

Chapter 174

STORMWATER MANAGEMENT

ARTICLE I General Provisions

- § 174-1. Short title.
- § 174-2. Findings.
- § 174-3. Purpose.
- § 174-4. Statutory authority.
- § 174-5. Applicability.
- § 174-6. Compatibility with other requirements.

ARTICLE II Definitions and Word Usage

- § 174-7. Word usage.
- § 174-8. Definitions.

ARTICLE III Stormwater Management

- § 174-9. General requirements.
- § 174-10. Compliance with other permit requirements.
- § 174-11. Project plan requirements.
- § 174-12. Stormwater management districts.
- § 174-13. District implementation provisions.
- § 174-14. Design criteria for stormwater management facilities.
- § 174-15. Calculation methodology.
- § 174-16. Erosion and sediment control requirements.
- § 174-17. Water quality requirements.
- § 174-18. Groundwater recharge requirements.

- § 174-19. General protection requirements.
- § 174-20. Design criteria for stormwater management plans.
- § 174-21. BMP operations and maintenance requirements.

ARTICLE IV Drainage Plan Requirements

- § 174-22. General requirements.
- § 174-23. Exemptions.
- § 174-24. Drainage plan contents.
- § 174-25. Drainage plan submission.
- § 174-26. Drainage plan review.
- § 174-27. Modification of plans.
- § 174-28. Resubmission of disapproved drainage plans.
- § 174-29. Recording of documents.

ARTICLE V Inspections

- § 174-30. Schedule of inspections.
- § 174-31. Right of entry.

ARTICLE VI Fees and Expenses; Performance Guarantee; Maintenance and Monitoring

- § 174-32. Reimbursement of costs for review of plan.
- § 174-33. Expenses covered by fees.
- § 174-34. Additional costs.
- § 174-35. Performance guarantee.
- § 174-36. Maintenance responsibilities.

§ 174-37. Postconstruction maintenance and monitoring inspections.

**ARTICLE VII
Prohibitions**

§ 174-38. Prohibited discharges.

§ 174-39. Prohibited connections.

§ 174-40. Roof drains.

§ 174-41. Waste disposal prohibitions.

§ 174-42. Alteration of BMPs.

**ARTICLE VIII
Enforcement and Penalties**

§ 174-43. Notification.

[HISTORY: Adopted by the Borough Council of the Borough of Camp Hill 5-12-2004 by Ord. No. 1012, approved 5-12-2004. Amendments noted where applicable.]

GENERAL REFERENCES

Building construction — See Ch. 79.
Drainage facilities — See Ch. 100.
Sewers — See Ch. 168.

Streets and sidewalks — See Ch. 176.
Subdivision and land development — See Ch. 179.
Zoning — See Ch. 200.

**ARTICLE I
General Provisions**

§ 174-1. Short title.

This chapter shall be known and may be cited as the "Camp Hill Borough Stormwater Management Ordinance."

§ 174-2. Findings.

The governing body of the municipality finds that:

- A. Inadequate management of accelerated stormwater runoff resulting from development throughout a watershed increases runoff flows and velocities, contributes to erosion and sedimentation, overtaxes the carrying capacity of existing streams and storm sewers, greatly increases the cost of public facilities to convey and manage stormwater, undermines floodplain management and flood reduction efforts in upstream and downstream communities, reduces groundwater recharge, and threatens public health and safety.

- B. Inadequate planning and management of stormwater runoff resulting from land development and redevelopment throughout a watershed can also harm surface water resources by changing the natural hydrologic patterns, accelerating stream flows (which increase scour and erosion of streambeds and streambanks, thereby elevating sedimentation), destroying aquatic habitat and elevating aquatic pollutant concentrations and loadings such as sediments, nutrients, heavy metals and pathogens. Groundwater resources are also impacted through loss of recharge.
- C. These impacts happen mainly through a decrease in natural infiltration of stormwater.
- D. A comprehensive program of stormwater management, including reasonable regulation of development and activities causing loss of natural infiltration and accelerated erosion, is fundamental to the public health, safety, and welfare, and the protection of the people of the municipality and all the people of the commonwealth, their resources, and the environment.
- E. Public education on the control of pollution from stormwater is an essential component in successfully addressing stormwater.
- F. Federal and state regulations require certain municipalities to implement a program of stormwater controls. These municipalities are required to obtain a permit for stormwater discharges from their separate storm sewer systems under the National Pollutant Discharge Elimination System (NPDES).
- G. Nonstormwater discharges to municipal separate storm sewer systems can contribute to pollution of waters of the commonwealth.

§ 174-3. Purpose.

The purpose of this chapter is to promote health, safety, and welfare within the municipality by minimizing the damages described in § 174-2 of this chapter through provisions designed to:

- A. Manage accelerated runoff and erosion and sedimentation problems at their source by regulating activities that cause these problems.
- B. Provide review procedures, performance standards and design criteria for stormwater planning and management.
- C. Utilize and preserve the existing natural drainage systems.
- D. Manage stormwater impacts close to the runoff source, which requires a minimum of structures and relies on natural processes.
- E. Encourage recharge of groundwater where appropriate, and prevent degradation of groundwater quality.
- F. Maintain existing flows and quality of streams and watercourses in the municipality and the commonwealth.

- G. Meet legal water quality requirements under state law, including regulations at 25 Pa. Code § 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.
- H. Prevent streambank and streambed scour and erosion.
- I. Preserve and restore the flood-carrying capacity of streams.
- J. Provide performance standards and design criteria for watershed-wide stormwater management and planning.
- K. Provide for proper operations and maintenance of all permanent stormwater management facilities that are implemented in the municipality.
- L. Provide a mechanism to identify controls necessary to meet the NPDES permit requirements.
- M. Implement an illegal discharge detection and elimination program to address nonstormwater discharges into the municipality's separate storm sewer system.

§ 174-4. Statutory authority.

The municipality is empowered to regulate land use activities that affect stormwater runoff by the authority of the Act of July 31, 1968, P.L. 805, No. 247, the Municipalities Planning Code, as amended;¹ the Act of October 4, 1978, P.L. 864, Act 167, 32 P.S. § 680.1 et seq., as amended, the Stormwater Management Act; and the Act of February 1, 1966, as amended, 53 P.S. § 45101 et seq., the Borough Code.

§ 174-5. Applicability.

- A. This chapter applies to any land development activities within the municipality, all stormwater runoff entering into the municipality's separate storm sewer system from lands within the boundaries of the municipality and existing stormwater best management practices (BMPs).
- B. This chapter contains the stormwater management performance standards and design criteria that are necessary or desirable from a watershed-wide perspective. Local stormwater management design criteria (e.g., inlet spacing, inlet type, collection system design and details, outlet structure design, etc.) shall continue to also be regulated by the applicable municipal ordinances or at the Municipal Engineer's discretion.
- C. The following activities are defined as "regulated activities" and shall be regulated by this chapter:
 - (1) Land development.
 - (2) Subdivision.

1. Editor's Note: See 53 P.S. § 10101 et seq.

- (3) Construction of new or additional impervious or semipervious 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 management BMPs or appurtenances thereto.
 - (7) Earth disturbance.
- D. Earth disturbance activities and associated stormwater management activities are also regulated under existing state law and implementing regulations. This chapter shall operate in coordination with those parallel requirements; the requirements of this chapter shall be no less restrictive in meeting the purposes of this chapter than state law.

§ 174-6. Compatibility with other requirements.

- A. Approvals issued and actions taken pursuant to this chapter do not relieve the applicant of the responsibility to comply with or to secure required permits or approvals for activities regulated by any other applicable codes, rules, statutes, or ordinances. To the extent that this chapter imposes more requirements for stormwater management, the specific requirements contained in this chapter shall be followed.
- B. Nothing in this chapter shall be construed to affect any of the municipality's requirements regarding stormwater matters which do not interfere with the provisions of this chapter, such as local stormwater management design criteria (e.g., inlet spacing, inlet type, collection system design and details, outlet structure design, etc.)

