Chapter 25 — Storm Water Management

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Article I — General Provisions

§ 25-101 Statement of Findings.

The Borough Council of the Borough of Alburtis 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, is fundamental to the public health, safety, and welfare, and the protection of the people of the Borough of Alburtis and all 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, including the Borough, to implement a program of stormwater controls, and obtain a permit for stormwater discharges from their separate storm sewer systems under the National Pollutant Discharge Elimination System (NPDES).

(f) Non-stormwater discharges to municipal separate storm sewer systems can contribute to pollution of the waters of the Commonwealth by the Borough.

§ 25-102 Purpose.

The purpose of this Chapter is to promote the public health, safety, and welfare within the Little Lehigh Creek Watershed by minimizing the damages and maximizing the benefits described in § 25-101 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, maintain groundwater recharge, prevent degradation of surface and ground water quality, and otherwise protect water resources;

(d) Maintain the existing flows and quality of streams and water courses in the Borough and the Commonwealth;

(e) Preserve and restore the flood carrying capacity of streams; and

(f) Provide for proper maintenance of all permanent stormwater management BMPs that are implemented in the Borough;

(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 stream banks and stream beds;

(k) Provide standards to meet the NPDES permit requirements.

§ 25-103 Statutory Authority.

This Chapter is adopted under authority granted by the Storm Water Management Act, Act of October 4, 1978, Pa. Laws 864, No. 167, as amended, 32 PA. STAT. ANN. § 680.1 *et seq*., and the Borough Code, Act of February 1, 1966, 1965 Pa. Laws 1656, No. 581, as amended, 53 PA. STAT. ANN. § 45101 *et seq*.

§ 25-104 Applicability.

(a) In General. This Chapter shall apply to the entire Borough, since all of the Borough is located within the Little Lehigh Creek Watershed. Detailed maps of the entire Little Lehigh Creek Watershed are included in the Stormwater Management Plan, including Figure 2 and Plate I. A copy of the Alburtis portion of Plate I of the Stormwater Management Plan, at a reduced scale, is included as Appendix ¶ 25-A for general reference.

(b) Regulated Activities. The following activities are defined as "Regulated Activities" and shall be regulated and governed by this Chapter:

(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.

§ 25-104.1 Exemptions.

(a) Impervious Cover. Any proposed Regulated Activity, except those defined in § 25-104(b)(5) or § 25-104(b)(6), which would create 10,000 square feet or less of additional impervious cover is exempt from the Drainage Plan preparation provisions of this Chapter. November 9, 1988 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. Additional 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. Any additional areas proposed to initially be gravel, crushed stone, porous pavement, etc. shall be assumed to be impervious areas for purpose of exemption evaluation. 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 Chapter. If a site has previously received an exemption and is proposing additional development such that the total impervious cover on the site exceeds 10,000 square feet, the total impervious cover on the site proposed since November 9, 1988 must meet the provisions of this Chapter.

(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 Borough prior to April 27, 2005 is exempt from the Drainage Plan preparation provisions of this Chapter, except as cited in subsection (c), *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 April 27, 2005, preparation of a new Drainage Plan, subject to the provisions of this Chapter, 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) Limitations. The exemptions provided under this Section 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.

(d) Exemptions Not Available for Certain Activities. No exemptions shall be provided for Regulated Activities defined in § 25-104(b)(5) or § 25-104(b)(6).

§ 25-105 Repealer.

Any ordinance of the Borough inconsistent with any of the provisions of this Chapter is hereby repealed to the extent of the inconsistency only. This Section shall be effective as of the original passage of Ordinance 263, and as of the date of passage of this Chapter and each amendment to this Chapter.

§ 25-106 Severability.

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

§ 25-107 Compatibility with Other Ordinance Requirements.

Approvals issued pursuant to this Chapter do not relieve the applicant of the responsibility to secure required permits or approvals for activities regulated by any other applicable code, rule, act, or ordinance.

§ 25-108 Duty of Persons Engaged in the Development of Land.

Notwithstanding any provision of this Chapter to the contrary, including waiver and exemption 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 reasonably necessary to prevent injury to health, safety, or other property. Such measures shall include such actions as are required to manage the rate, volume, and direction of resulting stormwater runoff in a manner which otherwise adequately protects persons and property from possible injury.

Article II — Definitions

§ 25-201 In General.

For purposes of this Chapter, the terms defined in the remaining sections of this Article shall have the meanings indicated, whether with or without initial capital letters, unless the context in which they are used clearly indicates a different meaning. In addition, certain terms and words used in this Chapter 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.

§ 25-202 Accelerated Erosion.

The term "Accelerated Erosion" shall mean 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.

§ 25-202.1 Best Management Practice (BMP).

The term "Best Management Practice" or "BMP" shall mean activities, facilities, measures, or procedures used to manage stormwater quantity and quality impacts from the Regulated Activities listed in § 25-104(b), to meet State Water Quality Requirements, to promote groundwater recharge, and to otherwise meet the purposes of this Chapter.

§ 25-202.2 Best Management Practice Operations and Maintenance Plan (BMP Operations and Maintenance Plan).

The term "Best Management Practice Operations and Maintenance Plan" or "BMP Operations and Maintenance Plan" shall mean documentation, included as part of a Drainage Plan, detailing the proposed BMPs, how they will be operated and maintained, and who will be responsible.

§ 25-202.3 Bioretention.

The term "Bioretention" shall mean 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.

§ 25-202.4 Buffer.

(a) Streamside Buffer. The term "Streamside Buffer" shall mean a zone of variable width located along a stream that is vegetated and is designed to filter pollutants from runoff.

(b) Special Geologic Feature Buffer. The term "Special Geologic Feature Buffer" shall mean 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.

§ 25-202.5 Capture/Reuse.

The term "Capture/Reuse" shall mean 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. Because this stormwater is utilized and no pollutant discharge results, water quality performance is superior to other non-infiltration BMPs.

§ 25-202.6 Carbonate Bedrock.

The term "Carbonate Bedrock" shall mean rock consisting chiefly of carbonate minerals, such as limestone and dolomite; specifically a sedimentary rock composed of more than fifty percent (50%) by weight of carbonate minerals that underlies soil or other unconsolidated, superficial material.

§ 25-203 Cistern.

The term "Cistern" shall mean an underground reservoir or tank for storing rainwater.

§ 25-204 Closed Depression.

The term "Closed Depression" shall mean a distinctive bowl-shaped depression in the land surface. It is characterized by internal drainage, varying magnitude, and an unbroken ground surface.

§ 25-205 Conservation District.

The term "Conservation District" shall mean the Lehigh County Conservation District.

§ 25-205.1 Constructed Wetlands.

The term "Constructed Wetlands" shall mean a basin which provides for necessary stormwater storage as well as a permanent pool or water level, planted with wetland vegetation, and is similar to a Wet Detention Pond (*see* § 25-245). 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.

§ 25-206 Culvert.

The term "Culvert" shall mean a pipe, conduit, or similar structure, including appurtenant works, which carries surface water.

§ 25-207 Dam.

The term "Dam" shall mean 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.

§ 25-208 DEP.

The term "DEP" shall mean the Pennsylvania Department of Environmental Protection.

§ 25-209 Design Storm.

The term "Design Storm" shall mean the depth and time distribution from a storm event measured in probability of occurrence (*e.g.*, 50-yr. storm) and duration (*e.g.*, 24-hour), and used in computing stormwater management control systems.

§ 25-210 Detention Basin.

The term "Detention Basin" shall mean a basin designed to retard stormwater runoff by temporarily storing the runoff and releasing it at a predetermined rate.

§ 25-211 Developer.

The term "Developer" shall mean a person, partnership, association, corporation, or other entity, or any responsible person therein or agent thereof, that undertakes any Regulated Activity.

§ 25-212 Development Site (Site).

The term "Development Site" or "Site" shall mean the specific tract of land for which a Regulated Activity is proposed.

§ 25-212.1 Diffused Drainage.

The term "Diffused Drainage" shall mean drainage by Sheet Flow (*see* § 25-233.2).

§ 25-213 Drainage Easement.

The term "Drainage Easement" shall mean a right granted by a land owner to a grantee, allowing the use of private land for stormwater management purposes.

§ 25-214 Drainage Plan.

The term "Drainage Plan" shall mean 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 § 25-403.

§ 25-214.1 Earth Disturbance Activity.

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

§ 25-215 Erosion.

The term "erosion" shall mean the removal of soil particles by the action of water, wind, ice, or other geological agents.

§ 25-215.1 Existing Uses.

The term "Existing Uses" shall mean 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).

§ 25-215.2 Fill.

The term "fill" shall mean man-made deposits of natural soils or rock products and waste materials.

§ 25-215.3 Filter Strips.

The term "Filter Strips" shall mean Vegetated Buffers (*see* § 25-242.2).

§ 25-216 Freeboard.

The term "freeboard" shall mean the incremental depth in a stormwater management structure above that required to convey the design runoff event, provided as a safety factor of design.

§ 25-217 Groundwater Recharge.

The term "Groundwater Recharge" shall mean replenishment of existing natural underground water supplies.

§ 25-217.1 Hardship Waiver Request.

The term "Hardship Waiver Request" shall mean a written request for a waiver alleging that the provisions of this Chapter inflict unnecessary hardship upon the applicant. Waivers from the water quality provisions of this Chapter shall not be granted.

§ 25-217.2 Hot Spot Land Uses.

The term "Hot Spot Land Uses" shall mean 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 ¶ 25-K.

§ 25-218 Impervious Surface (Impervious Cover).

The term "Impervious Surface" or "Impervious Cover" shall mean a surface which prevents the percolation of water into the ground.

§ 25-219 Infiltration Practice.

The term "Infiltration Practice" shall mean a practice designed to direct runoff into the ground (*e.g.*, a french drain, seepage pit, seepage trench, or bioretention area).

§ 25-219.1 Karst.

The term "Karst" shall mean a type of topography or landscape characterized by depressions, sinkholes, limestone towers and steep-sided hills, underground drainage, and caves. Karst is usually formed on carbonate rocks, such as limestones and dolomites and sometimes gypsum.

§ 25-220 Land Development.

The term "Land Development" shall mean—

(a) the improvement of one lot or two or more contiguous lots, tracts, or parcels of land for any purpose involving—

(1) a group of two or more residential or nonresidential buildings, whether proposed initially or cumulatively, or a single nonresidential building on a lot or lots regardless of the number of occupants or tenure; or

(2) the division or allocation of land or space, whether initially or cumulatively, between or among two or more existing or prospective occupants by means of, or for the purpose of, streets, common areas, leaseholds, condominiums, building groups, or other features; or

(b) a subdivision of land.

§ 25-220.1 Loading Rate.

The term "Loading Rate" shall mean the ratio of the land area draining to the system, as modified by the weighting factors in § 25-304(a.1)(2), compared to the base area of the infiltration system.

§ 25-221 "Local" Runoff Conveyance Facilities.

The term "'Local' Runoff Conveyance Facilities" shall mean any natural channel or man-made conveyance system which has the purpose of transporting runoff from a site to the Mainstem.

§ 25-221.1 Low Impact Development.

The term "Low Impact Development" shall mean a development approach that promotes practices that will minimize post-development runoff rates and volumes, thereby minimizing needs for artificial conveyance and storage facilities. Site design practices include preserving natural drainage features, minimizing impervious surface area, reducing the hydraulic connectivity of impervious surfaces, and protecting natural depression storage.

§ 25-222 Mainstem (main channel).

The terms "Mainstem" or "main channel" shall mean any stream segment or other conveyance used as a reach in the Little Lehigh Creek hydrologic model used to prepare the Stormwater Management Plan.

§ 25-223 Manning Equation (Manning formula).

The terms "Manning equation" or "Manning formula" shall mean 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, first presented in 1889 by Robert Manning. "Open channels" may include closed conduits so long as the flow is not under pressure. The Manning equation is:

$$Q = VA, \quad \text{and} \quad V = \frac{k}{n}\left(\frac{A}{P}\right)^{2/3} S^{1/2},$$

where "Q" represents discharge (flow rate), "V" represents velocity, "A" represents area, "n" is the Manning coefficient, "P" represents the wetted perimeter, "S" represents the channel slope, and "k" is a constant for unit conversion.

§ 25-223.1 Maryland Stormwater Design Manual.

The term "Maryland Stormwater Design Manual" shall mean a stormwater design manual written by the Maryland Department of the Environment and Center for Watershed Protection. As of January 2004, the Manual can be obtained through the following web site:

www.mde.state.md.us.

§ 25-223.2 Minimum Disturbance/Minimum Maintenance Practices (MD/MM).

The term "Minimum Disturbance/Minimum Maintenance Practices" or "MD/MM" shall mean 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.

§ 25-223.3 No Harm Option.

The term "No Harm Option" shall mean the option of using a less restrictive runoff quantity control if it can be shown that adequate and safe runoff conveyance exists and that the less restrictive control would not adversely affect health, safety, and property.

§ 25-224 NPDES.

The term "NPDES" shall mean the National Pollutant Discharge Elimination System.

§ 25-225 NRCS.

The term "NRCS" shall mean the Natural Resource Conservation Service of the U.S. Department of Agriculture (formerly known as the Soil Conservation Service).

§ 25-225.1 Oil/Water Separator.

The term "Oil/Water Separator" shall mean a structural mechanism designed to remove free oil and grease (and possibly solids) from stormwater runoff.

§ 25-225.2 Outfall.

The term "Outfall" shall mean the "point source" as described in 40 C.F.R. § 122.2 at the point where the Borough's storm sewer system discharges to surface waters of the Commonwealth.

§ 25-226 Peak Discharge.

The term "Peak Discharge" shall mean the maximum rate of flow of storm runoff at a given location and time resulting from a specified storm event.

§ 25-226.1 Person.

The term "person" shall mean an individual, partnership, public or private association, or corporation, or a governmental unit, public utility, or other not-for-profit statutory entity, or other legal entity whatsoever which is recognized by law as the subject of rights and duties.

§ 25-226.2 Point Source.

The term "Point Source" shall mean any discernable, 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 (relating to NPDES Permitting, Monitoring and Compliance—Definitions).

§ 25-226.3 Preliminary Site Investigation.

The term "Preliminary Site Investigation" shall mean the determination of the depth to bedrock, the depth to the seasonal high water table, and the soil permeability for a possible infiltration location on a site through the use of published data and on-site surveys. In carbonate bedrock areas, the location of Special Geologic Features must also be determined along with the associated buffer distance to the possible infiltration area. *See* § 25-301.5(a).

§ 25-226.4 Public Water Supplier.

The term "Public Water Supplier" shall mean a person who owns or operates a Public Water System.

§ 25-225.5 Public Water System.

The term "Public Water System" shall mean a system which provides water to the public for human consumption which has at least fifteen (15) service connections or regularly serves an average of at least twenty-five (25) individuals daily at least sixty (60) days out of the year. (*See* 25 PA. CODE Chapter 109 (relating to Safe Drinking Water)).

§ 25-225.6 Qualified Geotechnical Professional.

The term "Qualified Geotechnical Professional" shall mean a licensed professional geologist or a licensed professional engineer who has a background or expertise in geology or hydrogeology.

§ 25-227 Rational Method.

The term "Rational Method" shall mean 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, "i" is the rainfall intensity in inches per hour, and "A" is the area of the tract in acres. Runoff coefficient "c" values to be used for Rational Method calculations under this Chapter are set forth in Appendix ¶ 25-F, which is incorporated herein by reference.

§ 25-228 Reach.

The term "reach" shall mean any of the natural or man-made runoff conveyance channels used for watershed runoff modeling purposes, in developing the Stormwater Management Plan, to connect the subareas and transport flows downstream.

§ 25-229 Regulated Activities.

The term "Regulated Activities" shall mean actions or proposed actions which impact upon proper management of stormwater runoff and which are governed by this Chapter as specified in § 25-104(b).

§ 25-229.1 Regulated Earth Disturbance Activities.

The term "Regulated Earth Disturbance Activities" shall mean earth disturbance activity other than agricultural plowing or tilling of one (1) acre or more with a point source discharge to surface waters or to the Borough's storm sewer system, or earth disturbance activity of five (5) acres or more regardless of the planned runoff. The term includes earth disturbance on any portion of, part, or during any stage of, a larger common plan of development.

§ 25-230 Release Rate.

The term "Release Rate" shall mean 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.

§ 25-231 Return Period.

The term "Return Period" shall mean 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 (25) years.

§ 25-231.1 Road Maintenance.

The term "Road Maintenance" shall mean 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.

§ 25-232 Runoff.

The term "Runoff" shall mean that part of precipitation which flows over the land.

§ 25-232.1 Sediment Trap / Catch Basin Sump.

The term "Sediment Trap" or "Catch Basin Sump" shall mean a chamber which provides storage below the outlet in a storm inlet to collect sediment, debris, and associated pollutants, typically requiring periodic clean out.

§ 25-233 Seepage Pit / Seepage Trench.

The terms "Seepage Pit" or "Seepage Trench" shall mean an area of excavated earth filled with loose stone or similar material and into which surface water is directed for infiltration into the ground.

§ 25-233.1 Separate Storm Sewer System.

The term "Separate Storm Sewer System" shall mean 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.

§ 25-233.2 Sheet Flow.

The term "Sheet Flow" shall mean stormwater runoff flowing in a thin layer over the ground surface.

§ 25-234 Soil-Cover-Complex Method.

The term "Soil-Cover-Complex Method" shall mean 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.

§ 25-234.1 Special Geologic Features.

The term "Special Geologic Features" shall mean carbonate bedrock features, including, but not limited to, closed depressions, existing sinkholes, fracture traces, lineaments, joints, faults, caves, and pinnacles, which may exist and must be identified on a site when stormwater management BMPs are being considered.

§ 25-234.2 Spill Prevention and Response Program.

The term "Spill Prevention and Response Program" shall mean 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.

§ 25-234.3 State Water Quality Requirements.

The term "State Water Quality Requirements" shall mean the water quality requirements established under State regulations for the protection of designated and existing uses (*see* 25 PA.

CODE Chapter 93 (relating to Water Quality Standards) and 25 PA. CODE Chapter 96 (relating to Water Quality Standards Implementation)), including, without limitation—

(a) Each stream segment in Pennsylvania has a "designated use," such as "cold water fishes" or "potable water supply," which are listed in 25 PA. CODE Chapter 93. These uses must be protected and maintained, under State regulations.

