construction, operation, maintenance and repair of the on-site BMP's by the Developer. Accordingly, this Agreement shall not be deemed to create or expand any liability of the Township for any damage alleged to result from, or be caused by, stormwater runoff. Furthermore, nothing contained herein shall cause the Township to be considered a "person engaged in the alteration or development of land" within the meaning of the Storm Water Management Act or otherwise negate, diminish or affect other rights, privileges, immunities and limitations of damages available to the Township by law.

**8. Impact Upon Ordinance.** Unless expressly set forth in this Agreement or in the plans incorporated by reference herein, nothing contained in this Agreement shall modify or limit the obligations of the Developer as set forth in the Ordinance or modify or limit the rights and remedies of the Township as set forth in the Ordinance.

**9. Waiver and Release of Township.** *The Developer for and on behalf of himself and his heirs, executors, administrators, successors, assigns, transferees, grantees and any other successors in interest to the Premises or any part thereof, hereby releases the Township and all of its Boards, Commissions, Authorities, elected and appointed officials, employees, engineers, and other consultants and representatives of and from, and hereby expressly waives, any and all claims for damages, fines, accidents, casualties or occurrences, including without limitation claims for personal injury, death or property damage, which he has, had or may have and which in any way arise out of or relate to the design, construction, presence, existence, operation, maintenance or repair of the BMP's by Township, and including without limitation the Township's approval of the BMP's and the Township's approval of the Drainage and the O&M Plans.*

**10. Indemnification of Township.** The Developer for and on behalf of himself and his heirs, executors, administrators, successors, assigns, transferees, grantees and any other successors in interest to the Premises or any part thereof, hereby, indemnifies, defends and holds harmless the Township and all of its Boards, Commissions, Authorities, elected and appointed officials, employees, engineers, and other consultants and representatives (hereinafter, "Indemnitees") of and from all damages, fines, accidents, casualties, occurrences or claims, whether at law, in equity or otherwise, including without limitation claims for personal injury, death or property damage, which arise out of or relate to, or are alleged to arise out of or relate to, the design, construction, presence, existence, operation, maintenance or repair of the BMP's by the Developer or the Township, and including without limitation the Township's approval of the BMP's and the Township's approval of the Drainage and the O&M Plans. In the event that a claim is asserted against the Township or any of the Indemnitees, the Township shall promptly notify the Developer, and the Developer shall defend, at his own expense, any claim, action, proceeding, hearing or

suit based thereon. If any award, judgment, fine or relief against the Township or its Indemnitees shall be allowed or imposed, the Developer shall pay or perform the award, judgment, fine or other relief and pay all costs and expenses, including reasonable attorney and engineering fees, in connection therewith.

Nothing contained herein shall preclude the Township or the Indemnitees from retaining the services of legal counsel of their choice, and the Developer shall nonetheless pay the reasonable attorney fees, expert fees, costs and expenses incurred in such defense.

**11. Covenant Running with the Land.** The parties acknowledge and agree that because the ongoing duty to control stormwater runoff requires that successors in interest to the Premises be aware of, and comply with, the obligations set forth in this Agreement and the Ordinance, it is the intent of this Agreement that all of the obligations hereunder shall bind subsequent owners, occupants and successors in interest of all or any part of the Premises in perpetuity. Accordingly, this Agreement shall constitute an equitable servitude and a covenant running with the Premises and any part or parts thereof, and it shall be binding upon the Developer and his heirs, administrators, executors, successors, assigns, transferees, grantees and any other successors in interest of, or to, the Premises or any part, or parts, thereof in perpetuity. In order to carry out the intent of this paragraph, the Developer and every subsequent owner or successor in interest shall in connection with every sale or other transfer of all or a part of the Premises provide to the grantee, transferee or other successor in interest a copy of this Agreement at the time of making any such agreement to transfer or convey and in any event no later than at the actual time of such transfer or conveyance.

**12. Effect of Recitals.** The foregoing Recitals are incorporated herein by reference and made a substantive part of this Agreement.

**IN WITNESS WHEREOF**, the parties hereto have set their hands and seals the day and year first above written.

**ATTEST:**

**TOWNSHIP OF UPPER SAUCON**

\_\_\_\_\_

**BY:** \_\_\_\_\_

**TOWNSHIP MANAGER**

**ATTEST:**

\_\_\_\_\_, **DEVELOPER**

\_\_\_\_\_

**BY:** \_\_\_\_\_

**PRINT NAME:** \_\_\_\_\_

**TITLE:** \_\_\_\_\_

**COMMONWEALTH OF PENNSYLVANIA )**

**) SS:**

**COUNTY OF LEHIGH )**

On this, the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, before me, a notary public, the undersigned officer, personally appeared THOMAS F. BEIL, who acknowledged himself to be the Manager of UPPER SAUCON TOWNSHIP, and that he, as such officer, being authorized to do so, executed the foregoing instrument for the purposes therein contained.