**ARTICLE II
Definitions and Word Usage**

§ 174-7. Word usage.

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

- A. Words used in the present tense include the future tense; the singular number includes the plural, and the plural number includes the singular; words of masculine gender include feminine gender; and words of feminine gender include masculine gender.
- B. The word "includes" or "including" shall not limit the term to the specific example but is intended to extend its meaning to all other instances of like kind and character.
- C. The word "person" includes an individual, firm, association, organization, partnership, trust, company, corporation, or any other similar entity.
- D. The words "shall" and "must" are mandatory; the words "may" and "should" are permissive.

- E. The words "used or occupied" include the words "intended, designed, maintained, or arranged to be used, occupied or maintained."

§ 174-8. Definitions.

As used in this chapter, the following terms shall have the meanings indicated:

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

AGRICULTURAL ACTIVITIES — The work of producing crops and raising livestock, including tillage, plowing, disking, harrowing, pasturing and installation of conservation measures. Construction of new buildings or impervious area is not considered an agricultural activity.

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

APPLICANT — A landowner or developer who has submitted a drainage plan or filed an application for approval to engage in any regulated activities as defined in § 174-5 of this chapter.

BMP (BEST MANAGEMENT PRACTICE) — Activities, facilities, designs, measures or procedures used to manage stormwater impacts from regulated activities, to promote groundwater recharge and to otherwise meet the purposes of this chapter. BMPs include but are not limited to infiltration, filter strips, low-impact design, bioretention, wet ponds, permeable paving, grassed swales, forested buffers, sand filters and detention basins. Pennsylvania Handbook of Best Management Practices for Developing Areas, Spring 1998, or other credible source as approved by the Municipal Engineer.

BUILDING PERMIT — A permit or other approval issued by a municipality for construction and/or earth disturbance.

CCCD — Cumberland County Conservation District.

CHANNEL EROSION — The widening, deepening, and headward cutting of small channels and waterways due to erosion caused by moderate to large floods.

CISTERN — An underground reservoir or tank for storing rainwater.

CONSERVATION DISTRICT — The Cumberland County Conservation District (CCCD).

CULVERT — A structure with appurtenant works which carries a stream under or through an embankment or fill.

DAM — An artificial barrier, together with its appurtenant works, constructed for the purpose of impounding or storing water or another fluid or semifluid, or a refuse bank, fill or structure for highway, railroad or other purposes which does or may impound water or another fluid or semifluid.

DEP or PADEP — The Pennsylvania Department of Environmental Protection.

DESIGN STORM — The magnitude and temporal distribution of precipitation from a storm event measured in probability of occurrence (e.g., a five-year storm) and duration (e.g., 24 hours), used in the design and evaluation of stormwater management systems.

DETENTION BASIN — An impoundment structure designed to manage stormwater runoff by temporarily storing the runoff and releasing it at a predetermined rate.

DETENTION DISTRICT — Those subareas in which some type of detention is required to meet the plan requirements and the goals of Act 167.

DEVELOPER — A person, partnership, association, corporation, or other entity, or any responsible person therein or agent thereof, which undertakes any regulated activity of this chapter.

DEVELOPMENT SITE or PROJECT SITE — The specific tract of land for which a regulated activity is proposed.

DOWNSLOPE PROPERTY LINE — That portion of the property line of the lot, tract, or parcels of land being developed located such that all overland or pipe flow from the site would be directed towards it.

DRAINAGE CONVEYANCE FACILITY — A stormwater management facility designed to transmit stormwater runoff and shall include streams, channels, swales, pipes, conduits, culverts, storm sewers, etc.

DRAINAGE EASEMENT — A right granted by a landowner to a grantee allowing the use of private land for stormwater management purposes.

DRAINAGE PERMIT — A permit issued by the Borough governing body after the drainage plan has been approved. Said permit is issued prior to or with the final Borough approval.

DRAINAGE PLAN — The documentation of the stormwater management system, if any, to be used for a given development site, the contents of which are established in § 174-24 of this chapter.

EARTH DISTURBANCE — Any human activity, including, but not limited to, construction, mining, timber harvesting and grubbing, which alters, disturbs, or exposes the existing land surface.

EROSION — The movement of soil particles by the action of water, wind, ice, or other natural forces.

EROSION AND SEDIMENT POLLUTION CONTROL PLAN — A site-specific plan identifying BMPs to minimize accelerated erosion and sedimentation, pursuant to 25 Pa. Code Chapter 102.

EXISTING CONDITIONS — The initial condition of a project site prior to the proposed construction. If the initial condition of the site is undeveloped land, the land use shall be considered as "meadow" unless the natural land cover is proven to generate lower curve numbers or Rational "C" value, such as forested lands.

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

FLOODPLAIN — Any land area susceptible to inundation by water from any natural source or delineated by applicable Department of Housing and Urban Development Federal Insurance Administration Flood Hazard Boundary Maps as being a special flood hazard area. Also included are areas that comprise Group 13 soils, as listed in Appendix A of the Pennsylvania Department of Environmental Protection (PADEP) Technical Manual for Sewage Enforcement Officers (as amended or replaced from time to time by PADEP).

FLOODWAY — The channel of the watercourse and those portions of the adjoining floodplains that are reasonably required to carry and discharge the one-hundred-year frequency flood. Unless otherwise specified, the boundary of the floodway is as indicated on maps and flood insurance studies provided by FEMA. In an area where no FEMA maps or studies have defined the boundary of the one-hundred-year frequency floodway, it is assumed, absent evidence to the contrary, that the floodway extends from the stream to 50 feet from the top of the bank of the stream.

FOREST MANAGEMENT/TIMBER OPERATIONS — Planning and activities necessary for the management of forest land. These include timber inventory and preparation of forest management plans, silvicultural treatment, cutting budgets, logging road design and construction, timber harvesting, site preparation and reforestation.

FREEBOARD — A vertical distance between the elevation of the design high water and the top of a dam, levee, tank, basin, or diversion ridge. The space is required as a safety margin in a pond or basin.

GOVERNING BODY — The Camp Hill Borough Council, Cumberland County, Pennsylvania.

GRADE — A slope, usually of a road, channel or natural ground, specified in percent and shown on plans as specified herein. "To grade": to finish the surface of a roadbed, top of embankment or bottom of excavation.

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

GROUNDWATER RECHARGE — Replenishment of existing natural underground water supplies.

HYDROGRAPH — A graphical comparison of runoff being discharged from any particular site (measured in cubic feet per second) on the vertical axis, versus time (measured as time into the storm event such as hour one, two, three, etc.) on the horizontal axis.

IMPERVIOUS SURFACE — A surface that has been compacted or covered with material to the extent that it is highly resistant to infiltration by water, including, but not limited to, conventional impervious surfaces such as paved streets, roofs, compacted stone, and sidewalks. In addition, the following shall be considered impervious surfaces when used by motor vehicles: graveled areas, paver blocks, bricks, and cobblestone.

IMPOUNDMENT — A retention or detention basin designed to retain stormwater runoff and release it at a controlled rate.

INFILTRATION STRUCTURE — A structure designed to direct runoff into the ground (e.g., french drains, seepage pits, seepage trench).

INLET — A surface connection to a closed drain; a structure at the diversion end of a conduit; the upstream end of any structure through which water may flow.

LAND DEVELOPMENT —

- 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.
- B. Any subdivision of land.
- C. Earth disturbance, as defined herein.
- D. Land development in accordance with Section 503(1.1) of the Pennsylvania Municipalities Planning Code.