(b) "Existing uses" are those attained as of November 1975 or at any time on or after November 28, 1975, regardless of whether they have been designated in 25 PA. CODE 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, steam bed, and structural integrity of the waterway, to prevent these impacts.

§ 25-235 Storage Indication Method.

The term "Storage Indication Method" shall mean 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.

§ 25-236 Storm Drainage Problem Areas.

The term "Storm Drainage Problem Areas" shall mean those areas in the Borough which lack adequate stormwater collection and/or conveyance facilities and which present a hazard to persons or property. These areas are documented in Appendix ¶ 25-B (which is incorporated herein by reference) or formally identified by the Borough Engineer in a report to Council.

§ 25-237 Storm Sewer.

The term "Storm Sewer" shall mean 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.

§ 25-237.1 Stormwater.

The term "stormwater" shall mean the surface runoff generated by precipitation reaching the ground surface.

§ 25-237.2 Stormwater Filters.

The term "Stormwater Filters" shall mean 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.

§ 25-238 Stormwater Management Plan.

The term "Stormwater Management Plan" shall mean the plan for managing stormwater runoff adopted by Lehigh County for the Little Lehigh Creek Watershed as required by the Storm Water Management Act, Act of October 4, 1978, Pa. Laws 864, No. 167, as amended, 32 PA. STAT. ANN. § 680.1 *et seq.*, and approved by the Pennsylvania Department of Environmental Protection on January 19, 2005. A copy of the Stormwater Management Plan is on file at the offices of the Borough Manager and the Lehigh Valley Planning Commission, and additional copies may be obtained from the Lehigh Valley Planning Commission.

§ 25-239 Stream.

The term "Stream" shall mean a watercourse.

§ 25-240 Subarea.

The term "Subarea" shall mean the smallest unit of watershed breakdown for hydrologic modeling purposes for which the runoff control criteria have been established in the Stormwater Management Plan.

§ 25-241 Subdivision.

The term "Subdivision" shall mean 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.

§ 25-241.1 Surface Waters of the Commonwealth.

The term "Surface Waters of the Commonwealth" shall mean 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 the Commonwealth of Pennsylvania.

§ 25-242 Swale.

The term "Swale" shall mean a low lying stretch of land which gathers or carries surface water runoff. *See also* § 25-242.4 (relating to Vegetated Swales).

§ 25-242.1 Trash/Debris Collectors.

The term "Trash/Debris Collectors" shall mean racks, screens, or other similar devices installed in a storm drainage system to capture coarse pollutants (trash, leaves, etc.).

§ 25-242.2 Vegetated Buffers.

The term "Vegetated Buffers" shall mean 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. Vegetated buffers should be situated on minimally disturbed soils, have low flow velocities, and have extended residence times.

§ 25-242.3 Vegetated Roofs.

The term "Vegetated Roofs" shall mean 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 evapotranspirate the collected rooftop rainfall; overflows may be provided for larger storms.

§ 25-242.4 Vegetated Swales.

The term "Vegetated Swales" shall mean broad, shallow, densely vegetated, earthen channels designed to treat stormwater while slowly infiltrating, evapotranspirating, and conveying it. Swales should be gently sloping with low flow velocities to prevent erosion. Check dams may be added to enhance performance.

§ 25-242.5 Water Quality Inserts

The term "Water Quality Inserts" shall mean any number of commercially available devices that are inserted into storm inlets to capture sediment, oil, grease, metals, trash, debris, etc.

§ 25-242.6 Water Quality Volume (WQv).

The term "Water Quality Volume" or "WQv" for any Regulated Activity shall mean the water quality volume over the site area of the Regulated Activity as calculated under § 25-301.3(c).

§ 25-243 Watercourse.

The term "Watercourse" shall mean any channel of conveyance of surface water having defined bed and banks, whether natural or artificial, with perennial or intermittent flow.

§ 25-243.1 Watershed.

The term "watershed" (except when presented in all capital letters) shall mean the entire region or area drained by a river or other body of water, whether natural or artificial.

§ 25-244 WATERSHED.

The term "WATERSHED" (in all capital letters) means the computer-based hydrologic modeling technique as adapted to the Little Lehigh Creek Watershed for the Stormwater Management Plan. This model was written by Tarsi Software Laboratories and uses the same algorithms found in the Penn State Runoff Quality Model (PSRM-QUAL). PSRM-QUAL is an update of the Penn State Runoff Model (PSRM) to include water quality modeling capabilities; PSRM was used in certain previous stormwater management plans. The WATERSHED model has been "calibrated" to reflect actual flow values in the Little Lehigh Creek Watershed by adjusting key model input parameters.

§ 25-245 Wet Detention Pond (Wet Pond).

The term "Wet Detention Pond" or "Wet Pond" shall mean 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 III — Stormwater Management Requirements

§ 25-301 General Requirements.

(a) Regulated Activities. All Regulated Activities in the Borough shall be subject to the stormwater management requirements of this Chapter.

(a.1)Storm Drainage Systems Required. Storm drainage systems shall be provided to permit unimpeded flow of natural watercourses except as modified by stormwater detention facilities, pipe systems, or open channels consistent with this Chapter.

(b) Points of Concentrated Drainage Discharge. The existing points of concentrated drainage discharge onto adjacent property shall not be altered without written approval of the affected property owner(s).

(c) Areas of Existing Diffused Drainage Discharge. 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 Chapter. If diffused flow is proposed to be concentrated and discharged onto adjacent property, 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 or 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.

(d) Watercourses Which Traverse a Site. Where a site is traversed by watercourses other than those for which a 100-year floodplain is defined by the Borough, drainage easements shall be provided conforming substantially with the line of such watercourses. The width of any easement shall be adequate to provide for unimpeded flow of storm runoff based on calculations made in conformance with § 25-304 for the 100-year return period runoff, and to provide a freeboard allowance of one-half (0.5) foot above the design water surface level. The terms of the easement shall 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. Also, periodic maintenance of the easement to ensure proper runoff conveyance shall be required. Watercourses for which the 100-year floodplain is formally defined are subject to the applicable Borough floodplain regulations (*see* Chapter 24 (relating to Floodplain Management).

(e) [RESERVED]

(f) Construction of Open Channels. When it can be shown that, due to topographic conditions, natural drainage swales on the site cannot adequately provide for drainage, open channels may be constructed conforming substantially to the line and grade of such natural drainage swales. Capacities of open channels shall be calculated using the Manning equation.

(g) Minimization of Erosion. Post-construction BMPs shall be designed, installed, operated, and maintained to meet the requirements of the Clean Streams Law, 35 PA. STAT. ANN. § 691.1 *et seq*., and implementing regulations, including the established practices in 25 PA. CODE Chapter 102 (relating to Erosion and Sediment Control), and the specifications of this Chapter, so as to prevent accelerated erosion in watercourse channels and at all points of discharge.

(h) Earth Disturbance Activities. No Earth Disturbance Activities associated with any Regulated Activities shall commence until after the Borough approves a plan which demonstrates compliance with the requirements of this Chapter.

(i) Low Impact Development Practices. Techniques described in Appendix ¶ 25-M (which is incorporated herein by reference) are encouraged because they reduce the costs of complying with the requirements of this Chapter and the State Water Quality Requirements.

(j) Infiltration. Infiltration for stormwater management is encouraged where soils and geology permit, consistent with the provisions of this Chapter, and, where appropriate, the

Recommendation Chart for Infiltration Stormwater Management BMPs in Carbonate Bedrock set forth in Appendix ¶ 25-H (which is incorporated herein by reference). Infiltration is encouraged for capturing and treating the Water Quality Volume (as calculated in § 25-301.3(c)), any part of the Water Quality Volume, or for otherwise meeting the purposes of this Chapter.

§ 25-301.1 Permit Requirements by Other Government Entities.

The requirements set forth in this Chapter are in addition to all other requirements of law applicable to activities regulated by this Chapter, whether imposed by statute, regulation, rule, ordinance, resolution, court order, or otherwise. For example, the following permit requirements apply to certain Regulated Activities or Earth Disturbance Activities, and must be met prior to the commencement of those Regulated Activities or Earth Disturbance Activities, as applicable:

(a) All Regulated Activities or Earth Disturbance Activities subject to permit requirements by DEP under regulations at 25 PA. CODE Chapter 102 (relating to Erosion and Sediment Control);

(b) Work within natural drainageways subject to permit by DEP under 25 PA. CODE Chapter 102 (relating to Erosion and Sediment Control);

(c) Any stormwater management facility that would be located in or adjacent to surface waters of the Commonwealth, including wetlands, subject to permit by DEP under 25 PA. CODE Chapter 105 (relating to Dam Safety and Waterway Management);

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

(e) Culverts, bridges, storm sewers, or any other facilities which must pass or convey flows from the tributary area, and any facility which may constitute a dam, subject to permit by DEP under 25 PA. CODE Chapter 105 (relating to Dam Safety and Waterway Management).

§ 25-301.2 Erosion and Sediment Control.

(a) Erosion and Sediment Control Plan.

(1) No Regulated Earth Disturbance Activities within the Borough shall commence until an Erosion and Sediment Control Plan for construction activities is approved by the Borough, DEP, or the Lehigh County Conservation District.

(**2**) DEP regulations require an Erosion and Sediment Control Plan for any Earth Disturbance Activity that disturbs 5,000 square feet or more of land, and also for certain Earth Disturbance Activities that disturb less than 5,000 square feet of land. (*See* 25 PA. CODE § 102.4 (relating to Erosion and Sediment Control Requirements.)

(b) NPDES Permit. A DEP NPDES Stormwater Discharges Associated with Construction Activities Permit is required for certain Regulated Earth Disturbance Activities

under 25 PA. CODE Chapter 92 (relating to National Pollutant Discharge Elimination System Permitting, Monitoring and Compliance).

(c) Evidence of Permits. Evidence of any necessary permit(s) for Earth Disturbance Activities from the appropriate DEP regional office or Lehigh County Conservation District must be provided to the Borough before the commencement of an Earth Disturbance Activity.

(d) Availability of Plan and Permits. A copy of the Erosion and Sediment Control Plan and any permit required by DEP regulations shall be available at the project site at all times.

§ 25-301.3 Post-Construction Water Quality Criteria.

(a) Drainage Plan. No Regulated Earth Disturbance Activities within the Borough shall commence until after the Borough approves a Drainage Plan (*see* Article IV) which demonstrates compliance with this Chapter. DEP has determined that this Chapter meets State Water Quality Requirements as of January 19, 2005. Therefore, any approvals under this Chapter would satisfy the post-construction stormwater management requirements (as in effect on January 19, 2005) associated with an NPDES Permit for Stormwater Discharges Associated with Construction Activities.

(b) Capture and Treatment Required. The entire WQv for the site area of a Regulated Activity shall be captured and treated.

(c) Calculation of Water Quality Volume.

(1) In General. The Water Quality Volume (WQv) of a Regulated Activity shall be the *larger* of the formula amount calculated under paragraph (2) *or* the difference amount calculated under paragraph (3), *except that* in no case shall be WQv be permitted to exceed 1.25 inches of runoff over the site area.

(2) Formula Amount. The formula amount WQv under this paragraph shall be calculated as follows:

$$WQv = \frac{(c)(P)(A)}{12},$$

where "WQv" represents water quality volume in acre-feet, "c" is the Rational Method post-development runoff coefficient for the 2-year storm (*see* Appendix ¶ 25-F), "P" is 1.25 inches (0.104167 feet), and "A" represents area in acres of proposed Regulated Activity.

(3) Difference Amount. The difference amount WQv under this paragraph shall be calculated as the difference in runoff volume from pre-development to post-development for the 2-year return period storm. The effect of closed depressions on the site shall be considered in this calculation.

(4) Drainage Directions. The WQv shall be calculated for each post-development drainage direction on a site for sizing BMPs.

(5) Unaffected Areas. 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) Treatment Methods. Any stormwater runoff from the site as a result a Regulated Activity must either be treated with infiltration or *two* acceptable BMPs such as those listed in Appendix ¶ 24-J (which is incorporated herein by reference).

(e) Investigation and Use of Infiltration.

(1) Preliminary Site Investigation. For each proposed Regulated Activity in the watershed, the applicant shall conduct a Preliminary Site Investigation on the portion of the site that is judged to be the best candidate hydrogeologically for possible infiltration, including gathering data from published sources, a field inspection of the site, a minimum of one test pit, and a minimum of two percolation tests, as outlined in § 25-301.5(a). This investigation will determine depth to bedrock, depth to the seasonal high water table, soil permeability, and location of Special Geologic Features, if applicable. The location(s) of Special Geologic Features shall be verified by a Qualified Geotechnical Professional.

(2) Bedrock Types. The applicant shall document the bedrock type(s) present on the site from published sources. Any apparent boundaries between carbonate and non-carbonate bedrock shall be verified through more detailed site evaluations by a Qualified Geotechnical Professional.

(3) Entirely Non-Carbonate Sites.

(A) In General. For entirely non-carbonate sites, the WQv shall be infiltrated unless the applicant demonstrates that it is infeasible to infiltrate the WQv for reasons of seasonal high water table, permeability rate, soil depth, or isolation distances, or except as provided in § 25-301.4 (relating to Alternative Water Quality Methods). If it is not feasible to infiltrate the full WQv, the applicant shall infiltrate that portion of the WQv that is feasible based on the site characteristics.

(B) Feasibility Determination. The Preliminary Site Investigation described in paragraph (1) shall continue on different areas of the site until a suitable infiltration location is found or the entire site is determined to be infeasible for infiltration. For proposed infiltration areas, the Additional Site Investigation and Testing as outlined in § 25-301.5(b) shall be completed. The Borough may determine infiltration to be infeasible if there are known existing conditions or problems that may be worsened by the use of infiltration.

(C) Conditions Suitable for Infiltration. The following conditions are suitable for infiltration in non-carbonate areas:

(I) Depth to bedrock below the invert of the BMP greater than or equal to two (2) feet;

(II) Depth to seasonal high water table below the invert of the BMP greater than or equal to three (3) feet. (If the depth to bedrock is between two (2) and three (3) feet and the evidence of the seasonal high water table is not found in the soil, no further testing to locate the depth to seasonal high water table is required.);

(III) Soil permeability greater than or equal to one-half (0.5) inches per hour and less than or equal to twelve (12) inches per hour;

(IV) Setback distances or buffers as follows:

(i) One hundred (100) feet from water supply wells;

(ii) Ten (10) feet downgradient or one hundred (100) feet upgradient from building foundations;

(iii) Fifty (50) feet from septic system drainfields;

(iv) Fifty (50) feet from a geologic contact with carbonate bedrock, unless a Preliminary Site Investigation is done in the carbonate bedrock to show the absence of Special Geologic Features within fifty (50) feet of the proposed infiltration area;

(v) One hundred (100) feet from the property line, unless documentation is provided to show that all setbacks from wells, foundations, and drainfields on neighboring properties will be met;

(vi) Not within any Zone I Wellhead Protection radius as provided in subsection (f)(6); and

(vii) Not within twenty-five (25) feet of any percolation test hole with a fast percolation rate as provided in § 25-301.5(a)(6) (relating to Fast Percolation Rates).

(4) Entirely Carbonate Sites.

(A) Further Investigation. In entirely carbonate areas, in addition to the testing required in paragraph (1), the Preliminary Site Investigation shall include an assessment of the remainder of the site for possible infiltration based on required isolation distances from Special Geologic Features and the likely soil depth and permeability based on published data or other site data available. the WQv shall be infiltrated unless the applicant demonstrates that it is infeasible to infiltrate the WQv for reasons of seasonal high water table, permeability rate, soil depth, or isolation distances, or except as provided in § 25-301.4 (relating to Alternative Water Quality Methods). If it is not feasible to infiltrate the full WQv, the applicant shall infiltrate that portion of the WQv that is feasible based on the site characteristics.

(B) Infiltration Not Required. Applicants are not required to use infiltration BMPs on a carbonate site even if the site falls in the "Recommended" range on the Recommendation Chart in Appendix ¶ 25-H. If infiltration is not proposed, the WQv shall be treated by *two* acceptable BMPs, as specified in Appendix ¶ 25-J (which is incorporated herein by reference). (If Capture/Reuse is used to treat the entire WQv, then only that one BMP is required because of its superior water quality performance.)

(C) Conditions Required for Infiltration. In addition to the recommendation from the Recommendation Chart in Appendix ¶ 25-H, *all* of the conditions set forth in paragraph (3)(C) (except clause (IV)(iv)) are required for infiltration in carbonate areas.

(5) Site With Both Carbonate and Non-Carbonate Areas. If a site has both carbonate and non-carbonate areas, the applicant shall investigate the ability of the non-carbonate portion of the site to fully meet the requirements of this Chapter to control runoff for the whole site through infiltration. If that proves infeasible, the applicant shall perform the Preliminary Site Investigation for the carbonate area to determine the appropriate design strategy. No infiltration structure in the non-carbonate area shall be located within fifty (50) feet of a boundary with carbonate bedrock, except when a Preliminary Site Investigation has been

done showing the absence of Special Geologic Features within fifty (50) feet of the proposed infiltration area.

(f) Special Rules for Infiltration BMPs.

(1) Carbonate Areas. If infiltration BMPs are proposed in carbonate areas, the post-development 2-year runoff volume leaving the site shall be eighty percent (80%) or more of the pre-development runoff volume for the carbonate portion of the site to prevent infiltration of volumes far in excess of the pre-development infiltration volume.

(2) Fill. Infiltration BMPs shall not be constructed on fill.

(3) Protection from Disturbance and Compaction. Site areas proposed for infiltration shall be protected from disturbance and compaction except as necessary for construction of infiltration BMPs.

(4) Hot Spot Land Uses. The use of infiltration BMPs is prohibited on Hot Spot Land Use areas.

(5) Special Geologic Features. Stormwater infiltration BMPs shall not be placed in or on a Special Geologic Feature(s). Additionally, stormwater runoff shall not be discharged into existing on-site sinkholes.

(6) Wellhead Protection. 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 (*see* 25 PA. CODE Chapter 109 (relating to Safe Drinking Water)), for any public water supply well within four hundred (400) feet of the site. In addition to the setback distances specified in subsection (e)(3)(C)(IV), 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 one hundred (100) feet.