**IN WITNESS WHEREOF**, I have hereunto set my hand and official seal.

\_\_\_\_\_

Notary Public

**COMMONWEALTH OF PENNSYLVANIA )**

**) SS:**

**COUNTY OF LEHIGH )**

On this, the \_\_\_\_ day of \_\_\_\_\_, 20\_\_, before me, a notary public, the undersigned officer, personally appeared \_\_\_\_\_, who acknowledged himself/herself to be \_\_\_\_\_ of the \_\_\_\_\_, and that he/she, as such officer, being authorized to do so, executed the foregoing instrument for the purposes therein contained.

**IN WITNESS WHEREOF**, I have hereunto set my hand and official seal.

\_\_\_\_\_

**Notary Public**

**COMMONWEALTH OF PENNSYLVANIA** )

) **SS:**

**COUNTY OF LEHIGH** )

On this, the \_\_\_ day of \_\_\_\_\_, 20\_\_, before me, a notary public, the undersigned officer, personally appeared \_\_\_\_\_, known to me (or satisfactorily proven) to be the person's whose name is subscribed to the within instrument, and acknowledged that he executed the same for the purposes therein contained.

**IN WITNESS WHEREOF**, I have hereunto set my hand and official seal.

\_\_\_\_\_

**Notary Public**

## LIST OF ACCEPTABLE BMPs

<b>Best Management Practice</b>	<b>Design Reference Number<sup>C</sup></b>
Bioretention <sup>A</sup>	4, 5, 11, 16
Capture/Reuse <sup>B</sup>	4, 14
Constructed Wetlands	4, 5, 8, 10, 16
Dry Extended Detention Ponds	4, 5, 8, 12, 18
Minimum Disturbance/ Minimum Maintenance Practices	1, 9
Significant Reduction of Existing Impervious Cover	N/A
Stormwater Filters <sup>A</sup> (Sand, Peat, Compost, etc.)	4, 5, 10, 16
Vegetated Buffers/Filter Strips	2, 3, 5, 11, 16, 17
Vegetated Roofs	4, 13
Vegetated Swales <sup>A</sup>	2, 3, 5, 11, 16, 17
Water Quality Inlets <sup>D</sup>	4, 7, 15, 16, 19
Wet Detention Ponds	4, 5, 6, 8

<sup>A</sup> This BMP could be designed with or without an infiltration component. If infiltration is proposed, the site and BMP will be subject to the testing and other infiltration requirements in this Ordinance.

<sup>B</sup> See table below.

<sup>C</sup> Water Quality Inlets include such BMPs as Oil/Water Separators, Sediment Traps/Catch Basin Sumps, and Trash/Debris Collectors in Catch Basins.

<b>Number</b>	<b>Design Reference Title</b>
1	“Conservation Design For Stormwater Management – A Design Approach to Reduce Stormwater Impacts From Land Development and Achieve Multiple Objectives Related to Land Use”, Delaware Department of Natural Resources and Environmental Control, The Environmental Management Center of the Brandywine Conservancy, September 1997
2	“A Current Assessment of Urban Best Management Practices: Techniques for Reducing Nonpoint Source Pollution in the Coastal Zone”, Schueler, T. R., Kumble, P. and Heraty, M., Metropolitan Washington Council of Governments, 1992.
3	“Design of Roadside Channels with Flexible Linings”, Federal Highway Administration, Chen, Y. H. and Cotton, G. K., Hydraulic Engineering Circular 15, FHWA-IP-87-7, McLean Virginia, 1988.