LAND/EARTH DISTURBANCE — Any activity involving the grading, tilling, digging, or filling of ground or the stripping of vegetation or any other activity that causes an alteration to the natural condition of the land.

MAIN STEM (MAIN CHANNEL) — Any stream segment or other runoff conveyance facility used as a reach in the Cedar Run hydrologic model.

MANNING EQUATION (MANNING FORMULA) — A method for calculation of velocity of flow (e.g., feet per second) and flow rate (e.g., cubic feet per second) in open channels based upon channel shape, roughness, depth of flow and slope. Open channels may include closed conduits so long as the flow is not under pressure.

MUNICIPALITY — Camp Hill Borough, Cumberland County, Pennsylvania.

NONPOINT SOURCE POLLUTION — Pollution that enters a watery body from diffuse origins in the watershed and does not result from discernible, confined, or discrete conveyances.

NPDES — National Pollutant Discharge Elimination System, the federal government's system for issuance of permits under the Clean Water Act, which is delegated to DEP in Pennsylvania.

NRCS — Natural Resource Conservation Service (previously SCS).

OPEN CHANNEL — A drainage element in which stormwater flows with an open surface. Open channels include, but shall not be limited to, natural and man-made drainageways, swales, streams, ditches, canals, and pipes flowing partly full.

OUTFALL — A point where the municipality's storm sewer system discharges to surface waters of the commonwealth.

OUTLET — Points of water disposal from a stream, river, lake, tidewater or artificial drain.

PARKING LOT STORAGE — Involves the use of impervious parking areas as temporary impoundments with controlled release rates during rainstorms.

PEAK DISCHARGE — The maximum rate of stormwater runoff from a specific storm event.

PENN STATE RUNOFF MODEL (CALIBRATED) — A computer-based hydrologic modeling technique.

PERSON — An individual, partnership, public or private association or corporation, or a governmental unit, public utility or any other legal entity whatsoever which is recognized by law as the subject of rights and duties.

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

PLANNING COMMISSION — The Camp Hill Borough Planning Commission.

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

POINT SOURCE — Any discernible, confined and discrete conveyance, including, but not limited to, any pipe, ditch, channel, tunnel, or conduit from which stormwater is or may be discharged.

RATIONAL FORMULA — A rainfall-runoff relation used to estimate peak flow.

REDEVELOPMENT — Development of land which has previously been developed, but not including building additions less than 5,000 square feet.

REGULATED ACTIVITIES — Actions or proposed actions that have an impact on stormwater runoff and that are specified in § 174-5 of this chapter.

RELEASE RATE — The percentage of predevelopment peak rate of runoff from a site or subarea to which the postdevelopment peak rate of runoff must be reduced to protect downstream areas.

RETENTION BASIN — An impoundment in which stormwater is stored and not released during the storm event. Stored water may be released from the basin at some time after the end of the storm.

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

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

ROOFTOP DETENTION — Temporary ponding and gradual release of stormwater falling directly onto flat roof surfaces by incorporating controlled-flow roof drains into building designs.

RUNOFF — Any part of precipitation that flows over the land surface.

SEDIMENTATION — The process by which mineral or organic matter is accumulated or deposited by the movement of water.

SEDIMENT BASIN — A barrier, dam, retention or detention basin located and designed to retain rock, sand, gravel, silt, or other material transported by water.

SEDIMENT POLLUTION — The placement, discharge or any other introduction of sediment into the waters of the commonwealth occurring from the failure to design, construct, implement or maintain control measures and control facilities in accordance with the requirements of this chapter.

SEEPAGE PIT/SEEPAGE TRENCH — An area of excavated earth filled with loose stone or similar coarse material, into which surface water is directed for infiltration into the ground.

SEPARATE STORM SEWER SYSTEM — A conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, artificial channels or storm drains) primarily used for collecting and conveying stormwater runoff.

SHEET FLOW — Runoff that flows over the ground surface as a thin, even layer, not concentrated in a channel.

SOIL COVER COMPLEX METHOD — A method of runoff computation developed by the NRCS that is based on relating soil type and land use/cover to a runoff parameter called curve number (CN).

SOIL GROUP, HYDROLOGIC — A classification of soils by the Soil Conservation Service into four runoff potential groups. The groups range from A soils, which are very permeable and produce little runoff, to D soils, which are not very permeable and produce much more runoff.

SPILLWAY — A depression in the embankment of a pond or basin which is used to pass peak discharge greater than the maximum design storm controlled by the pond.

STORAGE INDICATION METHOD — A reservoir routing procedure based on solution of the continuity equation (inflow minus outflow equals the change in storage), with "outflow" defined as a function of storage volume and depth.

STORM FREQUENCY — The number of times that a given storm "event" occurs or is exceeded on the average in a stated period of years. See "return period."

STORM SEWER — A system of pipes and/or open channels that convey intercepted runoff and stormwater from other sources, but excludes domestic sewage and industrial wastes.

STORMWATER — The total amount of precipitation reaching the ground surface.

STORMWATER MANAGEMENT FACILITY — Any structure, natural or man-made, that, due to its condition, design, or construction, conveys, stores, or otherwise affects stormwater runoff. Typical stormwater management facilities include, but are not limited to, detention and retention basins, open channels, storm sewers, pipes, infiltration structures, water quality BMPs and groundwater recharge BMPs.

STORMWATER MANAGEMENT PLAN — The plan for managing stormwater runoff in the Cedar Run watershed adopted by Cumberland County Commissioners as required by the Act of October 4, 1978, P.L. 864 (Act 167), and known as the "Cedar Run Watershed Act 167 Stormwater Management Plan."

STORMWATER MANAGEMENT SITE PLAN — The plan prepared by the developer or his representative indicating how stormwater runoff will be managed at the particular site of interest according to this chapter.

STREAM ENCLOSURE — A bridge, culvert or other structure in excess of 100 feet in length upstream to downstream which encloses a regulated water of this commonwealth.

SUBAREA — The smallest drainage unit of a watershed for which stormwater management criteria have been established in the stormwater management plan.

SUBDIVISION — The division or redivision of a lot, tract, or parcel of land by any means into two or more lots, tracts, parcels or other divisions of land, including changes in existing lot lines for the purpose, whether immediate or future, of lease, transfer of ownership, or building or lot development; provided, however, that the subdivision by lease of land for agricultural purposes into parcels of more than ten acres, not involving any new street or easement of access or any residential dwellings, shall be exempt.

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

TIMBER OPERATIONS — See "forest management/timber operations."

TIME OF CONCENTRATION (TC) — The time for surface runoff to travel from the hydraulically most distant point of the watershed to a point of interest within the watershed. This time is the combined total of overland flow time and flow time in pipes or channels, if any.

TR-20 — The computer-based hydrologic modeling technique adapted to the Cedar Run watershed for the Act 167 plan. The model has been "calibrated" to reflect actual recorded flow values by adjoining key model input parameters.

WATERCOURSE — A channel or conveyance of surface water, such as a stream or creek, having defined bed and banks, whether natural or artificial, with perennial or intermittent flow.

WATER QUALITY REQUIREMENTS — As defined under state regulations, protection of designated and existing uses (see 25 Pa. Code Chapters 93 and 96):

- A. Each stream segment in Pennsylvania has a "designated use," such as "cold water fishery" or "potable water supply," which uses are listed in Chapter 93. These uses must be protected and maintained, under state regulations.
- B. "Existing uses" are those attained as of November 1975, regardless whether they have been designated in Chapter 93. Land development 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 land development, these characteristics can be impacted by addition of pollutants such as sediment and changes in habitat through increased flow volumes and/or rates. Therefore, discharges to surface waters must be designed and managed to protect the streambank, streambed and structural integrity of the waterway, to prevent these impacts.