(g) Other Treatment Methods. If infiltration of the entire WQv is not proposed, the remainder of the WQv shall be treated by *two* acceptable BMPs in series for each discharge location. Sheet flow draining across a pervious area can be considered as one BMP. Sheet flow across impervious areas and concentrated flow shall flow through two BMPs. If sheet flow from an impervious area is to be drained across a pervious area as one BMP, the length of the pervious area must be equal to or greater than the length of the impervious area. In no case may the same BMP be employed consecutively to meet this requirement. Acceptable BMPs are listed in Appendix ¶ 25-J, along with the recommended reference for design. (If Capture/Reuse is used to treat the entire WQv, then only that one BMP is required because of its superior water quality performance.)

(h) Hot Spot Land Uses.

(1) Pretreatment Required. Stormwater runoff from Hot Spot Land Uses shall be pre-treated. In no case may the same BMP be employed consecutively to meet this requirement and the requirement in subsection (g). Acceptable methods of pre-treatment are listed in Appendix ¶ 25-K (which is incorporated herein by reference). Design references for the pre-

treatment methods, as necessary, are listed in Appendix ¶ 25-L (which is incorporated herein by reference).

(2) Classification. The applicant may demonstrate that due to the site characteristics a land use is not a Hot Spot Land Use.

(i) Protection from Thermal Impacts. If an applicant is proposing to use a wet pond, constructed wetland, or other 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 to protect the High Quality waters of the Little Lehigh Creek from thermal impacts.

(j) Protection from Physical Degradation of Receiving Waters. The volume and rate of the net increase in stormwater runoff from the Regulated Activities must be managed to prevent the physical degradation of receiving waters from such effects as scour and stream bank destabilization, to satisfy State Water Quality Requirements.

§ 25-301.4 Alternative Water Quality Methods.

(a) In General. The Borough may, after consultation with DEP, approve alternative methods for meeting the State Water Quality Requirements other than those in § 25-301.3, *provided* they meet the minimum requirements of and do not conflict with State law, including but not limited to the Clean Streams Law, 35 PA. STAT. ANN. § 691.1 *et seq*. Any such methods shall be adopted by ordinance and added to this § 25-301.4.

§ 25-301.5 Site Investigation and Testing.

(a) Preliminary Site Investigation.

(1) Required Data and Site Information. The following data shall be gathered utilizing standard testing procedures, including all of the procedures set forth in paragraphs (2) through (5), as part of a Preliminary Site Investigation:

(A) Bedrock composition — Any apparent boundaries between carbonate and non-carbonate bedrock must be verified by a Qualified Geotechnical Professional;

(B) Bedrock structure geology — This includes the possible presence of faults and mapping of conspicuous fracture traces or lineaments;

(C) Overburden and soil mantle composition and thickness;

(D) Permeability of the soil;

(E) Depth to the seasonal high water table;

(F) Presence of Special Geological Features — This includes sinkholes, closed depressions, fracture traces, lineaments, and geologic contacts between carbonate and non-carbonate bedrock.

(2) Review of Available Data, Maps, and Reports. Some of the required information listed in paragraph (1) can be found in existing published data. Suggested resources include the following:

(A) Geologic maps and references for the development area;

(B) The Little Lehigh Creek Basin Carbonate Prototype Area Closed Depression Map — available at the Lehigh Valley Planning Commission;

(C) USGS topographic maps;

(D) Lehigh and Berks County soil survey maps;

(E) Aerial photographs from the Lehigh Valley Planning Commission or other sources;

(F) Relevant Pennsylvania Geologic Survey Open File Reports (Kochanov 1987a, 1987b) that provide maps of sinkholes and Karst features for Lehigh and Berks counties.

(3) Field Inspections. In addition to gathering data from published sources, a field inspection of the proposed site is required. A field inspection can provide additional information relating to site features, such as carbonate bedrock features, indicators of seasonal high stream-level or water table levels, streams, springs, etc.

(4) Soil Test Pit and Percolation Test Requirements. A minimum of one (1) test pit and a minimum of two (2) percolation tests are required for every site. A test pit is a two-to-three (2-3) foot wide, eight (8) foot deep trench excavated with a backhoe for observing subsurface conditions. The test pits will be used to describe soil depth and quality, including soil horizons, and testing of permeability or percolation rates.

(5) Method of Conducting Percolation Tests. Percolation tests are to be conducted as follows (adapted from 25 PA. CODE § 73.15 (relating to Percolation Tests):

(A) The percolation tests shall be made in separate holes uniformly spaced over the possible infiltration area.

(B) An "Initial Presoak" should not be performed.

(C) Percolation holes located within the possible infiltration area shall be used in the calculation of the average percolation rate.

(D) Holes having a uniform diameter of six (6) to ten (10) inches shall be bored or dug as follows:

(I) To the depth of the bottom of the possible infiltration BMP;

(II) Alternate depths if the test pits/auger holes indicate that the soils are more suitable at a different depth (*i.e.*, if a clay horizon is identified and more suitable soils are located beneath the horizon, and infiltration test should be performed in the suitable horizon).

(E) The bottom and sides of the hole shall be scarified with a knife blade or sharp-pointed instrument to completely remove any smeared soil surfaces and to provide a natural soil interface into which water may percolate. Loose material shall be removed from the hole. Two (2) inches of coarse sand or fine gravel shall be placed in the bottom of the hole to protect the soil from scouring and clogging of the pores.

(F) Immediately before the percolation test, as a final presoak, water shall be placed in the hole to a minimum depth of six (6) inches over the gravel and readjusted every thirty (30) minutes for one (1) hour.

(G) The drop in the water level during the last thirty (30) minutes of the final presoaking period shall be applied to the following standard to determine the time interval between readings for each percolation hole:

(I) If water remains in the hole, the interval for readings during the percolation test shall be thirty (30) minutes.

(II) If no water remains in the hole, the interval for readings during the percolation test may be reduced to ten (10) minutes.

(H) After the final presoaking period, water in the hole shall again be adjusted to approximately six (6) inches over the gravel and readjusted when necessary after each reading.

(I) Measurement to the water level in the individual percolation holes shall be made from a fixed reference point and shall continue at the interval determined from subparagraph (G) above for each individual percolation hole until a minimum of eight (8) readings are completed or until a stabilized rate of drop is obtained, whichever occurs first. A stabilized rate of drop means a difference of one-quarter (1/4) inch or less of drop between the highest and lowest readings of four (4) consecutive readings.

(II) The drop that occurs in the final period in percolation test holes, expressed as inches per hour, shall be used to calculate the average percolation rate.

(III) When the rate of drop in a percolation test is too slow to obtain a measurable rate, the rate one one-quarter (0.25) inches per hour shall be assigned to that hole for use in calculating the average percolation rate. The infiltration area may be placed over holes with no measureable rate when the average percolation rate for the possible infiltration area is within the acceptable range.

(6) Fast Percolation Rates. When a percolation test hole yields a percolation rate of greater than twelve (12) inches per hour, the proposed infiltration area may not be designed or installed within twenty-five (25) feet of this hole, unless the Borough determines that a testing anomaly caused the fast percolation rate and a retest of the area yields acceptable percolation rates. This percolation rate limit is established to protect groundwater quality and to minimize the risk of subsidence.

(b) Additional Site Investigation and Testing When Infiltration Is Proposed. When infiltration is proposed after a Preliminary Site Investigation, the following additional investigation and testing is required:

(1) Soil Pit Test Requirements. The required number of test pits varies with Effective Soil Thickness. As risk factors increase, the number of test pits increases. A minimum of two (2) test pits, uniformly spaced within the proposed infiltration area (*e.g.*, the two (2) pits should be centered on each half of the proposed infiltration area), are required for any site proposing infiltration, unless the applicant can demonstrate that one (1) test pit is adequately representative of the area proposed for infiltration. For larger infiltration areas, multiple test pits shall be developed at the densities listed in the table in paragraph (4).

(2) Soil Auger Testing Requirements for Carbonate Areas. Because soil depth is not uniform in many carbonate areas, test pits will not be sufficient to accurately determine the depth to bedrock. Augering provides this essential data as inexpensively as possible. Track-rig rotary soil auger test drilling allows relatively inexpensive, qualitative determination of the presence of overburden voids and will generally penetrate to the top of bedrock. Augers typically extend to depths of twenty (20) feet. Special augers extend to as much as fifty (50)

feet. Augers do not extend into the bedrock. Auger testing should be performed in a grid pattern across the proposed infiltration area, spaced as indicated in the table in paragraph (4).

(3) Percolation Testing Requirements. A minimum of six (6) percolation tests shall be conducted in accordance with the procedures set forth in subsection (a)(5), unless the applicant can demonstrate that fewer tests accurately represent the percolation rate of the proposed infiltration area. Additional testing shall be required if the initial test results show significant variability in percolation rate. For larger infiltration areas, percolation tests shall be conducted at the densities listed in the table in paragraph (4).

(4) Testing Table.

Effective Soil Thickness (ft.)	Test Pit Density (per acre of proposed infiltration area)*	Percolation Tests (per acre of proposed infiltration area)**	Auger Grid Spacing (feet on-center)
8	4	8	50
4 to 8	6	12	35
2 to 4	8	16	25

* Number of Test Pits required = Infiltration sq. ft./43,560 sq. ft. x test pit density from chart, rounded up to the nearest whole number.

** Number of Percolation Tests required = Infiltration sq. ft./43,560 sq. ft. x percolation tests from chart, rounded up to the nearest whole number.

§ 25-302 Stormwater Management Districts.

(a) Mapping of Stormwater Management Districts. To implement the provisions of the Little Lehigh Creek Stormwater Management Plan, the Borough is hereby divided into Stormwater Management Districts consistent with the Little Lehigh Creek Release Rate Map presented in the Stormwater Management Plan. The boundaries of the Stormwater Management Districts are shown on Plate I of the Storm Water Management Plan, which is incorporated herein by reference. The Borough is encompassed by portions of subareas 25, 27, 112, 118, and 120 under the Stormwater Management Plan. A copy of the Alburtis portion of Plate I of the Stormwater Management Plan at a reduced scale, showing the subarea boundaries, is included as Appendix ¶ 25-A for general reference. *See* § 25-303(b) for the method of determining the exact location of the Stormwater Management District boundaries.

(b) Description of Stormwater Management Districts. Two types of Stormwater Management Districts are provided under the Stormwater Management Plan, namely Conditional No Detention Districts and Dual Release Rate Districts, as described below. There are only Dual Release Rate Districts within the Borough.

(1) Conditional No Detention Districts. Within these districts, the capacity of the "local" runoff conveyance facilities (as defined in § 25-221) must be calculated to determine if adequate capacity exists. For this determination, the developer must calculate peak flows assu-

ming that the site is developed as proposed, and that the remainder of the local watershed is in the existing condition. The developer must also calculate peak flows assuming that the entire local watershed is developed per current zoning and that all new development would use the runoff controls specified by this Chapter. The larger of the two peak flows calculated will be used in determining if adequate capacity exists. If adequate capacity exists to safely transport runoff from the site to the main channel (as defined in § 25-222), these watershed areas may discharge post-development peak runoff without detention facilities. If the capacity calculations show that the "local" runoff conveyance facilities lack adequate capacity, the developer shall either use a 100% release rate control or provide increased capacity of downstream elements to convey increased peak flows consistent with § 25-303(n). Any capacity improvements must be designed to convey runoff from development of all areas tributary to the improvement consistent with the capacity criteria specified in § 25-303(c). By definition, a storm drainage problem area associated with the "local" runoff conveyance facilities indicates that adequate capacity does not exist.

(2) Dual Release Rate Districts. Within these districts, the 2-year post-development peak runoff must be controlled to thirty percent (30%) of the pre-development 2-year runoff peak. Further, the 10-year, 25-year, and 100-year post-development peak runoff must be controlled to the stated percentage of the pre-development peak as set forth below and on Plate I of the Storm Water Management Plan, which varies from 50% to 100% depending upon location in the watershed:

Subarea	10/25/100 Year Release Rate
25	50%
27	50%
112	80%
118	80%
120	60%

§ 25-303 Stormwater Management District Implementation Provisions.

(a) Hydrograph Analysis Required. 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 Chapter.

(a.1) Satisfaction of Release Rate Requirements. Any stormwater management controls required by this Chapter and subject to dual release rate criteria shall meet the applicable release rate criteria (*see* § 25-302(b)(2)) for each of the 2-, 10-, 25-, and 100-year return period runoff events, consistent with the calculation methodology specified in § 25-304.

(b) Determination of District Boundaries. 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 (2') 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.

(c) Criteria for Downstream Capacity Analyses. Any downstream capacity analysis conducted in accordance with this Chapter shall use the following criteria for determining adequacy for accepting increased peak flow rates:

(1) Channels or Swales: 2-year event. 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) Channels or Swales: 25-year event. Natural or man-made channels or swales must be able to convey the increased 25-year return period runoff peak without creating any hazard to persons or property.

(3) Other Facilities. Culverts, bridges, storm sewers, or any other facilities which must pass or convey flows from the tributary area must be designed in accordance with the DEP Chapter 105 regulations, 25 PA. CODE Ch. 105 (relating to Dam Safety and Waterway Management) (if applicable) and, at a minimum, pass the increased 25-year return period runoff.

(d) Development in One Release Rate Category Subarea. 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 so long as the total runoff from the site is controlled to the applicable release rate.

(e) Development in Multiple Release Rate Category Subareas. For a proposed development site located within two or more release rate 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. The calculated peak discharges shall apply regardless of whether the grading plan changes the drainage area by subarea. An exception to the preceding portions of this subsection (e) may be granted by the Borough if discharges from multiple subareas recombine in proximity to the site. In that case, peak discharges in any direction may be a 100% release rate provided that the overall site discharge meets the weighted average release rate.

(f) Development in Release Rate Subarea and Conditional No Detention Subarea.

For a proposed development site located partially within a release rate category subarea(s) and partially within a conditional no detention subarea(s), a significant portion of the site area subject to the release rate control may not be drained to the discharge point(s) located in the no detention area except as part of a "No Harm" or hardship waiver procedure.

(f.1) Regrading Between Little Lehigh Creek Watershed and Adjacent Watersheds.

No portion of a site may be regraded between the Little Lehigh Creek Watershed and any adjacent watershed except as part of a "No Harm" or hardship waiver procedure.

(g) Drainage to Closed Depressions. Within a release rate category area, for a proposed development site which has areas which drain to a closed depression(s), the design release from the site must be the *lesser* of—

(1) the applicable release rate flow assuming no closed depressions; or

(2) the existing peak flow actually leaving the site.

In cases where paragraph (2) 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 § 25-303(c) and the minimum orifice criteria.

(h) Effect of Off-Site Flows. 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 § 25-303(c) and the detention criteria in § 25-304.

(i) Phased Developments. For development sites proposed to take place in phases, all detention ponds shall be designed to meet the applicable release rate(s) applied to all site areas tributary to the proposed pond discharge direction. All site tributary areas will be assumed as developed, regardless of whether all site tributary areas are proposed for development at that time. However, for sites with multiple detention ponds in series, only the downstream pond must be designed to the stated release rate.

(j) Sites Where Development Impact Area is Significantly Smaller Than the Total Site Area. 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.

(k) No Change to Both the Rate and Volume of Runoff Discharged. Development proposals which, through groundwater recharge or other means, do not increase either the rate or volume of runoff discharged from the site compared to the pre-development condition are not subject to the release rate provisions of this Chapter.

(l) "No Harm" Water Quantity Option.

(1) In General. For any proposed development site not located in a conditional no detention district, the developer has the option of using a less restrictive runoff control (including no detention) if the developer can prove that special circumstances exist for the development site and that "no harm" would be caused by discharging at a higher runoff rate than that specified by the Stormwater Management Plan and this Chapter. For purposes of this paragraph (1), "special circumstances" shall mean any hydrologic or hydraulic aspects of the development itself not specifically considered in the development of the Stormwater Management Plan runoff control strategy. Proof of "no harm" must be shown from the development site through the remainder of the downstream drainage network to the confluence of the Little Lehigh Creek with the Lehigh River. Proof of "no harm" must be shown using the capacity criteria specified in § 25-303(c) if downstream capacity analysis is a part of the "no harm" justification.

(2) Analysis Considerations. Attempts to prove "no harm" based upon downstream peak flow versus capacity analysis shall be governed by the following provisions:

(A) Peak Flow Values. The peak flow values to be used for downstream areas for the design return period storms (2-, 10-, 25- and 100-year) shall be the values from the calibrated WATERSHED model for the Little Lehigh Creek Watershed, or as calculated by an

applicant using an alternate method acceptable to the Borough. The flow values from the WATERSHED model are reproduced in Appendix ¶ 25-I, which is incorporated herein by reference.

(B) Allocation of Available Downstream Capacity. Any available capacity in the downstream conveyance system as documented by a developer may be used by the developer only in proportion to his development site acreage relative to the total upstream undeveloped acreage from the identified capacity (*i.e.*, if his site is 10% of the upstream undeveloped acreage, he may use up to 10% of the documented downstream available capacity).

(C) Increased Flow Rates at Problem Areas. Developer-proposed runoff controls which would generate increased peak flow rates at storm drainage problem areas are, by definition, precluded from successful attempts to prove "no harm," except in conjunction with proposed capacity improvements for the problem areas consistent with § 25-303(n).

(3) Submission. Any "no harm" justifications shall be submitted by the developer as part of the Drainage Plan submission per Article IV.

(m) Regional Detention Alternatives. For certain areas within the Little Lehigh Creek Watershed, 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.

(n) Capacity Improvements.

(1) Local Drainage Network Capacity Deficiency. In certain instances, primarily within the conditional no detention areas, local drainage conditions may dictate more stringent levels of runoff control than those based upon protection of the entire watershed. In these instances, if the developer can prove that it is feasible to provide capacity improvements to relieve the capacity deficiency in the local drainage network, then the capacity improvements may be provided by the developer in lieu of runoff controls on the development site. Peak flow calculations are to be made assuming that the local watershed is in the existing condition and then assuming that the local watershed is developed per current zoning and using the specified runoff controls. Any capacity improvements must be designed using the *larger* of the above peak flows and the capacity criteria specified in § 25-303(c). All new development in the entire subarea(s) within which the proposed development site is located shall be assumed to implement the developer's proposed discharge control, if any.

(2) Other Circumstances. Capacity improvements may also be provided as necessary to implement any regional detention alternatives or to implement a modified "no harm" option which proposes specific capacity improvements to provide that a less stringent discharge control will not create any harm downstream.