### APPENDIX F

## LIST OF ACCEPTABLE BMPs

Number	Design Reference Title
4	"Stormwater Best Management Practices Manual", Pennsylvania Department of Environmental Protection, December 2006.
5	"Evaluation and Management of Highway Runoff Water Quality", Federal Highway Administration, FHWA-PD-96-032, Washington, D.C., 1996.
6	"Evaporation Maps of the United States", U.S. Weather Bureau (now NOAA/National Weather Service) Technical Paper 37, Published by Department of Commerce, Washington D.C., 1959.
7	"Georgia Stormwater Manual", AMEC Earth and Environmental, Center for Watershed Protection, Debo and Associates, Jordan Jones and Goulding, Atlanta Regional Commission, Atlanta, Georgia, 2001.
8	"Hydraulic Design of Highway Culverts", Federal Highway Administration, FHWA HDS 5, Washington, D.C., 1985 (revised May 2005).
9	"Low Impact Development Design Strategies <i>An Integrated Design Approach</i> ", Prince Georges County, Maryland Department of Environmental Resources, June 1999.
10	"Maryland Stormwater Design Manual", Maryland Department of the Environment, Baltimore, Maryland, 2000.
11	"Pennsylvania Handbook of Best Management Practices for Developing Areas", Pennsylvania Department of Environmental Protection, 1998.
12	"Recommended Procedures for Act 167 Drainage Plan Design", LVPC, Revised 1997.
13	"Roof Gardens History, Design, and Construction", Osmundson, Theodore. New York: W.W. Norton & Company, 1999.
14	"The Texas Manual on Rainwater Harvesting", Texas Water Development Board, Austin, Texas, Third Edition, 2005.
15	"VDOT Manual of Practice for Stormwater Management", Virginia Transportation Research Council, Charlottesville, Virginia, 2004.
16	"Virginia Stormwater Management Handbook", Virginia Department of Conservation and Recreation, Richmond, Virginia, 1999.
17	"Water Resources Engineering", Mays, L. W., John Wiley & Sons, Inc., 2005.
18	"Urban Hydrology for Small Watersheds", Technical Report 55, US Department of Agriculture, Natural Resources Conservation Service, 1986.
19	US EPA, Region 1 New England web site (as of August 2005) <a href="http://www.epa.gov/NE/assistance/ceitts/stormwater/techs/html">http://www.epa.gov/NE/assistance/ceitts/stormwater/techs/html</a> .

## LIST OF ACCEPTABLE BMPs

### PRE-TREATMENT METHODS FOR “HOT SPOT” LAND USES

Hot Spot Land Use	Pre-treatment Method(s)
Vehicle Maintenance and Repair Facilities including Auto Parts Stores	-Water Quality Inlets -Use of Drip Pans and/or Dry Sweep Material Under Vehicles/Equipment -Use of Absorbent Devices to Reduce Liquid Releases -Spill Prevention and Response Program
Vehicle Fueling Stations	-Water Quality Inlets -Spill Prevention and Response Program
Storage Areas for Public Works	-Water Quality Inlets -Use of Drip Pans and/or Dry Sweep Material Under Vehicles/Equipment -Use of Absorbent Devices to Reduce Liquid Releases -Spill Prevention and Response Program -Diversion of Stormwater away from Potential Contamination Areas
Outdoor Storage of Liquids	-Spill Prevention and Response Program
Commercial Nursery Operations	-Vegetated Swales/Filter Strips -Constructed Wetlands -Stormwater Collection and Reuse
Salvage Yards and Recycling Facilities*	-BMPs that are a part of a Stormwater Pollution Prevention Plan under an NPDES Permit
Fleet Storage Yards and Vehicle Cleaning Facilities*	-BMPs that are a part of a Stormwater Pollution Prevention Plan under an NPDES Permit
Facilities that Store or Generate Regulated Substances*	-BMPs that are a part of a Stormwater Pollution Prevention Plan under an NPDES Permit
Marinas*	-BMPs that are a part of a Stormwater Pollution Prevention Plan under an NPDES Permit
Certain Industrial Uses (listed under NPDES)*	-BMPs that are a part of a Stormwater Pollution Prevention Plan under an NPDES Permit

\*Regulated under the NPDES Stormwater Program

Design references for the pre-treatment methods, as necessary, are listed below. If the applicant can demonstrate to the satisfaction of the municipality that the proposed land use is not a Hot Spot, then the pre-treatment requirement would not apply.

## LIST OF ACCEPTABLE BMPs

<b>Pre-treatment Method</b>	<b>Design Reference<sup>A</sup></b>
Constructed Wetlands	5, 6, 10, 12, 18
Diversion of Stormwater Away from Potential Contamination Areas	5, 13
Stormwater Collection and Reuse (especially for irrigation)	5, 16
Stormwater Filters (Sand, Peat, Compost, etc.)	5, 6, 12, 18
Vegetated Swales	2, 4, 6, 13, 18, 19
Water Quality Inlets	5, 9, 17, 18, 21

<sup>A</sup>These numbers refer to the Design Reference Title Chart in beginning on page H-1.