WATERSHED — Region or area drained by a river, watercourse or other body of water, whether natural or artificial.

WATERS OF THE COMMONWEALTH — Any and all rivers, streams, creeks, rivulets, ditches, watercourses, storm sewers, lakes, dammed water, wetlands, ponds, springs, and all other bodies or channels of conveyance of surface and underground water, or parts thereof, whether natural or artificial, within or on the boundaries of this commonwealth.

WETLAND — Those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions, including swamps, marshes, bogs, ferns, and similar areas.

ARTICLE III Stormwater Management

§ 174-9. General requirements.

- A. All land development within the municipality shall be designed, implemented, operated and maintained to meet the purposes of this chapter through these two elements:
 - (1) Erosion and sediment control prevention during land development (e.g., earth disturbance during construction).
 - (2) Water quality protection measures after completion of land development (e.g., postconstruction).
- B. No approval of any subdivision or land development plans, issuance of any building or occupancy permit, or commencement of any earth disturbance at a project site within the municipality shall proceed until the requirements of this chapter are met, including

- approval of a drainage plan under § 174-22 and a permit under PADEP regulations, where applicable.
- C. Erosion and sediment control during land development shall be addressed as required by § 174-16.
 - D. Water quality protection shall be addressed as required by § 174-17.
 - E. All best management practices (BMPs) used to meet the requirements of this chapter shall conform to the design criteria contained in § 174-16 and shall use the calculation methods as described in § 174-17.
 - F. Techniques described in Appendix A, Low-Impact Development Practices,² of this chapter are encouraged because they reduce the costs of complying with the requirements of this chapter and the state water quality requirements.
 - G. No regulated activities that do not fall under the exemption criteria shown in § 174-23A shall commence until a drainage plan consistent with this chapter is approved by the municipality. These criteria shall apply to the total proposed development, even if development is to take place in stages. Impervious cover shall include, but not be limited to, any roof, parking or driveway areas and any new streets and sidewalks. Any areas designed to initially be gravel or crushed stone shall be assumed to be impervious for the purposes of comparison to the waiver criteria.
 - H. Stormwater drainage systems shall be provided in order to permit unimpeded flow along natural watercourses, except as modified by stormwater management facilities or open channels consistent with this chapter.
 - I. The existing points of concentrated drainage that discharge onto adjacent property shall not be altered without permission of the adjacent property owner(s) and shall be subject to any applicable discharge criteria specified in this chapter.
 - J. Areas of existing diffused drainage discharge shall be subject to any applicable discharge criteria in the general direction of existing discharge, whether proposed to be concentrated or maintained as diffused drainage areas, except as otherwise provided by this chapter. If diffused flow is proposed to be concentrated and discharged onto adjacent property, the developer must obtain drainage easements from downstream property owners and:
 - (1) Document that adequate downstream conveyance facilities exist to safely transport the concentrated discharge; or
 - (2) Otherwise prove that no erosion, sedimentation, flooding or other harm will result from the concentrated discharge.
 - K. Where a development site is traversed by watercourses, drainage easements shall be provided conforming to the line of such watercourses. The terms of the easement shall prohibit excavation, the placing of fill or structures, and any alterations that may adversely affect the flow of stormwater within any portion of the easement. Also,

2. Editor's Note: Appendix A is included at the end of this chapter.

maintenance, including the mowing of vegetation within the easement, shall be required, except as approved by the appropriate governing authority.

- L. When it can be shown that, due to topographic conditions, natural drainageways on the site cannot adequately provide for drainage, open channels may be constructed conforming substantially to the line and grade of such natural drainageways. Work within natural drainageways shall be subject to approval by DEP through the joint permit application process or, where deemed appropriate by DEP, through the general permit process.
- M. Minimization of impervious surfaces and infiltration of runoff through seepage beds, infiltration trenches, etc., are encouraged, where soil conditions permit, to reduce the size or eliminate the need for detention facilities.
- N. Roof drains must not be connected to streets, sanitary or storm sewers or roadside ditches to promote overland flow and infiltration/percolation of stormwater where advantageous to do so. When it is more advantageous to connect directly to streets or storm sewers, then it shall be permitted on a case-by-case basis by the municipality.
- O. Any development impacting special protection waters of the commonwealth shall implement measures consistent with DEP Chapter 93 Regulations.

§ 174-10. Compliance with other permit requirements.

Any stormwater management plan submitted to the Borough must comply with all applicable state and federal laws. Compliance with such laws is a condition of approval of the stormwater management plan. The following permit requirements apply to certain land development activities and must be met prior to municipal approval of subdivision approval or land development plans or issuance of building or occupancy permits, where applicable:

- A. All earth disturbance activities subject to standards and possible permit requirements by PADEP under regulations at 25 Pa. Code Chapter 102.
- B. Work within natural drainageways subject to permit by PADEP under 25 Pa. Code Chapter 105.
- C. Any stormwater management facility that would be located in or adjacent to surface waters of the commonwealth, including wetlands, subject to permit by PADEP under 25 Pa. Code Chapter 105
- D. Any stormwater management facility that would be located on a state highway right-of-way 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.

§ 174-11. Project plan requirements.

- A. Any person conducting any land development activities in the municipality involving earth disturbance 5,000 square feet or greater shall submit and obtain approval from the municipality of a project plan meeting the requirements of this chapter prior to commencing the activity.
- B. The project plan shall describe the management plan to be utilized taking into account the BMPs for erosion and sediment control, and the postconstruction management plan to be utilized taking into account the BMPs for water quality protection.
- C. The project plan shall follow the design criteria and calculation methodology contained in §§ 174-14 and 174-15, respectively.
- D. The requirements in this section apply to the total land development project, even if it is to take place in stages.
- E. All redevelopment projects shall evaluate the feasibility of reducing site impervious area by at least 20%. Where project site conditions prevent the reduction of impervious area, then stormwater BMPs shall be evaluated to provide qualitative controls for at least 20% of the site's impervious area.

§ 174-12. Stormwater management districts.

- A. The municipality has been divided into four stormwater management districts as shown on the Watershed Map in Appendix B.³
- B. Standards for managing runoff from each subarea for the two-, ten-, twenty-five-, fifty-, and one-hundred-year design storms are shown below. Development sites located in each of the districts must control postdevelopment runoff rates to predevelopment runoff rates for the design storms as follows:

Allowable Release Rate	Control Criteria	District
50%	Postdevelopment peak discharge for all design storms must be no greater than predevelopment peak discharges	Cedar Run A
75%	Postdevelopment peak discharge for all design storms must be no greater than 75% of the predevelopment peak discharges	Cedar Run B
100%	Postdevelopment peak discharge for all design storms must be no greater than 50% of the predevelopment peak discharges	Cedar Run C and other

3. Editor's Note: The Watershed Map is on file in the Clerk's office and is also available on the Borough's Web site.

§ 174-13. District implementation provisions.