§ 25-304 Calculation Methodology.

(a) Approved Methodologies. Stormwater runoff from all development sites shall be calculated using either the rational method or the soil-cover-complex methodology.

(a.1)Calculation Methodology for Infiltration BMPs in Carbonate Bedrock. The following calculation methods shall be employed in utilizing the Recommendation Chart for Infiltration Stormwater Management BMPs in Carbonate Bedrock in Appendix ¶ 25-H:

(1) Loading Rate Percentages. Infiltration BMP loading rate percentages shall be calculated as follows:

$$\left(\frac{\text{Area Tributary to infiltration BMP}}{\text{Base area of infiltration BMP}}\right) * 100\%.$$

(2) Weighting Factors. For purposes of paragraph (1), 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%.

(3) Soil Thickness. Soil thickness is to be measured from the bottom of any proposed infiltration system. The effective soil thickness in the Recommendation Chart for Infiltration Stormwater Management BMPs in Carbonate Bedrock in Appendix ¶ 25-H is the measured soil thickness multiplied by the thickness factor based on soil permeability, as follows:

Permeability Range*	Thickness Factor
6.0 to 12.0 inches/hour	0.8
2.0 to 6.0 inches/hour	1.0
1.0 to 2.0 inches/hour	1.4
0.75 to 1.0 inches/hour	1.2
0.5 to 0.75 inches/hour	1.0

* If the permeability rate falls on a break between two thickness factors, the smaller thickness factor shall be used.

Sites with soil permeability greater than 12.0 inches/hour or less than 0.5 inches/hour are not recommended for infiltration.

(b) Verification of Detention Basin Design. The design of any detention basin intended to meet the requirements of this Chapter 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 technique, the design hydrograph for routing shall be either the Universal Rational Hydrograph or the

modified rational method trapezoidal hydrograph which maximizes detention volume. Use of the modified rational hydrograph shall be consistent with the procedure described in Section "PIPE.RAT" of the Users' Manual for the Penn State Urban Hydrograph Method (1987).

(c) Freeboard. All stormwater detention facilities shall provide a minimum 1.0 foot freeboard above the maximum pool elevation associated with the 2- through 25-year runoff events. A 0.5 foot freeboard shall be provided above the maximum pool elevation of the 100-year runoff event. The freeboard shall be measured from the maximum pool elevation to the invert of the emergency spillway. The 2- through 100-year storm events shall be controlled by the primary outlet structure. An emergency spillway for each 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 the basin. The freeboard criteria shall be satisfied considering any offsite areas tributary to the basin as developed, as applicable. If this detention facility is considered to be a dam under the DEP Chapter 105 regulations, 25 PA. CODE Ch. 105 (relating to Dam Safety and Waterway Management), the design of the facility must be consistent with those regulations, and may be required to pass a storm greater than the 100-year event.

(d) Circular Orifice Diameter. 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.

(e) Rainfall Calculations.

(1) Soil-Cover-Complex Method. Runoff calculations using the soil-cover-complex method shall use the NRCS Type II 24-hour rainfall distribution. (A graphic and tabular presentation of the NRCS Type II 24-hour rainfall distribution is reproduced in Appendix ¶ 25-C, which is incorporated herein by reference.) The 24-hour rainfall depths for the various return periods to be used consistent with this Chapter may be taken from NOAA Atlas 14, Volume 12 or the *PennDOT Intensity–Duration–Frequency Field Manual (May 1986)* for Region 4 ("PDT-IDF"). The following values are taken from the PDT-IDF Field Manual:

Return Period	24-Hour Rainfall Depth
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

(2) Rational Method. Runoff calculations using the Rational Method shall use rainfall intensities consistent with appropriate times of concentration and return periods and the Intensity-Duration–Frequency Curves presented in Appendix ¶ 25-D, which is incorporated herein by reference.

(f) Runoff Calculations.

(1) Soil-Cover-Complex Method. Runoff Curve Numbers (CN's) to be used in the soil-cover-complex method shall be based upon the matrix presented in Appendix ¶ 25-E, which is incorporated herein by reference.

(2) Rational Method. Runoff coefficients for use in the Rational Method shall be based upon the table presented in Appendix ¶ 25-F, which is incorporated herein by reference.

(g) [RESERVED]**.**

(h) Time of Concentration Calculations.

(1) Flow Types. All time of concentration calculations shall use a segmental approach, which may include one or all of the following flow types:

(A) Overland Flow. Sheet Flow (overland flow) calculations shall use either the NRCS average velocity chart (Figure 3-1 of 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.

(B) Shallow Concentrated Flow. Shallow Concentrated Flow travel times shall be determined from the watercourse slope, type of surface, and the velocity from Figure 3-1 of NRCS TR-55, June 1986.

(C) Open Channel Flow. 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 ¶ 25-G, which is incorporated herein by reference.

(D) Pipe Flow. Pipe Flow travel times shall be determined from velocities calculated using the Manning Equation, assuming full flow and the Manning 'n' values from Appendix ¶ 25-G.

(2) Common Time of Concentration.

(A) Pre-Development. 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.

(B) Post-Development. 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.

(i) Capacity of Watercourses. 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 ¶ 25-G, or other appropriate standard engineering 'n' value resources. Pipe capacities shall be determined by methods acceptable to the Borough.

(j) DEP Dam Safety and Waterway Management Regulations. DEP's Chapter 105 regulations, 25 Pa. Code Ch. 105 (relating to Dam Safety and Waterway Management), apply to the construction, modification, operation, and/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 Chapter may not be the same criteria that are used in the permitting of dams under the Dam Safety Program. The requirements of both this Chapter and the DEP Chapter 105 regulations must be satisfied where both are applicable.

Article IV — Drainage Plan Requirements

§ 25-401 General Requirements.

For any of the Regulated Activities of this Chapter, 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 Borough approval of the Drainage Plan.

§ 25-402 Exemptions.

Exemptions from the Drainage Plan requirements are as specified in § 25-104.1.

§ 25-403 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) Maps. Map(s) of the project area showing:

(1) The location of the project relative to highways, municipalities, and other identifiable landmarks.

(2) Existing contours at intervals of two (2) feet. In areas of steep slopes (greater than 15%), five-foot (5') contour intervals may be used. Off-site drainage areas impacting the project shall also be shown, including topographic detail.

(3) Streams, lakes, ponds, or other bodies of water within the project area.

(4) Other physical features, including existing drainage swales, wetlands, closed depressions, sinkholes, 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 fifty (50) feet of the property lines of the project site shall also be shown.

(6) An overlay showing soil types and boundaries based on the Lehigh County Soil Survey, latest edition.

(6.1) An overlay showing geologic types and boundaries.

(7) Proposed changes to land surface and vegetative cover.

(8) Proposed structures, roads, paved areas, and buildings.

(9) Final contours at intervals of two (2) feet. In areas of steep slopes (greater than 15%), five-foot (5') contour intervals may be used.

(10) Stormwater Management District boundaries applicable to the site.

(11) 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.

(12) Clear identification of the location and nature of permanent stormwater BMPs.

(13) An adequate access easement around all stormwater BMPs that would provide Borough ingress to and egress from a public right-of-way.

(14) The location of all public water supply wells within four hundred (400) feet of the project, and all private water supply wells within one hundred (100) feet of the project.

(c) Stormwater Management Controls and BMPs.

(1) All stormwater management controls and BMPs must 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 septic tank infiltration areas and wells must 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 BMPs must be shown.

(3) All site testing data used to determine the feasibility of infiltration on a site must be shown.

(4) A statement, signed by the landowner, acknowledging that the stormwater BMPs are fixtures that cannot be altered or removed without approval by the Borough.

(d) Operation and Maintenance Program. A description of how each permanent stormwater BMP will be operated and maintained and the identity of the person(s) responsible for operations and maintenance.

§ 25-404 Plan Submission.

(a) Subdivisions or Land Development. For Regulated Activities specified in § 25-104(b)(1) or (2):

(1) To the Borough. Two (2) copies of the Drainage Plan shall be submitted by the developer to the Zoning Officer as part of the Preliminary Plan submission for the subdivision or land development. One (1) copy shall be distributed to Council, and one (1) copy shall be distributed to the Borough Engineer.

(2) To the Lehigh Valley Planning Commission. 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 ten thousand (10,000) square feet of additional impervious cover. The Lehigh Valley Planning Commission will conduct an advisory review of the Drainage Plan for consistency with the Stormwater Management Plan. The Lehigh Valley Planning Commission will provide written comments to the developer and the Borough, within a time frame consistent with established procedures under the Municipalities Planning Code, 53 PA. STAT. ANN. § 10101 *et seq*., as to whether the Drainage Plan has been found to be consistent with the Stormwater Management Plan. The Lehigh Valley Planning Commission will not review details of the Erosion and Sedimentation Plan or the BMP Operations and Maintenance Plan.

(b) Impervious Surface, New Buildings, or Additions. For Regulated Activities specified in § 25-104(b)(3) or (4), the Drainage Plan shall be submitted by the developer to the Borough Zoning Officer as part of the building permit application.

(c) Storm Water Systems; Diversion or Piping of Stream Channel; Regulated Earth Disturbance Activities. For Regulated Activities specified in § 25-104(b)(5), (6), or (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 (relating to Dam Safety and Waterway Management), Chapter 106 (relating to Flood Plain Management) of DEP's Regulations, 25 PA. CODE Ch. 105 & 106, and NPDES regulations.

(d) Earthmoving. Earthmoving for all Regulated Activities under § 25-104 shall be conducted in accordance with the current federal and State regulations relative to the NPDES and DEP Chapter 102 regulations, 25 PA. CODE Ch. 102 (relating to Erosion and Sediment Control).

§ 25-405 Drainage Plan Review.

(a) By the Borough Engineer. The Borough Engineer shall review the Drainage Plan, including the BMP Operations and Maintenance Plan, for consistency with the Stormwater Management Plan as implemented by this Chapter, any permits issued by DEP, and with any additional storm drainage provisions contained in Chapter 22 (relating to Subdivision and Land Development) or Chapter 21 (relating to Zoning).

(a.1)BMP Operations and Maintenance Plan. The Borough shall notify the applicant in writing whether the BMP Operations and Maintenance Plan is approved.

(b) Effect on Subdivision/Land Development and Building Permit Applications. The Borough shall not approve any subdivision or land development (concerning Regulated Activities described in § 25-104(b)(1) or (2)) or building permit application (concerning Regulated Activities described in § 25-104(b)(3) or (4)) if the Drainage Plan has been found to be inconsistent with the Stormwater Management Plan.

(c) "As-Built" Survey. The Borough requires an "As-Built Survey" of all stormwater BMPs and an explanation of any discrepancies with the Drainage Plan.

§ 25-406 Modification of Plans.

A modification to a submitted Drainage Plan for a proposed development site which involves a change in control methods or techniques, or which involves the relocation or redesign of control measures, or which is necessary because soil or other conditions are not as stated on the Drainage Plan shall require a resubmission of the modified Drainage Plan consistent with § 25-404, subject to review per § 25-405.

§ 25-407 Hardship Waiver Procedure.

(a) In General. The Borough may hear requests for waivers from certain provisions of this Chapter where it is alleged that the provisions of this Chapter inflict unnecessary hardship upon the applicant. The waiver request shall be in writing on an application form promulgated by the Borough and accompanied by the requisite fee based upon a fee schedule adopted by the Borough. A copy of the completed application form shall be provided to each of the following: Borough, Borough Engineer, Borough Solicitor, and the Lehigh Valley Planning Commission. The application shall fully document the nature of the alleged hardship.

(b) Necessary Findings. The Borough may grant a waiver under this Section *provided* that *all* of the following findings are made in a given case:

(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 Chapter 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 Chapter, including the "no harm" provisions of § 25-303(l), 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 the waiver.

(c) Conditions. In granting any waiver under this Section, the Borough may attach such reasonable conditions and safeguards as it may deem necessary to implement the purposes of this Chapter. If a hardship waiver is granted under this Section, the applicant must still manage the quantity, velocity, direction, and quality of resulting storm runoff as is necessary to prevent injury to health, safety, or other property.

(d) Hearing Body.

(1) For Regulated Activities described in § 25-104(b)(1) or (2) (relating to subdivisions or land developments), Council shall hear requests for and decide hardship waiver requests under this Section on behalf of the Borough.

(2) For Regulated Activities described in § 25-104(b) other than those for which Council has jurisdiction under paragraph (1) of this subsection (d), the Zoning Hearing Board shall hear requests for and decide hardship waiver requests under this Section on behalf of the Borough.

(e) No Waiver of Water Quality Requirements. The Borough shall not waive any of the water quality provisions of this Chapter.

Article V — Inspections

§ 25-501 Schedule of Inspections.

(a) In General. DEP or its designees (*e.g.*, Lehigh County Conservation District) normally ensure compliance with any permits issued, including those for stormwater management. In addition to DEP compliance programs, the Borough Engineer or his designee may inspect all phases of the construction, operations, maintenance, and any other implementation of stormwater BMPs.

(b) Revocation of Permits. During any stage of the Regulated Earth Disturbance Activities, if the Borough Engineer determines that any BMPs are not being implemented in accordance with this Chapter, the Borough may suspend or revoke any existing permits or other approvals issued by the Borough until the deficiencies are corrected.

Article VI — Fees and Expenses

§ 25-601 In General.

Council may, from time to time, by ordinance or resolution, establish a fee to defer the Borough's costs for Drainage Plan review and processing (including the BMP Operations and Maintenance Plan). Until further action by Council, the fee shall be equal to the amount described in § 25-602. The applicant shall deposit an estimate of the total fee, as approved by the Borough Engineer, at the time the Drainage Plan is filed, and shall pay any additional billings in excess of the amount deposited within thirty (30) calendar days after the date of billing. No permits shall be issued if any outstanding billing remains unpaid, and any issued permit shall be revoked if an outstanding billing is not paid by its due date.

§ 25-602 Expenses Covered by Fees.

The fees required by this Chapter shall at a minimum cover:

(a) The review of the Drainage Plan (including the BMP Operations and Maintenance Plan) by the Borough Engineer.

(b) The site inspection.

(c) The inspection of required controls and improvements during construction.

(d) The final inspection upon completion of the controls and improvements required in the plan.

(e) Any additional work required to enforce any permit provisions regulated by this Chapter, correct violations, and assure the completion of stipulated remedial actions.

(f) Administrative and clerical costs.

Article VII — Stormwater BMP Operations and Maintenance Plan Requirements

§ 25-701 General Requirements.

No Regulated Earth Disturbance Activities within the Borough shall commence until approval by the Borough of the BMP Operations and Maintenance Plan, which describes how the permanent (*i.e.*, post-construction) stormwater BMPs will be properly operated and maintained.

§ 25-702 Responsibilities for Operations and Maintenance of BMPs.

(a) In General. The BMP Operations and Maintenance Plan for the project site shall establish responsibilities for the continuing operation and maintenance of all permanent stormwater BMPs, as follows:

(1) Borough Ownership and Maintenance. If a Plan includes structures or lots which are to be separately owned and in which streets, sewers, and/or other public improvements are to be dedicated to the Borough, stormwater BMPs may also be dedicated to and maintained by the Borough, if acceptable to the Borough.

(2) Private Ownership and Maintenance. If a Plan includes operations and maintenance by a single ownership or if sewers and other public improvements are to be privately owned and maintained, then the operation and maintenance of stormwater BMPs shall be the responsibility of the owner or private management entity.

(b) Borough Discretion. The Borough shall make the final determination on the continuing operations and maintenance responsibilities. The Borough reserves the right to accept or reject the operations and maintenance responsibility for any or all of the stormwater BMPs in its complete discretion.

§ 25-703 Adherence to Approved BMP Operations and Maintenance Plan.

It shall be unlawful to alter or remove any permanent stormwater BMP required by an approved BMP Operations and Maintenance Plan or to allow the property to remain in a condition which does not conform to an approved BMP Operations and Maintenance Plan unless an exception is granted in writing by the Borough.

§ 25-704 Operations and Maintenance Agreement for Privately Owned Stormwater BMPs.

(a) In General. The property owner shall sign an operations and maintenance agreement with the Borough covering all stormwater BMPs that are to be privately owned. The agreement shall include the terms of the format agreement set forth in Appendix ¶ 25-N (which is incorporated herein by reference).

(b) Additional Provisions. Other items may be included in the agreement where determined by the Borough to be reasonable or necessary to guarantee the satisfactory operation and maintenance of all permanent stormwater BMPs. The agreement shall be subject to the review and approval of the Borough.

§ 25-705 Stormwater Management Easements.

Stormwater management easements shall be provided by the property owner if necessary for access for inspections and maintenance or for preservation of stormwater conveyance, infiltration, detention areas, and other BMPs by persons other than the property owner. The purpose of the easement shall be specified in any agreement under § 25-704.

§ 25-706 Recording of Approved BMP Operations and Maintenance Plan and Related Agreements.

(a) In General. The owner of any land upon which permanent BMPs will be placed, constructed, or implemented, as described in the BMP Operations and Maintenance Plan, shall record the following documents in the Office of the Recorder of Deeds for Lehigh County within ninety (90) days after approval of the BMP Operations and Maintenance Plan by the Borough:

(1) The BMP Operations and Maintenance Plan, or a summary thereof approved by the Borough;

(2) Operations and Maintenance Agreements under § 25-704; and

(3) Stormwater management easements under § 25-705.

(b) Enforcement. The Borough may suspend or revoke any approvals granted for the project site upon discovery of the failure of the owner to comply with this Section.

§ 25-707 Stormwater BMP Operation and Maintenance Fund.

(a) In General. If stormwater BMPs are accepted by the Borough for dedication, the Borough may require persons installing stormwater BMPs to pay a specified amount to the Borough's Stormwater BMP Operation and Maintenance Fund to help defray costs of operations and maintenance activities. The amount shall be determined as follows:

(1) If the BMP is to be owned and maintained by the Borough, the amount shall cover the estimated costs for operation and maintenance *in perpetuity*, as determined by the Borough.

(2) The amount shall then be converted to present worth of the annual series values, using reasonable interest rates determined by the Borough.

(b) Recreation Facility. If a BMP is proposed that also serves as a recreation facility (*e.g.,* ball field, lake), the Borough may adjust the amount due under subsection (a) accordingly.

Article VIIA — Prohibitions

§ 25-751 Prohibited Discharges.

(a) Non-stormwater Discharges. No person shall allow or cause to allow stormwater discharges into the Borough's separate storm sewer system which are not composed entirely of stormwater except as provided in subsection (b) or as allowed under a State or Federal permit.

(b) Exceptions. The following discharges are allowed based on the Borough's finding that the discharge(s) do not significantly contribute pollution to surface waters of the Commonwealth (except as provided in subsections (c) and (d)):

(1) Discharges from 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) Water from individual residential car washing.

(7) Springs.

(8) Water from crawl space pumps.

(9) Uncontaminated water from foundation or from footing drains.

(10) Flows from 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.

(14) Uncontaminated groundwater.

(c) Determination of Significant Contribution to Pollution. In the event the Borough determines that any of the discharges identified in subsection (b) significantly contribute to pollution of waters of the Commonwealth, or is so notified by DEP, the Borough will notify the responsible person(s) to cease the discharge. Upon such notice, the discharger will have a reasonable time, as determined by the Borough, to cease the discharge consistent with the degree of pollution caused by the discharge.

(d) State Law. Nothing in this Section shall affect a discharger's responsibilities under State law.

§ 25-752 Prohibited Connections.

The following connections are prohibited, except as provided in § 25-751(b):

(a) Non-Stormwater Discharges. Any drain or conveyance, whether on the surface or subsurface, which allows any non-stormwater discharge, including sewage, process wastewater, and wash water, to enter the separate storm sewer system, and any connections to the storm drain system from indoor drains and sinks.

(b) Undocumented Commercial or Industrial Land Uses. Any drain or conveyance connected from a commercial or industrial land use to the separate storm sewer system which has not been documented in plans, maps, or equivalent records, and approved by the Borough.

§ 25-753 Roof Drains.

(a) In General. Roof drains shall not be connected to streets, sanitary or storm sewers, or roadside ditches, except as provided in subsection (b).

(b) Exception. When it is more advantageous to connect directly to streets or storm sewers, connections of roof drains to streets or roadside ditches may be permitted by the Borough.

(c) Discharge to Infiltration or Vegetative BMPs. Roof drains shall discharge to infiltration areas or vegetative BMPs to the maximum extent practicable.

§ 25-754 Alteration of BMPs.

(a) No person shall modify, remove, fill, landscape, or alter any existing stormwater BMP without the written approval of the Borough, unless it is part of an approved maintenance program.

(b) No person shall place any structure, fill, landscaping, or vegetation into a stormwater BMP or within a drainage easement, which would limit or alter the functioning of the BMP, without the written approval of the Borough.

Article VIII — Enforcement

§ 25-801 Right-of-Entry.

(a) In General. Upon presentation of the proper credentials, duly authorized representatives of the Borough may enter at reasonable times upon any property within the Borough to inspect the implementation, condition, or operation and maintenance of stormwater BMPs, or to

investigate or ascertain the condition of the subject property in regard to any aspect regulated by this Chapter.

(b) BMP Owners and Operators. BMP owners and operators shall allow persons working on behalf of the Borough ready access to all parts of the premises for the purposes of determining compliance with this Chapter.

(c) Temporary Devices. Persons working on behalf of the Borough shall have the right to temporarily locate on any BMP in the Borough such devices as are necessary to conduct monitoring and/or sampling of the discharges from such BMPs.

(d) Delays. Unreasonable delays in allowing the Borough access to a BMP is a violation of this Chapter.

§ 25-802 Notification of Violations.

(a) Compliance Order. Whenever the Borough finds that a person has violated a prohibition or failed to meet a requirement of this Chapter, the Borough may order compliance by written notice to the responsible person. Such notice may require, without limitation:

(1) The performance of monitoring, analyses, and reporting.

(2) The elimination of prohibited connections or discharges.

(3) Cessation of any violating discharges, practices, or operations.

(4) The abatement or remediation of stormwater pollution or contamination hazards and the restoration of any affected property.

(5) Payment of a fine to cover administrative and remediation costs.

(6) The implementation of stormwater BMPs.

(7) Operation and maintenance of stormwater BMPs.

(b) Content of Notice. Such notification shall set forth the nature of the violation(s) and establish a time limit(s) for correction of the violation(s). The 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 Borough or its designee, and the expense thereof, together with all related lien and enforcement fees, charges, and expenses, shall be changed to the violator.

(c) Failure to Cure in Timely Fashion. Failure to comply with the notification within the time period(s) specified shall also subject such person to the penalty provisions of this Chapter. All such penalties shall be cumulative, they shall not prevent the Borough from pursuing any and all other remedies available at law or in equity, and the Borough may resort to one or more penalties and/or remedies concurrently or successively.

§ 25-803 Criminal Penalties.

Any person who shall violate this Chapter shall be subject to prosecution in the same manner as provided for a summary offense under the Pennsylvania Rules of Criminal Procedure, and upon conviction thereof, shall be sentenced to pay a criminal fine of One Thousand Dollars ($1,000.00) for each violation, plus court costs and reasonable attorney fees incurred by the Borough in the enforcement proceedings, and/or imprisonment for a period not exceeding thirty (30) days. Each day that a violation occurs or continues shall constitute a separate offense, and each violation of a separate section, subsection, paragraph, or other division of this Chapter shall constitute a separate offense. The enforcement action shall be brought before a magisterial district judge or, where applicable under Borough Code § 3321(5), 53 PA. STAT. ANN. § 48321(5), the Lehigh County Court of Common Pleas. These penalties are imposed pursuant to Sections 3321 and 3323 of the Borough Code, 53 PA. STAT. ANN. §§ 48321 and 48323.

§ 25-804 Civil Remedies; Public Nuisance.

The violation of any provision of this Chapter is hereby declared to be a public nuisance. Each day that a violation continues shall constitute a separate offense. The Borough may abate such nuisance, and the Borough Solicitor is hereby authorized to institute injunctive, mandamus, or any other appropriate actions or proceedings at law or in equity to restrain, prevent, or abate such violations, recover damages, and otherwise enforce this Chapter, each in accordance with the applicable provisions of Sections 15 and 16 of the Storm Water Management Act, 32 PA. STAT. ANN. §§ 680.15 and 680.16., Section 1202(5) of the Borough Code, 53 PA. STAT. ANN. § 46205(5), and/or Sections 511, 515.1, or 515.3 of the Municipalities Planning Code, 53 PA. STAT. ANN. §§ 10511, 10515.1, 10515.3, or other applicable authority. 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.

§ 25-805 Suspension and Revocation of Permits and Approvals.

(a) Suspension or Revocation. Any building, land development, or other permit or approval issued by the Borough may be suspended or revoked by the Borough for:

(1) Non-compliance with or failure to implement any provision of the permit.

(2) A violation of any provision of this Chapter.

(3) The creation of any condition, or the commission of any act during construction or development, which constitutes or creates a hazard, a nuisance, or pollution, or which endangers the life or property of others.

(b) Reinstatement. A suspended permit or approval shall not be reinstated by the Borough until:

(1) The Borough or its designee has inspected and approved the corrections to the stormwater BMPs or the elimination of the hazard or nuisance;

(2) The Borough is satisfied that the violation of the ordinance, law, rule, regulation, and/or permit has been corrected; and

(3) Payment of all Borough fees, costs, and expenses related to or arising from the violation has been made.

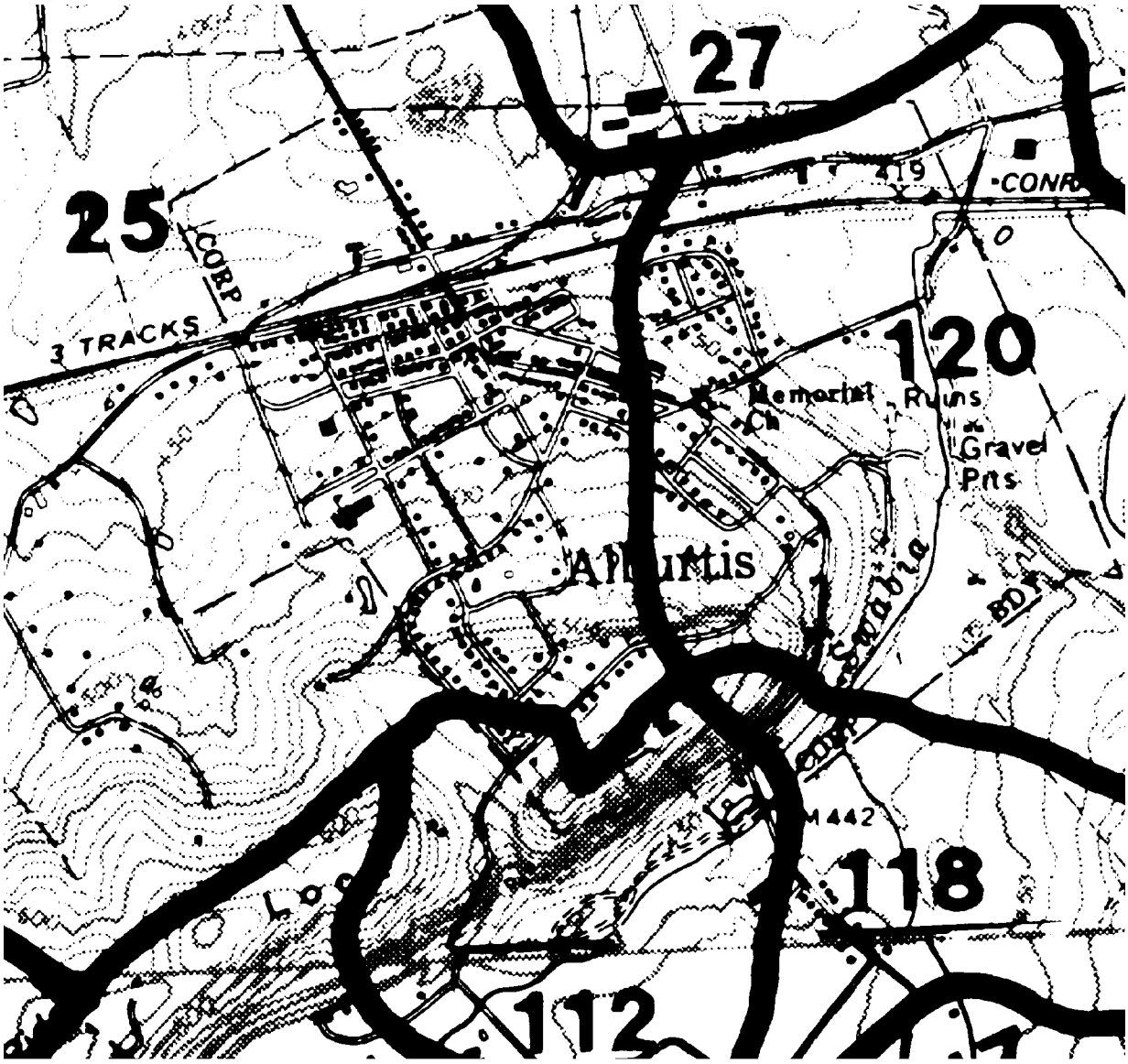
(c) Effect of Revocation. A permit or approval which has been revoked by the Borough cannot be reinstated. The applicant may apply for a new permit(s) or approval(s). In the case of a new permit or approval under this Chapter, the applicant shall utilize the procedures set forth in this Chapter.

§ 25-806 Appeals.

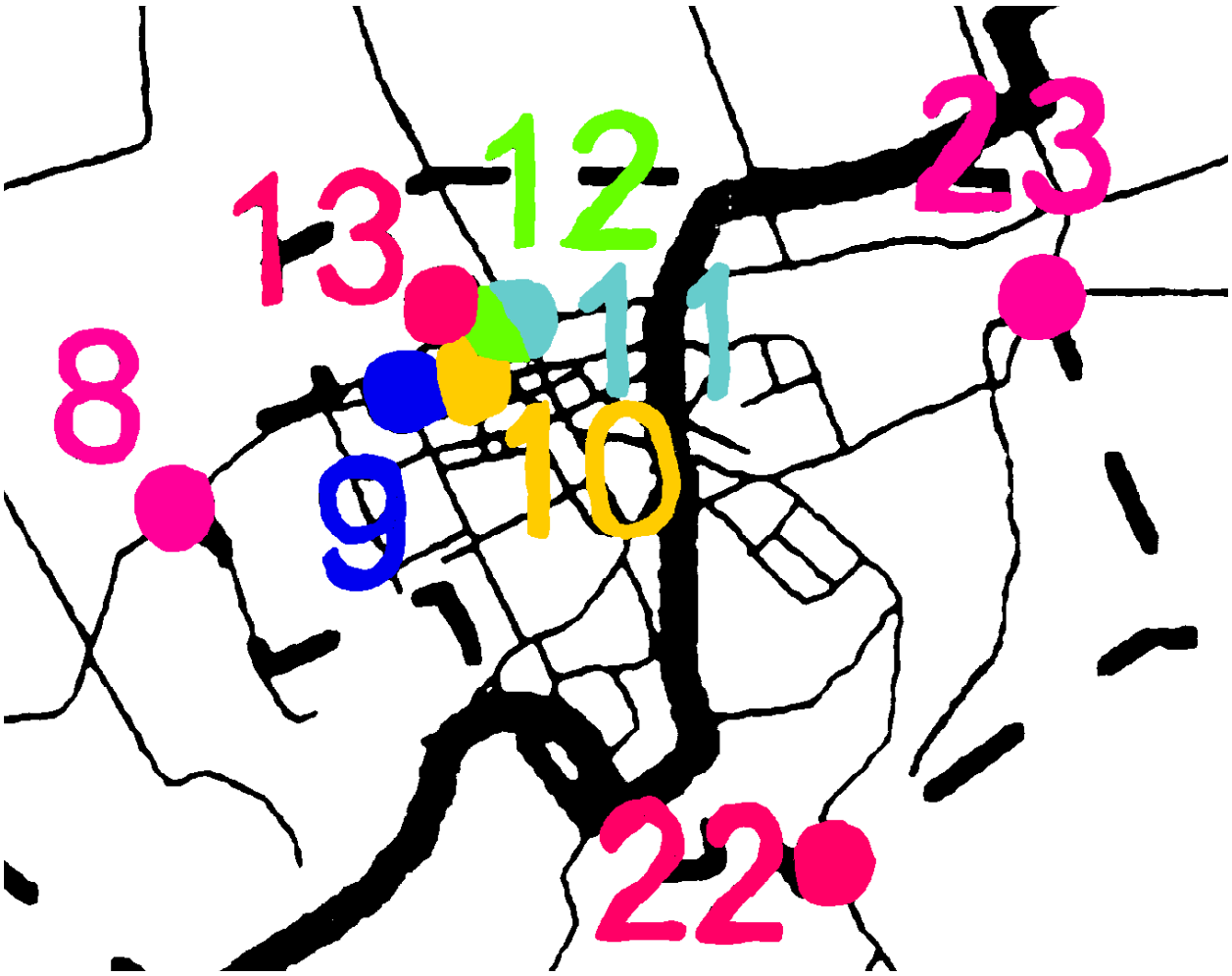
Any person aggrieved by any action of the Borough or its designee relevant to the provisions of this Chapter may appeal using the appeal procedures established in Articles IX and X-A of the Pennsylvania Municipalities Planning Code, 53 PA. STAT. ANN. §§ 10901 *et seq*., 11001-A *et seq*.

Appendix

¶ 25-A Map of Storm Water Management Districts / Subareas Within the Borough of Alburtis.

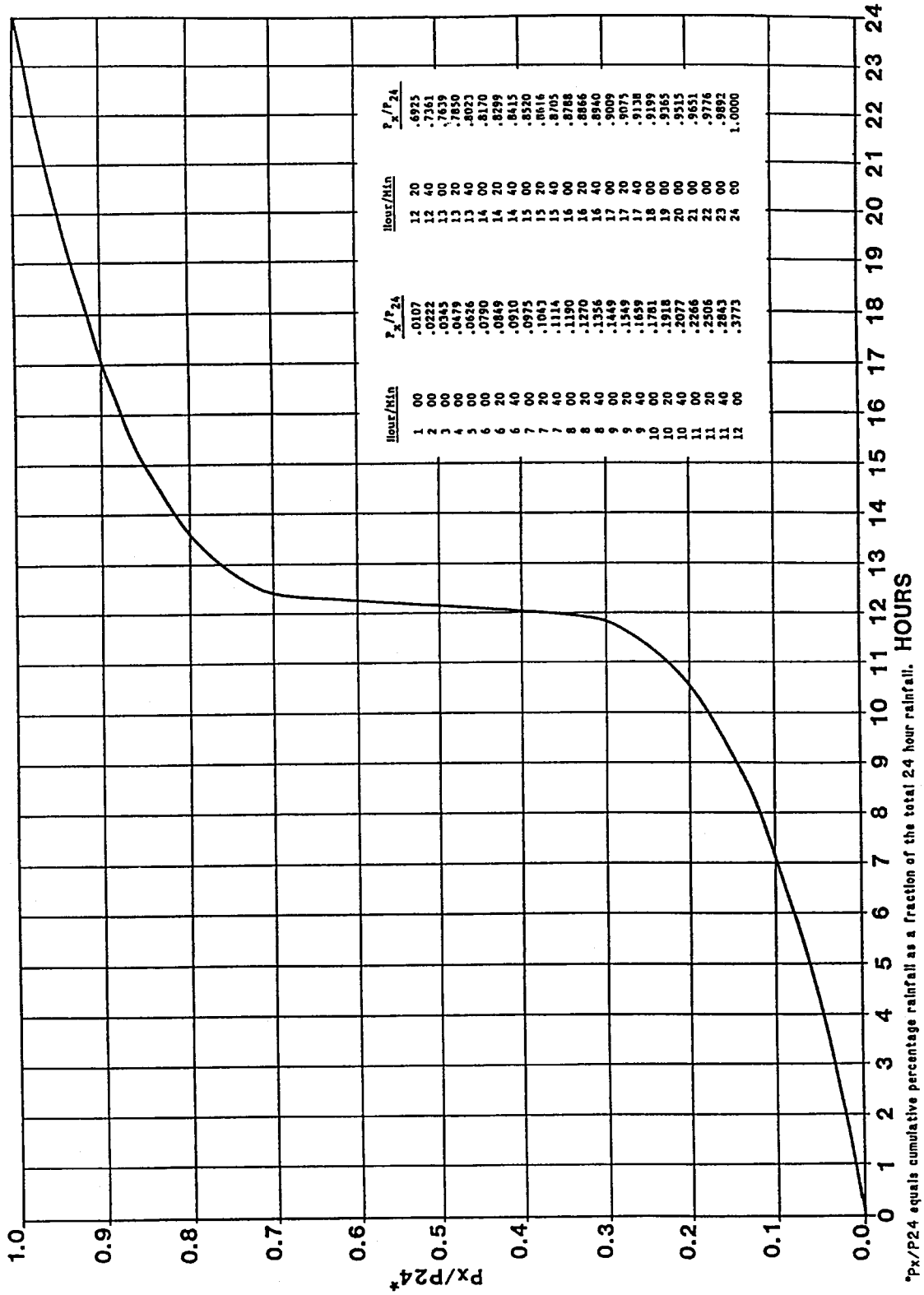


¶ 25-B Storm Drainage Problem Areas in the Borough.