- A. General. Postdevelopment rates of runoff from any regulated activity shall not exceed the peak release rates of runoff prior to development for the design storms specified on the Stormwater Runoff Peak Rate Districts Map, Appendix B⁴, and § 174-14 of this chapter.
- B. District boundaries. The boundaries of the Stormwater Management Districts are shown on an official map, which is available for inspection at the municipal office. A copy of the official map at a reduced scale is included in Appendix B.⁵ The exact location of the Stormwater Management District boundaries as they apply to a given development site shall be determined by mapping the boundaries using the two-foot topographic contours (or most accurate data required) provided as part of the drainage plan.
- C. Sites located in more than one district. For a proposed development site located within two or more release category subareas, the peak discharge rate from any subarea shall be the predevelopment 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 above may be granted if discharges from multiple subareas recombine in proximity to the site. In this case, peak discharge in any direction may be a 100% release rate, provided that the overall site discharge meets the weighted average release rate.
- D. Off-site areas. Off-site areas that 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.
- E. Site areas. Where the site area to be impacted by a proposed development activity is less than the total site area, only the proposed impact area shall be subject to the release rate criteria.
- F. Downstream hydraulic capacity analysis. Any downstream capacity hydraulic analysis conducted in accordance with this chapter shall use the following criteria for determining adequacy for accepting increased peak flow rates:
 - (1) Natural or man-made channels or swales must be able to convey the increased runoff associated with a two-year return period event within their banks at velocities consistent with protection of the channels from erosion. Acceptable velocities shall be based upon criteria included in the DEP Erosion and Sediment Pollution Control Program Manual.
 - (2) Natural or man-made channels or swales must be able to convey the increased twenty-five-year return period runoff without creating any hazard to persons or property.
 - (3) Culverts, bridges, storm sewers or any other facilities which must pass or convey flows from the tributary area must be designed in accordance with DEP, Chapter

4. Editor's Note: The Watershed Map is on file in the Clerk's office and is also available on the Borough's Web site.

5. Editor's Note: The Watershed Map is on file in the Clerk's office and is also available on the Borough's Web site.

105, regulations (if applicable) and, at a minimum, pass the increased twenty-five-year return period runoff.

- G. Regional detention alternatives. For certain areas, 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 on a case-by-case basis using the hydrologic model of the watershed consistent with protection of the downstream watershed areas. "Hydrologic model" refers to the calibrated model as developed for the stormwater management plan.
- H. Waiver of detention requirement.
- (1) For certain development sites in close proximity to stream channels, the municipality may consider a waiver of the detention requirement, upon recommendation of the Municipal Engineer. The developer is responsible to demonstrate "no harm" by providing engineering analysis, in accordance with the following:
 - (a) The developer must demonstrate that discharge without detention will improve drainage conditions by draining the development site prior to peak stream flows from the upstream drainage area.
 - (b) The developer must demonstrate that all drainage facilities downstream from the site have adequate capacity to safely convey the undetained increased peak flows for the storm events listed in § 174-10B. This analysis may be required for any drainage facility between the development site and the discharge point at the Yellow Breeches Creek.
 - (2) Approval of a detention waiver shall not relieve the developer from meeting the water quality (§ 174-17) and groundwater recharge (§ 174-18) requirements.

§ 174-14. Design criteria for stormwater management facilities.

- A. Any stormwater management facility (i.e., detention basin) designed to store runoff and requiring a berm or earthen embankment required or regulated by this chapter shall be designed to provide an emergency spillway to handle flow up to and including the one-hundred-year postdevelopment conditions. The height of the embankment must be set as to provide a minimum 1.0 foot of freeboard above the maximum pool elevation computed when the facility functions for the one-hundred-year postdevelopment inflow. Should any stormwater management facility require a dam safety permit under DEP Chapter 105, the facility shall be designed in accordance with Chapter 105 and meet the regulations of Chapter 105 concerning dam safety which may be required to pass storms larger than one-hundred-year event.
- B. Any facilities that constitute water obstructions (e.g., culverts, bridges, outfalls, or stream enclosures), and any work involving wetlands as directed in DEP Chapter 105

regulations (as amended or replaced from time to time by DEP), shall be designed in accordance with Chapter 105 and will require a permit from DEP. Any other drainage conveyance facility that does not fall under Chapter 105 regulations must be able to convey, without damage to the drainage structure or roadway, runoff from the twenty-five-year design storm with a minimum 1.0 foot of freeboard measured below the lowest point along the top of the embankment along the edge of the roadway. Any facility that constitutes a dam as defined in DEP Chapter 105 regulations may require a permit under dam safety regulations. Any facility located within a PADOT right-of-way must meet PADOT minimum design standards and permit submission requirements.

- C. Storm sewers must be able to convey postdevelopment runoff from a twenty-five-year design storm without surcharging inlets.
- D. Adequate erosion protection shall be provided along all open channels and at all points of discharge.
- E. The design of all stormwater management facilities shall incorporate sound engineering principles and practices. The municipality shall reserve the right to disapprove any design that would result in the occupancy or continuation of an adverse hydrologic or hydraulic condition.

§ 174-15. Calculation methodology.

Stormwater runoff from all development sites shall be calculated using either the Rational Method or a soil-cover-complex methodology.

- A. Any stormwater runoff calculations involving drainage areas greater than 200 acres, including on- and off-site areas, shall use a generally accepted calculation technique that is based on the NRCS Soil Cover Complex Method. Table 174-15.1 summarizes acceptable computation methods. It is assumed that all methods will be selected by the design professional based on the individual limitations and suitability of each method for a particular site.
 - (1) These assumptions shall be used in runoff calculations:
 - (a) Average antecedent moisture conditions.
 - (b) Type II distribution storm.
 - (c) Meadow in good condition shall be used in predevelopment runoff calculations for all areas of existing cultivation.
 - (d) All areas other than cultivation shall use the land cover condition which existed during the past 10 consecutive years.
 - (e) All areas to be disturbed during construction and subsequently returned to open space will be assumed to be reduced one hydrologic group category level for postdevelopment runoff.

- (f) If the initial condition of the site is undeveloped land, the land use shall be considered as "meadow" unless the natural land cover is proven to generate lower curve numbers or Rational "C" value, such as forested lands.
- (2) The municipality may approve the use of the Rational Method to estimate peak discharges from drainage areas that contain less than 200 acres.

Table 174-15.1

Acceptable Computation Methodologies for Stormwater Management Plans

Method	Method Developed by	Applicability
TR-20 or commercial package based on TR-20	USDA - NRCS	When use of full model is desirable or necessary
TR-55 or commercial package based on TR-55	USDA - NRCS	Applicable for plans within the model's limitations
HEC-1 HEC-HMS	U.S. Army Corps of Engineers	When use of full model is desirable or necessary
PSRM	Penn State University	When use of full model is desirable or necessary
Rational Method or commercial package based on Rational Method	Emil Kuiching (1889)	For sites less than 200 acres
Other methods	Various	As approved by the Municipal Engineer

- B. All calculations consistent with this chapter using the Soil Cover Complex Method shall use the appropriate design rainfall depths for the various return-period storms presented in Table C-1 in Appendix C of this chapter.⁶ If a hydrologic computer model such as TR-20, PSRM, or HEC-1 or HEC-HMS is used for stormwater runoff calculations, then the duration of rainfall shall be 24 hours. The NRCS S-curve shown in Figure A-1 of this chapter shall be used for the rainfall distribution.
- C. For the purposes of predevelopment flow rate determination, undeveloped land shall be considered as "meadow" good condition, unless the natural ground cover generates a lower curve number or Rational "C" value (i.e., forest).
- D. All calculations using the Rational Method shall use rainfall intensities consistent with appropriate times of concentration for overland flow and return periods from the design storm curves from Pennsylvania Department of Transportation Design Rainfall Curves (1986) (Figure A-2). Times of concentration for overland flow shall be calculated using the methodology presented in Chapter 3 of Urban Hydrology for Small Watersheds, NRCS, TR-55 (as amended or replaced from time to time by NRCS). Times of concentration for channel and pipe flow shall be computed using Manning's equation.