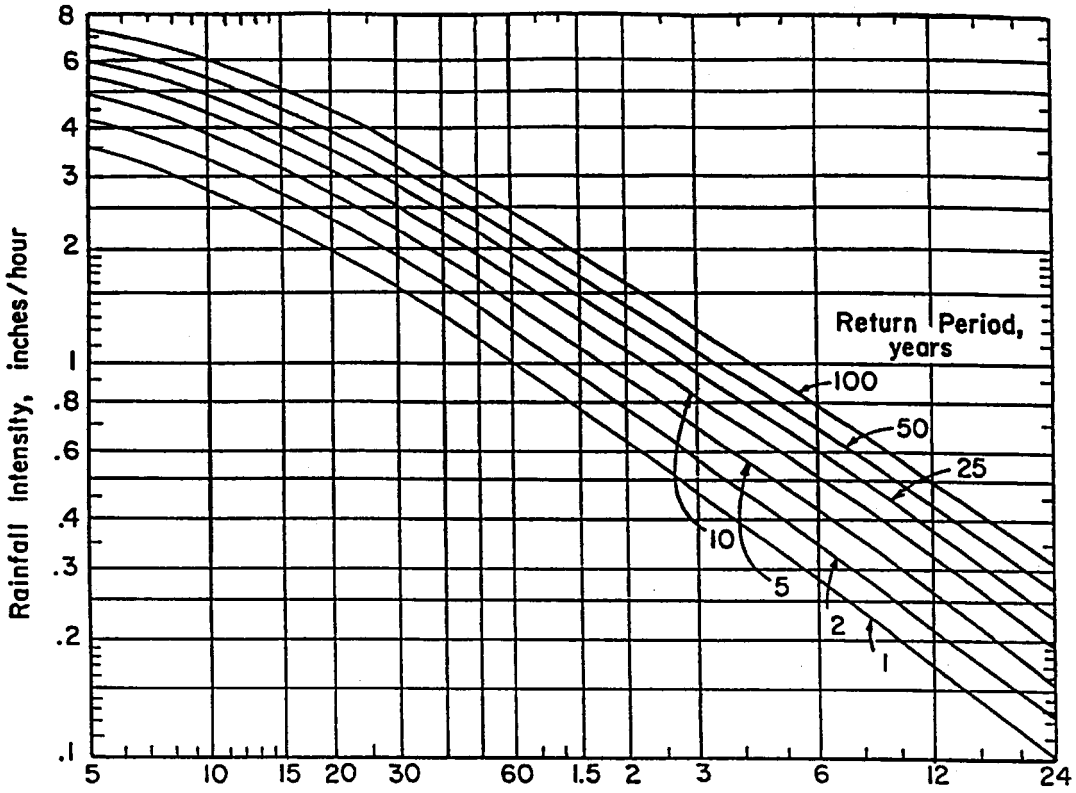


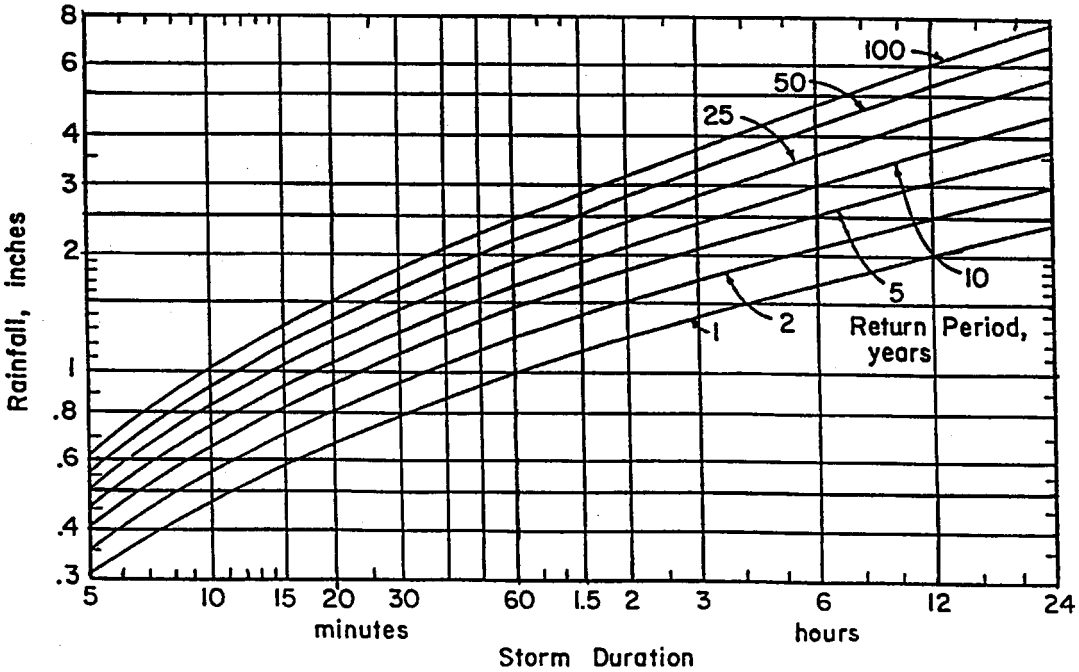
No.	Location	Problem Description	Subarea No.	Reach No.	Proposed Solution
8	Front Street – west end	Street Flooding	25	-	Enlarged Culvert
9	Front & Walnut Sts.	Street & Field Flooding	25	-	Enlarged Culvert
10	Front & Chestnut Sts.	Street Flooding	25	-	Enlarged Culvert
11	Main & East Penn Ave.	Street & Property Flooding	25	-	Storm Sewers
12	West Penn Ave.	Street & Building Flooding	25	-	Enlarged Culvert
22	Franklin St. at Borough line South	Street Flooding	112	111	Church St. Bridge Replacement
23	Church St. at Borough line East	Street Flooding	120	118	Bridge Replacement & Channel Dredging/Realignment

¶ 25-C NRCS Type II 24-Hour Rainfall Distribution.



¶ 25-D Intensity–Duration–Frequency Curves.





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

¶ 25-E Runoff Curve Numbers and Percent Impervious Values.

Cover Description		Curve numbers for hydrologic soil group**			
Land Use/Cover Type	Average percent impervious area	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:					
⅛ acre or less (townhouses)	65	77	85	90	92
¼ acre	38	61	75	83	87
⅓ acre	30	57	72	81	86
½ 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.

¶ 25-F Runoff Coefficients for the Rational Method.

LAND USE	HYDROLOGIC SOIL GROUP AND SLOPE RANGE**											
	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[A]	[a]0.18 [b]0.23	0.23 0.29	0.28 0.34	0.24 0.30	0.29 0.36	0.33 0.40	0.30 0.36	0.34 0.41	0.38 0.45	0.33 0.39	0.37 0.44	0.41 0.48
Pasture[B]	0.09 0.12	0.13 0.17	0.17 0.23	0.19 0.24	0.24 0.30	0.29 0.36	0.27 0.33	0.31 0.38	0.36 0.43	0.31 0.37	0.35 0.42	0.39 0.46
Meadow, Lawn[C]	0.05 0.07	0.08 0.12	0.12 0.17	0.15 0.19	0.20 0.25	0.24 0.30	0.23 0.28	0.28 0.34	0.32 0.39	0.28 0.33	0.32 0.39	0.36 0.43
Forest, Woods	0.03 0.04	0.05 0.08	0.08 0.12	0.11 0.15	0.16 0.21	0.20 0.26	0.20 0.25	0.25 0.31	0.29 0.36	0.25 0.31	0.30 0.37	0.34 0.41
Gravel	0.24 0.30	0.29 0.36	0.33 0.40	0.32 0.38	0.36 0.43	0.40 0.47	0.35 0.42	0.39 0.46	0.43 0.50	0.37 0.44	0.41 0.48	0.44 0.51
Parking, Other Impervious	0.72 0.84	0.76 0.88	0.80 0.92	0.72 0.84	0.76 0.88	0.80 0.92	0.72 0.84	0.76 0.88	0.80 0.92	0.72 0.84	0.76 0.88	0.80 0.92
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.											

*Based on Rossmiller Equation for translating NRCS curve numbers into Rational Method 'c' values.
**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.

[A]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.
[B]Represents grasslands in fair condition with 50% to 75% grass cover.
[C]Represents grasslands in good condition with greater than 75% grass cover.

¶ 25-G Manning 'n' Values.

MANNING 'n' VALUES BY TYPICAL REACH DESCRIPTION

Reach Description	Manning 'n'
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

Surface Description	Manning 'n'[1]
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[2]	0.240
Bermuda grass	0.410
Range (natural)	0.130
Woods:[3]	
Light underbrush	0.400
Dense underbrush	0.800

[1]The n values are a composite of information compiled by Engman (1986).
[2]Includes species such as weeping lovegrass, bluegrass, buffalo grass, blue grama grass and native grass mixtures.
[3] 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.

¶ 25-H Recommendation Chart for Infiltration Stormwater Management BMPs in Carbonate Bedrock.

Recommendation Chart for Infiltration Stormwater Management BMP's in Carbonate Bedrock

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

RECOMMENDED

NOT RECOMMENDED

* 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.

¶ 25-I Calibrated WATERSHED Peak Flow Values for the Little Lehigh Creek Watershed.

		1 YEAR		2 YEAR		10 YEAR		25 YEAR		100 YEAR	
	SUBAREA		TOTAL	SUBAREA	TOTAL	SUBAREA	TOTAL	SUBAREA	TOTAL	SUBAREA	TOTAL
SUBAREA NO.		PEAK	PEAK	PEAK	PEAK	PEAK	PEAK	PEAK	PEAK	PEAK	PEAK
Little Lehigh Creek	1	20.1 (cfs)	20.1	41.6 (cfs)	41.6	157.8 (cfs)	157.8	253.2 (cfs)	253.2	504.4 (cfs)	504.4
	2	26.3	43.6	58.4	96.7	226.9	378.6	364.7	608.4	730.9	1210.4
	3	26.4	26.4	51.1	51.1	158.6	158.6	250.7	250.7	488.1	488.1
	4	39.8	101.5	71.0	202.9	192.6	684.6	295.3	1071.2	551.5	2036.5
	5	30.8	30.8	47.9	47.9	140.1	140.1	217.8	217.8	405.7	405.7
	6	52.8	52.8	81.6	81.6	194.6	194.6	304.8	304.8	692.9	692.9
	7	8.8	90.3	16.6	144.2	48.2	356.6	73.8	554.9	133.2	1128.8
	8	38.3	117.7	81.7	206.6	254.8	571.3	405.7	884.7	801.6	1738.8
	9	45.8	213.8	74.7	423.9	185.4	1361.7	275.4	2087.5	509.2	3811.4
	10	61.6	232.2	107.9	477.3	266.0	1482.3	395.1	2225.6	728.1	3938.5
	11	31.1	251.0	54.5	518.5	149.7	1572.0	229.5	2341.3	439.1	4073.5
Toad Creek	12	32.5	32.5	54.9	54.9	122.2	122.2	176.1	176.1	314.5	314.5
	13	87.0	114.5	126.6	171.2	250.6	346.7	338.4	475.8	541.0	782.5
	14	44.4	44.4	65.3	65.3	131.4	131.4	181.7	181.7	302.5	302.5
	15	17.8	175.6	24.4	258.3	44.4	509.4	58.2	690.4	88.2	1113.2
	16	48.9	212.3	75.9	316.8	166.5	623.4	235.9	844.5	405.3	1384.2
	17	39.9	39.9	65.1	65.1	160.8	160.8	235.8	235.8	427.1	427.1
	18	4.5	241.5	9.8	367.5	31.7	790.0	50.2	1104.5	98.1	1875.1
	19	100.0	227.0	160.6	370.6	384.4	886.4	562.4	1272.5	1007.9	2125.6
	20	28.9	28.9	54.9	54.9	175.8	175.8	277.1	277.1	537.1	537.1
	21	14.7	261.8	33.1	448.3	109.9	1113.6	175.1	1597.0	345.3	2639.7
	22	7.2	260.1	15.4	445.2	48.6	1102.7	77.1	1578.7	147.6	2604.9
Little Lehigh Creek	23	3.5	469.5	7.1	930.7	21.2	2476.0	33.1	3534.3	61.4	5882.1
	24	14.0	472.1	29.4	930.5	91.2	2464.8	143.2	3519.0	275.6	5841.5
	25	56.2	56.2	87.7	87.7	197.8	197.8	283.3	283.3	495.1	495.1
	26	35.8	505.0	62.4	983.2	167.9	2561.6	256.2	3644.7	486.0	6005.5
	27	22.3	510.6	36.1	991.7	86.7	2572.4	127.2	3656.7	228.7	6010.8
Schaefer Run	28	31.0	31.0	48.2	48.2	108.0	108.0	158.2	158.2	286.8	286.8
	29	23.6	22.0	38.4	38.4	91.5	91.5	135.0	135.0	228.4	228.4
	30	50.5	98.1	84.7	160.8	217.1	360.0	327.9	518.9	585.6	862.4
	31	20.6	20.6	35.4	35.4	88.0	88.0	127.1	127.1	220.1	220.1
	32	23.0	141.1	39.6	229.2	98.9	515.4	142.9	740.0	238.5	1237.2
	33	15.4	15.4	26.8	26.8	70.1	70.1	106.1	106.1	186.9	186.9
	34	21.3	171.6	39.7	288.0	115.1	664.8	176.5	943.0	326.8	1569.8
	35	21.6	21.6	36.5	36.5	91.5	91.5	139.8	139.8	265.6	265.6
	36	16.9	206.7	30.4	349.3	80.7	807.3	122.8	1149.2	222.9	1917.8
	37	19.5	19.5	34.8	34.8	89.6	89.6	134.5	134.5	239.8	239.8
	38	16.7	235.8	33.4	404.4	98.9	955.2	154.4	1371.0	295.7	2281.9
	39	3.7	235.3	7.7	403.8	23.3	955.4	36.5	1365.9	69.8	2279.5
	40	24.6	24.6	42.9	42.9	109.2	109.2	162.1	162.1	293.1	293.1
	41	67.2	87.0	115.0	150.1	295.8	394.3	445.2	595.5	837.8	1100.2

	1 YEAR		2 YEAR		10 YEAR		25 YEAR		100 YEAR	
SUBAREA NO.	SUBAREA PEAK	TOTAL PEAK	SUBAREA PEAK	TOTAL PEAK	SUBAREA PEAK	TOTAL PEAK	SUBAREA PEAK	TOTAL PEAK	SUBAREA PEAK	TOTAL PEAK
Schaefer Run, cont.										
42	8.7 (efs)	94.0	16.9 (cfs)	164.9	48.5 (cfs)	441.0	74.6 (cfs)	666.7	141.3 (cfs)	1229.0
43	7.1	331.8	14.7	573.7	45.0	1393.9	70.5	2023.4	134.5	3449.8
44	27.7	27.7	51.3	51.3	138.9	138.9	210.0	210.0	389.8	389.8
45	67.1	373.7	100.1	650.2	200.4	1578.1	276.7	2281.5	457.7	3867.2
46	133.2	393.3	185.6	673.6	345.2	1599.8	458.7	2296.5	710.8	3851.1
47	15.2	404.9	30.5	696.5	89.0	1665.1	137.6	2387.2	261.3	4004.1
48	11.6	404.5	22.0	699.3	68.0	1674.7	104.7	2394.9	205.9	3992.4
49	18.1	18.1	31.3	31.3	79.8	79.8	119.2	119.2	213.2	213.2
50	22.0	39.3	39.7	69.2	106.6	181.7	161.1	273.5	298.6	501.0
51	56.6	73.5	84.4	114.8	166.3	263.2	225.5	371.8	366.0	658.2
52	6.0	77.9	9.6	121.3	23.1	277.6	34.0	391.8	61.9	682.5
53	12.4	448.3	20.6	770.0	50.6	1811.8	75.5	2566.2	139.3	4231.8
54	23.0	457.2	38.7	779.7	97.8	1817.7	146.9	2562.2	273.2	4216.8
55	25.7	25.7	39.9	39.9	88.3	88.3	125.9	125.9	218.9	218.9
56	16.4	468.4	25.9	795.4	61.7	1838.6	90.4	2581.4	163.2	4222.4
57	17.2	469.7	28.9	793.8	75.3	1824.5	113.7	2557.8	212.7	4170.1
58	35.9	35.9	61.0	61.0	158.4	158.4	238.8	238.8	443.5	443.5
59	71.2	100.4	119.4	169.6	293.1	428.6	437.9	645.2	795.9	1160.5
60	24.1	123.7	40.5	207.7	103.5	528.9	157.5	785.1	297.2	1410.5
61	23.9	131.2	42.5	233.8	116.7	612.1	179.3	914.4	343.2	1603.5
62	12.8	12.8	21.7	21.7	57.0	57.0	86.6	86.6	159.1	159.1
63	28.7	40.8	53.4	73.5	146.5	192.6	224.5	286.3	406.2	505.2
64	2.2	171.8	4.2	300.4	10.9	753.1	15.5	1093.9	24.9	1867.2
65	16.5	184.7	32.1	325.8	93.4	820.5	144.6	1194.0	276.5	2030.3
66	28.9	5.6	48.7	11.3	124.4	46.2	188.4	69.4	353.8	95.4
67	4.6	190.3	8.0	333.3	24.3	852.9	36.5	1254.2	66.3	2120.1
68	8.3	197.3	15.7	345.7	43.1	878.2	66.1	1285.9	126.9	2159.1
69	37.9	37.9	58.0	58.0	127.6	127.6	181.7	181.7	316.4	316.4
70	34.4	218.3	56.9	388.4	124.3	970.4	179.1	1403.4	314.9	2324.5
71	73.9	73.9	103.1	103.1	188.0	188.0	242.9	242.9	361.4	361.4
72	59.3	235.7	86.4	410.6	165.2	1011.5	218.9	1455.2	336.3	2396.1
73	20.5	20.5	38.2	38.2	104.3	104.3	158.6	158.6	285.7	285.7
74	35.1	252.5	53.4	434.7	115.9	1050.5	163.8	1503.6	280.5	2447.8
75	13.1	263.8	26.8	453.1	82.2	1083.5	128.6	1538.0	246.6	2489.7
76	232.6	232.6	342.7	342.7	673.1	673.1	904.7	904.7	1427.2	1427.2
77	175.1	400.0	251.1	578.1	482.1	1099.7	639.0	1455.0	979.5	2229.8
78	84.7	429.6	120.9	603.1	232.8	1107.1	309.0	1450.6	476.7	2205.1
79	25.0	409.8	36.4	571.6	69.1	1032.2	92.4	1348.1	146.1	2040.2
80	40.7	640.8	62.6	906.7	133.9	1708.2	187.6	2269.2	317.6	3510.5
81	73.8	654.0	110.1	923.1	222.0	1746.8	301.9	2323.7	483.8	3605.2
82	158.7	668.7	218.6	948.3	390.6	1797.4	500.9	2385.8	762.3	3698.0
83	12.2	12.2	26.5	26.5	85.6	85.6	135.9	135.9	265.7	265.7
84	20.2	891.8	29.0	1347.1	56.3	3064.5	76.6	4264.9	124.5	6809.1
85	27.5	890.6	47.1	1351.3	123.4	3061.3	188.0	4257.2	355.6	6787.4
Little Lehigh Creek										
86	11.5	1263.7	16.9	2164.2	34.4	5079.1	47.3	7120.2	77.8	11576.6