6. Editor's Note: Appendix C is included at the end of this chapter.

- E. Runoff curve numbers (CNs) for both existing and proposed conditions to be used in the Soil Cover Complex Method shall be obtained from Table C-2 in Appendix C of this chapter.
- F. Runoff coefficients (c) for both existing and proposed conditions for use in the Rational Method shall be obtained from Table C-3 in Appendix C of this chapter.
- G. Where uniform flow is anticipated, the Manning equation shall be used for hydraulic computations and to determine the capacity of open channels, pipes, and storm sewers. Values for Manning's roughness coefficient (n) shall be consistent with Table C-4 in Appendix C of the chapter.
- H. Outlet structures for stormwater management facilities shall be designed to meet the performance standards of this chapter using any generally accepted hydraulic analysis technique or method.
- I. The design of any stormwater detention facilities intended to meet the performance standards of this chapter shall be verified by routing the design storm hydrograph through these facilities using the storage-indication method. For drainage areas greater than 20 acres in size, the design storm hydrograph shall be computed using a calculation method that produces a full hydrograph. The municipality may approve the use of any generally accepted full hydrograph approximation technique that shall use a total runoff volume that is consistent with the volume from a method that produces a full hydrograph.
- J. The municipality may require that computed existing runoff rates be reconciled with field observations and conditions. If the designer can substantiate through actual physical calibration that different runoff and time-of-concentration values should be utilized at a particular site than calculated using the procedures specified in § 174-15 of this chapter, then appropriate variations may be made upon review and recommendations of the Municipal Engineer. Calibration shall require detailed gauge and rainfall data for the particular site in question.

§ 174-16. Erosion and sediment control requirements.

- A. Earth disturbance activities of 5,000 square feet or greater require design, implementation and maintenance of erosion and sediment control BMPs that control erosion and prevent sediment pollution during the earth disturbance activities.
- B. Whenever the vegetation and topography are to be disturbed, such activity must be in conformance with Chapter 102, Title 25, Rules and Regulations, Part I, Commonwealth of Pennsylvania, Department of Environmental Protection, Subpart C, Protection of Natural Resources, Article II, Water Resources, Chapter 102, Erosion Control, and in accordance with the Cumberland County Conservation District and the standards and specifications of the municipality.
- C. No regulated activities shall commence until an erosion and sediment control plan consistent with this chapter is approved by the municipality.

- D. Evidence of any permits required by DEP or CCCD must be provided to the municipality.
- E. Plan review, approval and permitting functions under this section may be delegated by the municipality to another entity, if such agreement is entered into by the municipality.
- F. Additional erosion and sedimentation control design standards and criteria that must be applied where infiltration BMPs are proposed include the following:
 - (1) Areas proposed for infiltration BMPs shall be protected from sedimentation and compaction during the construction phase, so as to maintain their maximum infiltration capacity.
 - (2) Infiltration BMPs shall not be constructed nor receive runoff until the entire contributory drainage area to the infiltration BMP has received final stabilization.
- G. A copy of the approved erosion and sediment control plan and any required permits shall be available at the project site at all times.

§ 174-17. Water quality requirements.

- A. All regulated activities shall be designed, implemented, operated and maintained to meet the purposes of this chapter through the following:
 - (1) Erosion and sediment control during earth disturbance activities; and
 - (2) Water quality protection measures after completion of earth disturbance activities, including operations and maintenance.
- B. In addition to the performance standards and design criteria requirements of Article III of this chapter, the land developer shall comply with the following water quality requirements of this article:
 - (1) The project plan shall specify permanent stormwater BMPs to be implemented, operated and maintained to meet legal water quality requirements. Because water quality requirements vary depending on the uses of the water bodies in the watershed, a framework methodology is provided here.
 - (2) In order to protect and maintain water quality, additional stormwater runoff created by the development project must be captured, stored and treated. In addition, postconstruction stormwater infiltration of runoff must replicate preconstruction infiltration of runoff to the maximum extent possible.
 - (3) Adequate storage and treatment facilities shall be provided necessary to capture and treat a volume of stormwater runoff termed as "water quality volume," which is calculated in accordance with the following:
 - (a) Calculation of water quality volume. The water quality volume (WQV) is the storage capacity needed to treat stormwater runoff equivalent to a minimum of the first two inches of rainfall (from Appendix F, Pennsylvania Handbook of BMPs for Developing Areas," p. F-2 for Region 4, value 1.95 rounded to

two) from the developed areas of the site. The following calculation is used to determine the storage of volume, WQV, in acre-feet of storage:

$$WQV = [(2.0)(Rv)(A)]/12$$

Where:

WQV = Water quality volume.

A = Area in acres.

Rv = $0.05 + 0.009(I)$ where I is the percent impervious cover (for example, use I = 50 for 50% impervious cover).

- (b) WQV shall be designed as part of a stormwater management facility which incorporates water quality BMPs as a primary benefit of using that facility, in accordance with design specifications contained in the Pennsylvania Handbook of Best Management Practices for Developing Areas, 1998.
 - (c) Runoff treatment BMPs must be employed where necessary to ensure the water quality requirements are met.
- (4) To accomplish Subsections A and B(1) above, the land developer may submit original and innovative designs to the Municipal Engineer for review and approval. Such designs may achieve the water quality objectives through a combination of BMPs (best management practices).
- (5) In selecting the appropriate management plans or combinations thereof, the land developer shall consider the following:
- (a) Total contributing area.
 - (b) Permeability and infiltration rate of the site soils.
 - (c) Slope and depth to bedrock.
 - (d) Seasonal high-water table.
 - (e) Proximity to building foundations and wellheads.
 - (f) Erodibility of soils.
 - (g) Land availability and configuration of the topography.
 - (h) BMPs.
- (6) The following additional factors should be considered when evaluating the suitability of BMPs used to control water quality at a given development site:
- (a) Peak discharge and required volume control.
 - (b) Streambank erosion.
 - (c) Efficiency of the BMPs to mitigate potential water quality problems.

- (d) The volume of runoff that will be effectively treated.
 - (e) The nature of the pollutant being removed.
 - (f) Maintenance requirements.
 - (g) Creation/protection of aquatic and wildlife habitat.
 - (h) Recreational value.
 - (i) Enhancement of aesthetic and property value.
- (7) Water quality BMPs shall be designed, implemented and maintained to meet state water quality requirements.
- (8) Evidence of any permits required by DEP or CCCD must be provided to the municipality.
- (9) The volume and rate of any stormwater discharges allowed under this chapter must be managed to prevent the physical degradation of receiving waters, such as by streambank scour and erosion. If a detention facility is proposed which is part of the BMPs approved for the project, the facility(ies) must be designed to provide for a twenty-four-hour extended detention of the one-year, twenty-four-hour storm event (i.e., the stormwater runoff will be released over a minimum 24 hours for the one-year, twenty-four-hour storm event).

§ 174-18. Groundwater recharge requirements.

- A. Prevention of stormwater runoff is key objective of Chapter 93 of the DEP regulations, because runoff can change the physical, chemical and biological integrity of water bodies, thereby impacting water quality.
- B. The project plan shall describe how these water quality protection requirements will be met. Infiltration BMPs shall be evaluated and utilized to the maximum extent possible to manage the net change in stormwater runoff generated so that postconstruction discharges do not degrade the physical, chemical or biological characteristics of the receiving waters. These BMPs may be used to satisfy all or part of the requirements in § 174-13.
- C. Design of stormwater management facilities shall give consideration to providing groundwater recharge to compensate for the reduction in the percolation that occurs when the ground surface is paved and roofed over. A detailed geologic evaluation of the project site shall be performed to determine the suitability of recharge facilities. The evaluation shall be performed by a qualified engineer, geologist or soil scientist and, at a minimum, address soil permeability, depth to bedrock, susceptibility to sinkhole formation, and subgrade stability. Where pervious pavement is permitted for parking, construction specifications shall be noted on the plan.
- D. Whenever a basin will be located in an area underlain by limestone, a geological evaluation of the proposed location shall be conducted to determine susceptibility to sinkhole formations. The design of all facilities over limestone formations shall include

measures to prevent groundwater contamination and, where necessary, sinkhole formation. Soils used for the construction of basins shall have low erodibility factors (K factors). The municipality may require the installation of an impermeable liner in detention basins. If the developer can prove through analysis that the site is in an area underlain by limestone and such geologic conditions may result in sinkhole formations, then the site is exempt from recharge requirements.