	1 YEAR		2 YEAR		10 YEAR		25 YEAR		100 YEAR	
SUBAREA NO.	SUBAREA PEAK	TOTAL PEAK	SUBAREA PEAK	TOTAL PEAK	SUBAREA PEAK	TOTAL PEAK	SUBAREA PEAK	TOTAL PEAK	SUBAREA PEAK	TOTAL PEAK
Little Lehigh Creek, cont.										
87	100.8	1275.1	150.2	2186.2	315.0	5128.1	434.7	7180.4	714.0	11649.5
88	62.7	62.7	97.6	97.6	222.8	222.8	319.2	319.2	557.5	557.5
89	18.6	18.6	27.7	27.7	57.5	57.5	80.2	80.2	135.8	135.8
90	34.7	98.7	49.4	146.9	91.3	312.0	120.3	437.1	183.9	744.7
91	34.1	106.8	52.1	160.1	112.5	351.2	158.1	499.9	268.6	866.9
92	12.9	1305.2	19.4	2241.4	41.6	5243.9	58.4	7330.0	99.4	11860.6
93	11.8	1306.9	20.8	2242.7	54.6	5242.7	83.4	7324.0	159.3	11840.3
94	32.9	32.9	54.8	54.8	137.1	137.1	205.4	205.4	381.3	381.3
95	6.8	36.9	14.4	64.0	46.3	172.3	73.2	266.2	142.5	507.7
96	13.5	1328.0	22.8	2276.7	55.3	5299.5	81.7	7389.4	149.4	11919.2
97	22.9	22.9	34.3	34.3	68.1	68.1	92.5	92.5	149.3	149.3
98	20.0	1333.7	32.0	2284.6	75.6	5309.2	110.3	7402.6	197.8	11931.7
99	44.6	44.6	63.7	63.7	123.6	123.6	166.4	166.4	266.5	266.5
100	9.0	1336.1	17.2	2287.4	48.6	5311.0	75.9	7399.3	148.7	11917.6
101	2.9	1335.8	4.5	2286.8	10.9	5309.2	15.7	7395.8	27.6	11910.3
102	87.9	1337.2	128.9	2288.4	261.0	5304.4	355.6	7382.0	576.2	11873.1
103	43.0	43.0	63.0	63.0	126.4	126.4	171.2	171.2	276.1	276.1
104	43.8	43.8	65.4	65.4	140.6	140.6	195.4	195.4	327.0	327.0
105	18.8	1344.0	31.5	2298.4	81.7	5316.4	123.0	7392.8	229.9	11879.5
106	3.0	1343.0	6.3	2295.9	20.0	5308.3	31.5	7379.4	61.5	11852.4
107	15.8	1342.2	25.2	2294.3	56.5	5302.5	80.5	7369.8	141.2	11832.9
Swabia Creek										
108	99.5	99.5	172.7	172.7	489.6	489.6	738.3	738.3	1402.1	1402.1
109	78.0	75.6	144.6	137.2	368.7	343.4	555.8	514.8	1043.3	972.0
110	15.0	189.8	26.8	333.7	61.8	881.2	88.4	1352.5	148.5	2533.5
111	26.1	199.9	46.8	353.1	109.2	948.3	159.9	1439.5	292.7	2696.0
112	27.1	210.8	44.4	379.8	104.2	1016.8	150.5	1544.2	268.9	2780.6
113	22.7	22.7	36.1	36.1	87.3	87.3	122.3	122.3	212.7	212.7
114	21.9	21.9	35.7	35.7	91.3	91.3	129.1	129.1	230.9	230.9
115	26.4	67.3	54.8	116.9	190.7	349.8	293.9	518.4	554.0	947.9
116	9.7	9.7	18.4	18.4	50.8	50.8	75.2	75.2	132.9	132.9
117	11.3	86.4	20.2	152.7	52.8	450.4	79.1	645.0	141.1	1172.8
118	16.1	304.3	27.2	530.4	71.5	1482.6	108.2	2237.8	200.9	4015.1
119	16.0	16.0	28.3	28.3	81.3	81.3	128.1	128.1	251.5	251.5
120	51.5	296.4	81.5	552.4	194.0	1588.7	284.4	2376.5	517.9	4239.6
121	28.0	294.3	46.2	557.7	115.1	1620.8	171.7	2413.5	316.1	4272.2
122	13.8	13.8	29.4	29.4	91.4	91.4	143.2	143.2	274.4	274.4
123	39.2	206.4	64.8	583.8	163.7	1638.8	247.6	2401.2	464.0	4156.5
124	53.8	309.3	77.5	588.2	147.4	1642.2	195.9	2395.0	305.1	4116.8
125	100.6	318.6	143.8	605.8	270.8	1667.9	357.3	2426.2	549.0	4150.6
126	37.0	37.0	68.1	68.1	205.0	205.0	308.1	308.1	586.9	586.9
127	58.3	93.6	80.8	143.1	155.3	337.5	205.5	475.1	328.1	827.5
128	45.7	337.0	64.3	652.2	125.1	1763.8	169.1	2542.9	265.6	4311.1
129	30.0	338.7	45.5	657.9	95.3	1772.5	131.7	2551.5	218.2	4306.0
130	50.7	50.7	84.6	84.6	203.7	203.7	292.9	292.9	529.6	529.6
131	53.1	92.8	78.1	142.1	158.5	301.9	220.5	418.7	370.9	739.1

SUBAREA NO.	1 YEAR SUBAREA PEAK	1 YEAR TOTAL PEAK	2 YEAR SUBAREA PEAK	2 YEAR TOTAL PEAK	10 YEAR SUBAREA PEAK	10 YEAR TOTAL PEAK	25 YEAR SUBAREA PEAK	25 YEAR TOTAL PEAK	100 YEAR SUBAREA PEAK	100 YEAR TOTAL PEAK
Swabis Creek , cont.										
132	111.5	437.4	160.6	718.9	317.9	1877.1	426.8	2672.8	682.1	4449.8
133	43.7	432.1	67.0	727.0	147.8	1871.0	210.4	2649.9	364.7	4381.5
Little Lehigh Creek										
134	1.8	1450.5	6.1	2473.2	18.3	5642.7	28.2	7816.6	49.7	12476.2
135	2.6	1450.3	6.8	2472.4	19.8	5640.8	29.3	7815.3	49.7	12474.2
136	27.5	27.5	45.7	45.7	106.2	106.2	153.7	153.7	276.8	276.8
137	31.7	55.5	51.5	90.5	126.1	213.8	181.2	297.6	321.2	530.9
138	88.1	133.4	128.5	200.3	256.4	412.2	346.5	531.7	557.3	862.2
139	32.8	1463.6	53.9	2489.7	135.3	5665.9	201.5	7844.9	372.8	12511.1
140	32.1	1460.3	47.7	2482.9	123.5	5649.7	176.9	7819.6	307.0	12462.9
141	23.6	1461.2	39.7	2483.0	94.0	5646.7	136.4	7808.6	243.7	12437.1
Leibert Creek										
142	15.6	15.6	25.3	25.3	65.7	65.7	97.3	97.3	173.9	173.9
143	50.3	59.6	84.8	97.4	193.0	213.8	276.7	295.3	489.7	519.7
144	16.3	65.3	29.3	112.6	80.3	274.6	126.6	407.2	245.7	732.3
145	15.1	15.1	26.5	26.5	78.2	78.2	122.4	122.4	234.4	234.4
146	5.7	20.4	13.5	39.8	36.5	113.7	57.3	177.9	111.3	335.1
147	52.1	109.6	89.8	202.7	206.0	509.3	297.8	760.6	529.5	1368.1
148	17.9	116.6	34.8	225.0	115.9	572.0	177.6	836.7	342.5	1476.3
149	25.6	130.4	40.2	242.5	91.9	622.8	130.7	913.7	227.0	1612.8
150	35.6	157.2	54.7	265.7	120.2	683.7	167.1	1002.3	280.9	1759.5
151	48.1	187.9	68.5	300.9	133.1	720.4	176.5	1050.0	274.6	1833.8
152	200.0	199.6	288.5	287.0	567.8	561.3	755.1	744.7	1177.4	1156.8
153	81.2	435.1	116.2	635.8	222.2	1192.9	293.8	1517.2	451.7	2325.1
154	41.1	431.0	60.2	626.9	126.0	1197.3	171.8	1554.4	278.6	2433.1
Little Lehigh Creek										
155	2.2	1498.7	6.7	2536.3	20.5	5725.0	32.3	7900.4	62.1	12552.9
156	10.2	1496.9	17.0	2532.3	39.5	5714.1	57.2	7886.0	102.4	12524.9
157	16.7	16.7	24.4	24.4	56.6	56.6	79.5	79.5	137.2	137.2
158	71.4	1495.8	105.8	2527.9	240.7	5701.1	336.8	7863.5	577.5	12481.0
159	100.0	100.0	144.0	144.0	293.9	293.9	392.4	392.4	621.7	621.7
160	74.9	142.7	113.1	204.1	249.8	427.7	343.3	577.3	567.2	941.0
161	151.6	151.6	207.4	207.4	384.5	384.5	496.6	496.6	744.7	744.7
162	179.2	414.3	254.1	575.7	482.1	1021.4	633.4	1289.2	963.9	1901.0
163	9.4	1503.0	20.8	2538.1	84.6	5711.0	131.4	7871.3	258.2	12480.1
164	10.2	1501.6	16.0	2534.9	41.7	5701.8	59.7	7857.9	106.3	12455.0
165	16.6	16.6	25.9	25.9	62.0	62.0	89.3	89.3	159.1	159.1
166	54.8	1503.3	85.0	2536.0	200.9	5700.2	285.5	7853.8	498.0	12443.9
167	1.2	1503.2	3.2	2535.6	14.9	5699.7	23.2	7851.7	44.8	12440.1
168	74.2	1502.6	106.9	2533.5	216.2	5691.0	290.6	7838.0	460.3	12412.3
169	102.8	1502.6	148.2	2532.3	301.7	5685.0	406.7	7825.2	647.2	12385.5
170	61.8	1500.6	88.1	2527.4	180.6	5671.1	248.4	7803.2	403.0	12345.7
171	46.6	1498.8	66.2	2523.0	133.9	5657.8	178.7	7783.2	285.3	12308.9
Cedar Creek										
172	64.0	64.0	93.1	93.1	184.5	184.5	252.3	252.3	413.8	413.8
173	33.1	33.1	49.4	49.4	99.5	99.5	137.1	137.1	227.1	227.1

SUBAREA NO.	1 YEAR SUBAREA PEAK	1 YEAR TOTAL PEAK	2 YEAR SUBAREA PEAK	2 YEAR TOTAL PEAK	10 YEAR SUBAREA PEAK	10 YEAR TOTAL PEAK	25 YEAR SUBAREA PEAK	25 YEAR TOTAL PEAK	100 YEAR SUBAREA PEAK	100 YEAR TOTAL PEAK
Cedar Creek, cont.										
174	66.6	153.4	102.0	222.3	202.0	420.5	274.6	569.3	445.9	886.0
175	30.0	30.0	44.3	44.3	97.3	97.3	136.0	136.0	230.3	230.3
176	253.2	369.1	372.0	533.1	733.0	998.9	984.6	1301.4	1560.5	1972.5
177	51.4	375.8	77.5	540.7	175.9	1017.1	244.7	1316.1	410.6	2010.4
178	23.9	375.6	38.8	570.9	103.2	1037.1	149.6	1367.4	268.6	2131.5
179	112.1	112.1	163.7	163.7	322.6	322.4	431.1	430.8	673.1	672.5
180	15.6	438.8	22.2	659.7	51.2	1161.2	70.4	1526.4	114.6	2369.7
181	139.4	139.4	203.2	203.2	402.8	402.8	541.1	541.1	854.5	854.5
182	73.9	183.6	112.1	266.7	243.2	527.3	339.1	711.4	568.0	1141.7
183	137.3	137.3	184.3	184.3	319.2	319.2	417.1	417.1	612.9	612.9
184	16.4	104.0	25.6	143.2	54.2	252.4	76.1	322.6	132.1	473.7
185	3.8	270.2	6.2	381.9	14.8	723.4	21.2	963.7	36.1	1510.0
186	92.6	92.6	140.2	140.2	291.1	291.1	400.9	400.9	659.2	659.2
187	66.2	367.6	98.1	535.1	204.5	1059.9	286.6	1436.2	488.3	2291.3
188	133.4	133.4	182.4	182.4	347.7	347.7	460.2	460.2	720.3	720.3
189	158.1	421.6	224.7	608.5	429.1	1260.7	568.6	1713.0	882.7	2779.4
190	117.4	508.7	162.7	619.5	292.5	1290.8	376.1	1756.7	564.7	2803.5
191	75.4	510.6	108.0	628.8	210.7	1315.5	279.8	1798.9	433.5	2869.8
192	12.6	895.8	17.4	1277.0	35.4	2304.5	46.7	3142.1	74.5	5058.2
193	70.3	10.5	101.0	15.3	202.3	47.8	271.3	115.7	427.8	324.4
194	114.6	118.6	157.7	162.6	292.6	299.8	377.5	386.4	576.8	586.3
195	48.1	48.1	66.0	66.0	113.6	113.6	145.1	145.1	209.8	209.8
196	14.7	178.3	19.4	243.4	34.0	428.9	42.2	552.7	60.0	8369.2
197	74.9	74.8	104.9	104.8	197.1	196.7	257.9	257.2	392.8	391.3
198	31.5	276.8	44.1	378.9	94.5	656.5	129.7	854.1	215.0	1306.6
199	163.6	907.4	222.6	1259.2	428.3	2442.2	560.9	3303.2	881.6	5241.4
200	36.0	897.5	51.0	1245.8	98.7	2436.6	130.8	3293.0	202.2	5215.3
201	49.4	899.8	68.8	1246.7	127.9	2446.0	167.0	3290.5	256.2	5205.5
202	68.9	894.2	96.7	1244.1	179.2	2447.9	233.3	3290.2	349.7	5202.1
203	57.1	57.1	81.5	81.5	159.1	159.1	211.3	211.3	328.7	328.7
204	97.1	891.5	10.3	1247.6	254.5	2463.6	334.0	3307.6	525.6	5219.1
205	21.0	21.0	29.4	29.4	56.2	56.2	74.7	74.7	120.6	120.6
206	9.2	888.1	14.1	1244.9	34.5	2462.8	49.6	3303.2	86.9	5207.3
207	12.4	884.8	17.5	1241.1	36.2	2457.1	48.5	3297.5	79.0	5198.0
Little Lehigh Creek										
208	12.7	1545.7	18.9	2588.5	42.2	5753.7	58.8	7895.1	98.5	12443.2
209	336.1	1542.7	456.7	2579.5	819.9	5724.5	1071.7	7851.4	1623.6	12364.5
Trout Creek										
210	24.1	24.1	36.9	36.9	87.5	87.5	123.0	123.0	211.7	211.7
211	52.2	75.9	76.4	111.2	170.2	249.7	232.4	343.0	381.0	569.4
212	10.2	10.2	16.0	16.0	77.1	77.1	119.3	119.3	230.1	230.1
213	122.6	184.0	172.4	249.4	352.6	446.5	472.9	630.1	754.1	1086.6
214	79.5	250.4	116.3	341.9	283.4	682.9	394.2	876.0	664.3	1498.4
215	70.4	306.1	100.0	418.6	197.6	780.6	262.6	1003.0	407.4	1627.4
216	10.7	315.9	17.5	435.4	56.7	831.3	83.4	1072.8	152.7	1760.4
217	196.8	475.9	285.2	668.6	581.9	1133.8	782.7	1451.2	1240.4	2261.9
218	87.2	87.2	127.3	127.3	259.8	259.8	349.9	349.9	552.9	552.9

	1 YEAR		2 YEAR		10 YEAR		25 YEAR		100 YEAR	
SUBAREA NO.	SUBAREA PEAK	TOTAL PEAK	SUBAREA PEAK	TOTAL PEAK	SUBAREA PEAK	TOTAL PEAK	SUBAREA PEAK	TOTAL PEAK	SUBAREA PEAK	TOTAL PEAK
Trout Creek, cont.										
219	223.1	271.0	314.7	378.2	584.5	705.2	762.5	919.3	1142.4	1351.1
220	66.4	704.4	89.5	971.8	165.5	1712.8	215.0	2105.6	332.2	3071.0
221	73.0	718.4	103.3	988.9	194.4	1759.2	354.6	2175.7	386.4	3168.9
222	68.6	704.3	92.6	968.5	175.3	1750.5	228.1	2190.2	353.9	3209.0
223	39.7	705.5	52.1	972.0	97.2	1753.7	127.7	2198.0	196.9	3219.9
Little Lehigh Creek										
224	6.5	1558.8	9.4	2596.9	20.9	5748.8	28.1	7877.3	44.2	12393.2
225	114.1	1551.7	156.6	2593.1	280.9	5737.4	365.5	7859.2	553.2	12360.8
226	132.8	1554.8	188.8	2594.7	367.5	5738.7	487.3	7859.5	753.2	12359.8

¶ 25-J Acceptable Non-Infiltration BMPs.