- E. It shall be the developer's responsibility to verify if the site is underlain by limestone. A note shall be attached to all drainage plans and signed and sealed by the developer's registered design professional, certifying the presence or absence of subsurface limestone on the site and citing the source of such determination.
- F. Land developers shall maintain annual groundwater recharge consistent with predevelopment conditions by infiltrating an amount of runoff equal to the "recharge volume" (based on the average annual infiltration rate based on the prevailing hydrologic soil groups present at a site). The recharge volume may be part of the water quality volume. The groundwater recharge is calculated in accordance with the following formula:

$$Rev = [(S)(Rv)(A)]/12$$

Where:

Rev = Recharge volume (acre-feet).

A = Area in acres.

Rv = $0.05 + 0.009(I)$ where I is the percent impervious cover (for example, use I = 50 for 50% impervious cover).

S is the soil specific recharge factor and varies according to soil type. For eastern Cumberland County, the thirty-year mean annual precipitation (Middle Atlantic River Forecast Center) equals 40 inches. Assume NRCS recharge rates for soil types A, B, C, and D are 18, 12, six, and three inches per year, respectively. The infiltration facility's efficiency may exceed (by approximately 10%) the efficiency of vegetated previous sites. For example, for Type A soil, $S = (18 \text{ inches}/40 \text{ inches}) \times 0.9 = .41$. The following soil specific recharge rates are to be used:

Hydrologic Soil Group	Soil Specific Recharge Factor (S)
A	0.38
B	0.25
C	0.13
D	0.06

If more than one hydrologic soil group (HSG) is present at a site, a composite recharge volume shall be computed based upon the proportion of total site area within each HSG.

- (1) In selecting the appropriate infiltration BMPs, the applicant shall consider the following:

- (a) Permeability and infiltration rate of the site soils.
 - (b) Slope and depth to bedrock.
 - (c) Seasonal high water table.
 - (d) Proximity to building foundations and wellheads.
 - (e) Erodibility of soils.
 - (f) Land availability and topography.
- (2) A detailed soils evaluation of the project site shall be performed to determine the suitability of infiltration BMPs. The evaluation shall be performed by a qualified professional and, at a minimum, address soil permeability, depth to bedrock, susceptibility to sinkhole formation, and subgrade stability. The general process for designing the infiltration BMP shall be:
- (a) Analyze hydrologic soil groups as well as natural and man-made features within the watershed to determine general areas of suitability for infiltration BMPs.
 - (b) Provide field testing data to determine appropriate percolation rate and/or hydraulic conductivity.
 - (c) Design infiltration BMPs for required stormwater volume based on field-determined capacity at the level of the proposed infiltration surface.
- (3) Soil characteristics. Subject to the specific considerations in Subsection F(7) below:
- (a) Infiltration BMPs are particularly appropriate in hydrologic soil groups A and B, as described in the Natural Resources Conservation Service Manual TR-55.
 - (b) Low erodibility factors (K factors) are preferred for the construction of basins.
 - (c) There must be a minimum depth of 48 inches between the bottom of any facility and the seasonal high water table and/or bedrock (limiting zones), except for infiltration BMPs receiving only roof runoff, which shall be placed in soils having a minimum depth of 24 inches between the bottom of the facility and the limiting zone.
 - (d) There must be an infiltration and/or percolation rate sufficient to accept the additional stormwater load and to drain completely as determined by field tests.
 - (e) Infiltration BMPs shall be located a minimum of 10 feet away from the foundation wall of any building.
 - (f) The infiltration system shall have positive overflow controls to prevent storage within one foot of the finished surface or grade.

- (g) Infiltration rates shall not be used in computing the storage volume of the infiltration system.
- (h) Surface inflows shall be designed to prevent direct discharge of sediment into the infiltration system.
- (4) The recharge volume provided at the site shall be directed to the most permeable HSG available, except where other considerations apply, such as in limestone geology.
- (5) Any management plan including infiltration BMPs shall be capable of completely infiltrating the impounded water within 48 hours.
- (6) Extreme caution shall be exercised where infiltration is proposed in geologically susceptible areas such as:
 - (a) Where salt or chloride may be applied in deicing and other winter applications, causing groundwater pollution, since soils do little to filter this pollutant.
 - (b) Limestone areas.
 - [1] Whenever a basin will be located in an area underlain by limestone, a geological evaluation of the proposed location shall be conducted to determine susceptibility to sinkhole formations.
 - [2] The design of all BMPs over limestone formations shall include measures to prevent groundwater contamination and, where necessary, sinkhole formation.
 - [3] It shall be the applicant's responsibility to verify whether the site is underlain by limestone. The following note shall be attached to all drainage plans and signed and sealed by the applicant's licensed engineer/surveyor/landscape architect/geologist if a detention facility is proposed: "I certify that the proposed facility is/is not underlain by limestone."
- (7) During the period of land disturbance, runoff shall be controlled prior to entering any proposed infiltration area. Areas proposed for infiltration BMPs shall be protected from sedimentation and compaction during the construction phase, so as to maintain their maximum infiltration capacity. Infiltration BMPs shall not be constructed nor receive runoff until the entire contributory drainage area to the infiltration BMP has received final stabilization.

§ 174-19. General protection requirements.

- A. Detain the one-year, twenty-four-hour design storm using the SCS Type II distribution. Provisions shall be made so that the one-year storm takes a minimum of 24 hours to drain from the facility from a point where the maximum volume of water from the one-year storm is captured (i.e., the maximum water surface elevation is achieved for the

one-year storm). Release of water can begin at the start of the storm (i.e., the invert of the water quality orifice is at the invert of the facility). The design of the facility shall consider and minimize the chances of clogging and sedimentation potential.

- B. All detention, water quality and groundwater recharge facilities and BMPs shall be designed to be completely dewatered within 48 hours after the end of any storm event.

§ 174-20. Design criteria for stormwater management plans.

- A. Applicants may select a combination of runoff control techniques which are most suitable to control stormwater runoff from the site. All controls shall be subject to approval of the Municipal Engineer. The Municipal Engineer may request specific information on design and/or operating features of the proposed stormwater controls in order to determine their suitability and adequacy in terms of the standards of this section.
- B. The applicant shall consider the effect of the proposed stormwater management techniques on any special soil conditions or geological hazards which may exist on the development site. In the event such conditions are identified on the site, the Municipal Engineer may require in-depth studies by a competent geotechnical engineer.
- C. The stormwater management BMPs shall be selected according to the following order of preference:
 - (1) Site planning for locating proposed buildings, impervious areas and grading which minimizes disruption of the natural site characteristics.
 - (2) Minimization of impervious areas and promotion of retentive grading.
 - (3) Implementation of innovative nonstructural measures. (See Appendix A.⁷)
 - (4) Infiltration of runoff on site.
 - (5) Flow attenuation by use of open vegetated swales and natural depressions.
 - (6) Stormwater detention/retention structures.
- D. Any BMP which is a dam, culvert, stream enclosure or outfall as defined in 25 Pa. Code Chapter 105 shall be designed according to the requirements in those regulations.
- E. Any stormwater BMP which does not constitute a dam under 25 Pa. Code Chapter 105, and is designed to store runoff and requiring a berm or earthen embankment (i.e., detention basin), shall be designed to satisfy the following:
 - (1) Berms and earthen embankments shall be designed to provide an emergency spillway to handle flow up to and including the one-hundred-year postdevelopment conditions.