The following are acceptable non-infiltration BMPs, together with the recommended reference for the design of each BMP. The internet web addresses identified for each design reference made those references available as of January 2004, and are included solely for the convenience of the reader. These web sites are not maintained by the Borough and may be changed or eliminated at any time.

Best Management Practice	Design Reference
Bioretention	Low Impact Development design Strategies, Prince George's County, MD, June 1999 (www.co.pg.md.us/Government/AgencyIndex/DER/PPD/LID/LiDNatl.pdf)
Capture/Reuse*	Texas Guide to Rainwater Harvesting, 2nd Edition, Texas Water Development Board, Center for Maximum Potential Building Systems, 1997 (www.twdb.state.tx.us/publications/reports/ RainHarv.pdf)
Constructed Wetlands	2000 Maryland Stormwater Design Manual, Maryland Department of the Environment (www.mde.state.md.us)
Minimum Disturbance/ Minimum Maintenance Practices	Conservation Design for Stormwater Management, Delaware Department of Natural Resources and Brandywine Conservancy, September 1997 (www.dnrec.state.de.us/dnrec2000/Divisions/Soil/Stormwater/Apps/DesignManualRequest.htm)
Oil/Water Separators	Georgia Stormwater Management Manual Volume 2 Technical Handbook, August 2001 (www.georgiastormwater.com)
Sediment Traps/ Catch Basin Sumps	U.S. Environmental Protection Agency's Post-Construction Storm Water Management in New Development & Redevelopment BMP Fact Sheet for "Catch Basins/Catch Basin Insert" (cfpub.epa.gov/npdes/stormwater/menuofbmps/post_7.cfm)
Significant Reduction of Existing Impervious Cover	N/A
Stormwater Filters (Sand, Peat, Compost, etc.)	Design of Stormwater Filtering Systems, Claytor, R. and Schueler, T., Center for Watershed Protection, December 1996 (www.cwp.org)
Trash/Debris Collectors in Catch Basins	Pennsylvania Handbook of BMPs for Developing Areas (www.dep.state.pa.us), or the latest Pennsylvania Department of Environmental Protection Manual.
Vegetated Buffers/ Filter Strips	Pennsylvania Handbook of BMPs for Developing Areas (www.dep.state.pa.us), or the latest Pennsylvania Department of Environmental Protection Manual.

Best Management Practice	Design Reference
Vegetated Roofs	Roof Gardens: History, Design, and Construction. Osmundson, T., W.W. Norton & Co., 1998 (www.wwnorton.com)
Vegetated Swales/ Filter Strips	2000 Maryland Stormwater Design Manual, Maryland Department of the Environment (www.mde.state.md.us)
Water Quality Inserts for Inlets	Pennsylvania Handbook of BMPs for Developing Areas (www.dep.state.pa.us), or the latest Pennsylvania Department of Environmental Protection Manual.
Wet Detention Ponds	Pennsylvania Handbook of BMPs for Developing Areas (www.dep.state.pa.us), or the latest Pennsylvania Department of Environmental Protection Manual.

* If this BMP is used to treat the entire WQv, then only one BMP is required because of this BMP's superior water quality performance.

¶ 25-K Pretreatment Methods for Hot Spot Land Uses.

The following are acceptable methods for pre-treatment of stormwater runoff from Hot Spot Land Uses. Design references for certain of these methods are listed in Appendix ¶ 25-L.

Hot Spot Land Use	Pre-treatment Methods
Vehicle Maintenance and Repair Facilities, including Auto Parts Stores	• Oil/Water Separators • 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	• Oil/Water Separators • Water Quality Inserts for Inlets • Spill Prevention and Response Program
Storage Areas for Public Works	• Oil/Water Separators • Sediment Traps/Catch Basin Sumps • Water Quality Inserts for 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

Hot Spot Land Use	Pre-treatment Methods
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.

¶ 25-L Design References for Hot Spot Land Use Pretreatment Methods.

The following are design references for certain pre-treatment methods for Hot Spot Land Uses under Appendix ¶ 25-K. The internet web addresses identified for each design reference made those references available as of January 2004, and are included solely for the convenience of the reader. These web sites are not maintained by the Borough and may be changed or eliminated at any time.

Pre-treatment Method	Design Reference
Constructed Wetlands	2000 Maryland Stormwater Design Manual, Maryland Department of the Environment (www.mde.state.md.us)
Diversion of Stormwater away from Potential Contamination Areas	Pennsylvania Handbook of BMPs for Developing Areas (www.dep.state.pa.us), or the latest Pennsylvania Department of Environmental Protection Manual.
Oil/Water Separators	Georgia Stormwater Management Manual Volume 2 Technical Handbook, August 2001 (www.georgiastormwater.com)
Sediment Traps/Catch Basin Sumps	U.S. Environmental Protection Agency's Post-Construction Storm Water Management in New Development & Redevelopment BMP Fact Sheet for "Catch Basins/Catch

Pre-treatment Method	Design Reference
	Basin Insert" (cfpub.epa.gov/npdes/stormwater/menuofbmps/post_7.cfm)
Stormwater Collection and Reuse (especially for irrigation)	Texas Guide to Rainwater Harvesting, 2nd Edition, Texas Water Development Board, Center for Maximum Potential Building Systems, 1997 (www.twdb.state.tx.us/publications/reports/ RainHarv.pdf)
Stormwater Filters (Sand, Peat, Compost, etc.)	Design of Stormwater Filtering Systems, Claytor, R. and Schueler, T., Center for Watershed Protection, December 1996 (www.cwp.org)
Trash/Debris Collectors in Catch Basins	Pennsylvania Handbook of BMPs for Developing Areas (www.dep.state.pa.us), or the latest Pennsylvania Department of Environmental Protection Manual.
Vegetated Swales/ Filter Strips	2000 Maryland Stormwater Design Manual, Maryland Department of the Environment (www.mde.state.md.us)
Water Quality Inserts for Inlets	Pennsylvania Handbook of BMPs for Developing Areas (www.dep.state.pa.us), or the latest Pennsylvania Department of Environmental Protection Manual.

¶ 25-M Low Impact Development Practices.

Alternative Approach for Managing Stormwater Runoff

Natural hydrologic conditions may be altered radically by poorly planned development practices, such as introducing unneeded impervious surfaces, destroying existing drainage swales, constructing unnecessary storm sewers, and changing local topography. A traditional drainage approach of development has been to remove runoff from a site as quickly as possible and capture it in a detention basin. This approach leads ultimately to the degradation of water quality as well as expenditure of additional resources for detaining and managing concentrated runoff at some downstream location.

The recommended alternative approach is to promote practices that will minimize post-development runoff rates and volumes, which will minimize needs for artificial conveyance and storage facilities. To simulate pre-development hydrologic conditions, forced infiltration is often necessary to offset the loss of infiltration by creation of impervious surfaces. The ability of the ground to infiltrate depends upon the soil types and its conditions. Preserving natural hydrologic conditions requires careful alternative site design considerations. Site design practices include preserving natural drainage features, minimizing impervious surface area, reducing the hydraulic connectivity of impervious surfaces, and protecting natural depression storage. A well-designed site will contain a mix of all those features. The following describes various techniques to achieve the alternative approach:

- **Preserving Natural Drainage Features.** Protecting natural drainage features, particularly vegetated drainage swales and channels, is desirable because of their ability to infiltrate and attenuate flows and to filter pollutants. However, this objective is often not accomplished in

land development. In fact, commonly held drainage philosophy encourages just the opposite pattern — streets and adjacent storm sewers typically are located in the natural headwater valleys and swales, thereby replacing natural drainage functions with a completely impervious system. As a result, runoff and pollutants generated from impervious surfaces flow directly into storm sewers with no opportunity for attenuation, infiltration, or filtration. Developments designed to fit site topography also minimizes the amount of grading on site.

- **Protecting Natural Depression Storage Areas.** Depressional storage areas have no surface outlet, or drain very slowly following a storm event. They can be commonly seen as ponded areas in farm fields during the wet season or after large runoff events. Traditional development practices eliminate these depressions by filling or draining, thereby obliterating their ability to reduce surface runoff volumes and trap pollutants. The volume and release-rate characteristics of depressions should be protected in the design of the development site. The depressions can be protected by simply avoiding the depression or by incorporating its storage as additional capacity in required detention facilities.

- **Avoiding Introduction of Impervious Areas.** Careful site planning should consider reducing impervious coverage to the maximum extent possible. Building footprints, sidewalks, driveways and other features producing impervious surfaces should be evaluated to minimize impacts on runoff.

- **Reducing the Hydraulic Connectivity of Impervious Surfaces.** Impervious surfaces are significantly less of a problem if they are not directly connected to an impervious conveyance system (such as storm sewer). Two basic ways to reduce hydraulic connectivity are routing of roof runoff over lawns and reducing the use of storm sewers. Site grading should promote increasing travel time of stormwater runoff, and should help reduce concentration of runoff to a single point in the development.

- **Routing Roof Runoff Over Lawns.** Roof runoff can be easily routed over lawns in most site designs. The practice discourages direct connections of downspouts to storm sewers or parking lots. The practice also discourages sloping driveways and parking lots to the street. By routing roof drains and crowning the driveway to run off to the lawn, the lawn is essentially used as a filter strip.

- **Reducing the Use of Storm Sewers.** By reducing use of storm sewers for draining streets, parking lots, and back yards, the potential for accelerating runoff from the development can be greatly reduced. The practice requires greater use of swales and may not be practical for some development sites, especially if there are concerns for areas that do not drain in a "reasonable" time. The practice requires educating local citizens and public works officials, who expect runoff to disappear shortly after a rainfall event.

- **Reducing Street Widths.** Street widths can be reduced by either eliminating on-street parking or by reducing roadway widths. Municipal planners and traffic designers should encourage narrower neighborhood streets which ultimately could lower maintenance.

- **Limiting Sidewalks to One Side of the Street.** A sidewalk on one side of the street may suffice in low-traffic neighborhoods. The lost sidewalk could be replaced with bicycle/recreational trails that follow back-of-lot lines. Where appropriate, backyard trails should be constructed using pervious materials.

- **Using Permeable Paving Materials.** These materials include permeable interlocking concrete paving blocks or porous bituminous concrete. Such materials should be considered as alternatives to conventional pavement surfaces, especially for low use surfaces such as driveways, overflow parking lots, and emergency access roads.
- **Reducing Building Setbacks.** Reducing building setbacks reduces driveway and entry walks and is most readily accomplished along low-traffic streets where traffic noise is not a problem.
- **Constructing Cluster Developments.** Cluster developments can also reduce the amount of impervious area for a given number of lots. The biggest savings is in street length, which also will reduce costs of the development. Cluster development clusters the construction activity onto less-sensitive areas without substantially affecting the gross density of development.

¶ 25-N Stormwater Best Manangement Practices Operations and Maintenance Agreement (Format).

THIS AGREEMENT, is made and entered into this _____ day of _____, 20___, by and between _____, (the "**Landowner**"), and the Borough of Alburtis, Lehigh County, Pennsylvania (the "**Borough**").

WHEREAS, the Landowner is the owner of certain real property as recorded by deed in the land records of Lehigh County, Pennsylvania, at document number _____ {or Deed Book Volume ____, page ____} (the "**Property**"); and

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

WHEREAS, the stormwater management BMP Operations and Maintenance Plan approved by the Borough (the "**Plan**") for the Property, which is attached hereto as **Appendix A** and made part hereof, as approved by the Borough, provides for management of stormwater within the confines of the Property through the use of Best Management Practices (BMP's); and

WHEREAS, the Borough, and the Landowner, his {her/their/its} successors and assigns, agree that the health, safety, and welfare of the residents of the Borough and the protection and maintenance of water quality require that on-site stormwater Best Management Practices be constructed and maintained on the Property; and

WHEREAS, for the purposes of this agreement, the following definitions shall apply:

- BMP – "Best Management Practice;" activities, facilities, designs, measures or procedures used to manage stormwater impacts from land development, to protect and maintain water quality and groundwater recharge and to otherwise meet the purposes of the Borough's Stormwater Management Ordinance (Chapter 25 of the Alburtis Codified Ordinances), including but not limited to infiltration trenches, seepage pits, filter strips, bioretention, wet ponds, permeable paving, rain gardens, grassed swales, forested buffers, sand filters and detention basins.

- Infiltration Trench – A BMP surface structure designed, constructed, and maintained for the purpose of providing infiltration or recharge of stormwater into the soil and/or groundwater aquifer,
- Seepage Pit – An underground BMP structure designed, constructed, and maintained for the purpose of providing infiltration or recharge of stormwater into the soil and/or groundwater aquifer,
- Rain Garden – A BMP overlain with appropriate mulch and suitable vegetation designed, constructed, and maintained for the purpose of providing infiltration or recharge of stormwater into the soil and/or underground aquifer; and

WHEREAS, the Borough requires, through the implementation of the Plan, that stormwater management BMPs as required by said Plan and the Borough's Stormwater Management Ordinance (Chapter 25 of the Alburtis Codified Ordinances) be constructed and adequately operated and maintained by the Landowner, his successors and assigns;

NOW, THEREFORE, in consideration of the foregoing, the mutual covenants contained herein, and the following terms and conditions, the parties hereto agree as follows, intending to be legally bound:

1. The BMPs shall be constructed by the Landowner in accordance with the plans and specifications identified in the Plan.

2. The Landowner shall operate and maintain the BMP(s) as shown on the Plan in good working order acceptable to the Borough and in accordance with the specific maintenance requirements noted on the Plan.

3. The Landowner hereby grants permission to the Borough, its authorized agents and employees, to enter upon the Property, at reasonable times and upon presentation of proper identification, to inspect the BMP(s) whenever it deems necessary. Whenever possible, the Borough shall notify the Landowner prior to entering the Property.

4. In the event the Landowner fails to operate and maintain the BMP(s) as shown on the Plan in good working order acceptable to the Borough, the Borough or its representatives may enter upon the Property and take whatever action is deemed necessary to maintain said BMP(s). This provision shall not be construed to allow the Borough to erect any permanent structure on the land of the Landowner. It is expressly understood and agreed that the Borough is under no obligation to maintain or repair said facilities, and in no event shall this Agreement be construed to impose any such obligation on the Borough.

5. In the event the Borough, pursuant to this Agreement, performs work of any nature, or expends any funds in performance of said work for labor, use of equipment, supplies, materials, and the like, the Landowner shall reimburse the Borough for all expenses (direct and indirect) incurred within ten (10) days of receipt of invoice from the Borough, and if not timely paid, Landlord agrees that the Borough may file a municipal lien against the Property for one hundred ten percent (110%) of the invoice amount, plus statutorily allowed fees, expenses, and costs.

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

7. The Landowner, his/her/its executors, administrators, assigns, and other successors in interests, hereby release and hold harmless the Borough and its employees and designated representatives from all damages, accidents, casualties, occurrences or claims which might arise or be asserted against said Borough, employees, and representatives from the construction, presence, existence, or maintenance of the BMP(s) by the Landowner or Borough. In the event that a claim is asserted against the Borough, its designated representatives or employees, the Borough shall promptly notify the Landowner, and the Landowner shall defend, at his/her/its own expense, any suit based on the claim. If any judgment or claims against the Borough or its employees or designated representatives shall be allowed, the Landowner shall pay all costs and expenses regarding said judgment or claim.

8. The Borough shall inspect the BMP(s) as necessary to ensure their continued functioning.

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

IN WITNESS WHEREOF, the parties have executed this Agreement as of the day and year first above written.

{Signatures, Attestations, Seals}

{Notarizations sufficient to permit recording of the Agreement}

¶ 25-O Disposition of Ordinance 263.

Ordinance 263	1981 Code, as added by Ord. 385	2003 Codified Ordinances
§ xx	§ 107-xx	§ 25-xx
Art. II	Ch 107, Art. II	Ch 25, Art. II
§ 702	§ 107-801	§ 25-801

¶ 25-P Disposition of 1981 Code, Chapter 107.

1981 Code, as added by Ord. 385	2003 Codified Ordinances
§ 107-xx	§ 25-xx
¶¶ 107-A to 107-I	¶¶ 25-A to 25-I

¶ 25-Q Derivation of Former Unofficial Chapter 107 to 1981 Code.

In 1989, General Code Publishers Corp. printed an unofficial codification of Ordinance 263 to Chapter 107 of the 1981 Code. Borough Council never added Ordinance 263 to the 1981 Code, and did not formally adopt any of the numbering and stylistic changes made by General Code Publishers Corp. Council adopted a new Chapter 107 by Ordinance 385 in 2001.

A copy of the GCP unofficial Chapter 107 prior to Ordinance 385 is provided with the on-line and CD-ROM versions of the Codified Ordinances.

The provisions of the GCP unofficial Chapter 107 were derived from Ordinance 263 as follows:

Unofficial Chapter 107	Ordinance 263
§ 107-1	§ 101
§ 107-2	§ 102
§ 107-3	§ 103
§ 107-4	§ 104
§ 107-5	§ 107
§ 107-6	Art. II
§ 107-7	§ 301
§ 107-8	§ 302
§ 107-9	§ 303
§ 107-10	§ 304
§ 107-11	§ 401
§ 107-12	§ 402
§ 107-13	§ 403
§ 107-14	§ 404
§ 107-15	§ 405
§ 107-16	§ 406
§ 107-17	§ 407
§ 107-18	§ 501
§ 107-19	§ 601
§ 107-20	§ 602
§ 107-21	§ 701
§ 107-22	§ 702

¶ 25-R Source Ordinances.

Ordinance 263	11-09-1988
Ordinance 385	01-10-2001
Ordinance 415	10-29-2003
Ordinance 434	03-30-2005

Ordinance 518	03-12-2014
Ordinance 526	01-28-2015