7. Editor's Note: Appendix A is included at the end of this chapter.

- (2) Berms and earthen embankments shall be designed to provide a minimum one foot of freeboard above the maximum pool elevation computed when the facility functions for the one-hundred-year postdevelopment inflow.
- (3) Water obstructions shall convey runoff from the twenty-five-year design storm with a minimum of one foot of freeboard measured below the lowest point along the top of the roadway, without damage to the drainage structure or the roadway.
- (4) Roadway crossings located within designated floodplain areas must be able to convey runoff from a one-hundred-year design storm.
- (5) Drainage conveyances must be able to convey, without damage to the drainage structure or roadway, runoff from the ten-year design storm without surcharging inlets, where appropriate.
- (6) Adequate erosion and sediment control protection shall be provided along all open channels and at all points of discharge.

§ 174-21. BMP operations and maintenance requirements.

- A. No regulated activities shall commence until a BMP operations and maintenance plan (O & M plan) consistent with this chapter is approved by the municipality.
- B. The drainage plan content requirements are applicable to the O & M plan and are incorporated herein by reference. O & M plan requirements can be shown concurrently in the plan set with the drainage plan requirements.
- C. The O & M plan shall establish responsibilities for the continuing operation and maintenance of all permanent stormwater facilities and BMPs, as follows:
 - (1) If a plan includes structures or lots which are to be separately owned and in which streets, sewers and other public improvements are to be dedicated to the municipality, stormwater facilities and BMPs may also be dedicated to and maintained by the municipality.
 - (2) If a plan includes operations and maintenance by a single owner, or if sewers and other improvements are to be privately owned and maintained, then the operation and maintenance of stormwater facilities and BMPs shall be the responsibility of the owner.
- D. The municipality shall make the final determination on the continuing operations and maintenance responsibilities. The municipality reserves the right to accept or reject the operations and maintenance responsibility for any or all of the stormwater facilities and BMPs.
- E. The property owner shall execute a stormwater facilities and BMP maintenance and monitoring agreement with the municipality covering all stormwater facilities and BMPs that are to be privately owned. The agreement shall be in a form provided by the

municipality and shall include financial security requirements consistent with Article IV, Section 406, of the municipality's Subdivision and Land Development Ordinance.⁸

ARTICLE IV Drainage Plan Requirements

§ 174-22. General requirements.

- A. No approval of any subdivision or land development plans, issuance of any building or occupancy permit, or the commencement of any earth disturbance, involving earth disturbance 5,000 square feet or greater at a project site within the municipality, shall proceed until a written approval of a project plan is issued by the municipality.
- B. The following general project plan requirements apply:
 - (1) Stormwater management designs shall permit unimpeded flow along natural watercourses, except as modified by stormwater BMPs consistent with this chapter.
 - (2) The existing points of concentrated drainage that discharge onto adjacent property shall not be altered without permission of the adjacent property owner(s).
 - (3) Areas of existing diffused drainage discharge shall be subject to any applicable criteria in the general direction of existing discharge, whether proposed to be concentrated or maintained as diffused drainage areas, except as otherwise provided by this chapter. If diffused flow is proposed to be concentrated and discharged onto adjacent property, the applicant must demonstrate that the resulting flows will not result in any increased flooding or risk to human health and safety and violation of the water quality requirements herein.
 - (4) Where a development site is traversed by watercourses, drainage easements shall be provided conforming to the line of such watercourses. The terms of the easement shall prohibit excavation, the placing of fill or structures, and any alterations that may adversely affect the flow of stormwater within any portion of the easement. In addition, maintenance, including mowing of vegetation within the easement, shall be required. All such easements shall be recorded in the County Recorder's office.
 - (5) When it can be shown that, due to topographic conditions, natural drainageways on the site cannot adequately provide for stormwater surface drainage, open channels may be constructed conforming substantially to the line and grade of such natural drainageways.

§ 174-23. Exemptions.

- A. Any regulated activity that meets the following exception criteria shall not be required to implement stormwater controls if the developer can demonstrate no downstream harm. These criteria shall apply to the total development even if development is to take place in

8. Editor's Note: See Ch. 179, Subdivision and Land Development.

phases. The date of the municipal ordinance adoption 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. Exemption shall not relieve the applicant from implementing such measures as are necessary to protect health, safety, and property. This exemption shall not relieve the applicant from meeting the water quality (§ 174-17) and groundwater recharge (§ 174-18) requirements.

Stormwater Management Exemption Criteria

Impervious Area Exemption

Total Parcel Size (acres)	Total Parcel Size (square feet)	Exemption (square feet)
Less than 0.25 acre	Less than 10,890	1,000
0.25 to less than 0.5 acre	10,890 to 21,780	2,500
0.5 acre or greater	21,780 to 43,560	5,000

- B. Prior to the granting of an exemption, the applicant must provide documentation from a registered professional engineer in the Commonwealth of Pennsylvania that the increased flows from the site leave the site so that there will be no adverse effects to properties along the path of flow(s) or that the increased flow(s) will reach a natural watercourse or an existing stormwater management facility before adversely affecting any property along the path of the flow(s).
- C. No exemption shall be provided for regulated activities as defined in § 174-5C(5) and (6) of this chapter.

§ 174-24. Drainage plan contents.

- A. The drainage plan shall consist of all applicable calculations, maps, and plans. A note on the maps shall refer to the associated computations and erosion and sedimentation control plan by title and date. The cover sheet of the computations and erosion and sedimentation control plan shall refer to the associated maps by title and date. All drainage plan materials shall be submitted to the municipality in a format that is clear, concise, legible, neat, and well organized; otherwise, the drainage plan shall be disapproved and returned to the applicant.
- B. The following items shall be included in the drainage plan:
 - (1) General:
 - (a) A general description of the project.
 - (b) A general description of permanent stormwater management techniques, including construction specifications of the materials to be used for stormwater management facilities.
 - (c) Complete hydrologic, hydraulic, and structural computations for all stormwater management facilities.

- (2) Map(s) of the project area shall be submitted on sheets no larger than 18 inches by 24 inches and shall be prepared in a form that meets the requirements for recording at the offices of the Recorder of Deeds of Cumberland County. The contents of the map(s) shall include but not be limited to:
 - (a) The location of the project relative to highways, municipalities or other identifiable landmarks.
 - (b) Existing contours at intervals of two feet. In areas of steep slopes (greater than 15%), five-foot contour intervals may be used. Spot elevations at significant points are required.
 - (c) Existing streams, lakes, ponds, or other bodies of water within the project area.
 - (d) Other physical features, including flood hazard boundaries, sinkholes, streams, existing drainage courses, areas of natural vegetation to be preserved, and the total extent of the upstream area draining through the site.
 - (e) The locations of all existing and proposed utilities, sanitary sewers, and water lines.
 - (f) An overlay showing soil names and boundaries.
 - (g) Proposed changes to the land surface and vegetative cover, including the type and amount of impervious area that would be added.
 - (h) Proposed structures, roads, paved areas, and buildings.
 - (i) Final contours at intervals at two feet. In areas of steep slopes (greater than 15%), five-foot contour intervals may be used. Spot elevations at significant points are required.
- (3) The name of the development, the name and address of the owner of the property, and the name of the individual or firm preparing the plan.
- (4) The date of submission and any subsequent revision dates.
- (5) A graphic and written scale of one inch equals no more than 50 feet.
- (6) A North arrow.
- (7) The total tract boundary and size with distances marked to the nearest foot and bearings to the nearest degree.
- (8) Existing and proposed land use(s).
- (9) A key map showing all existing man-made features beyond the property boundary that would be affected by the project.
- (10) Horizontal and vertical profiles of all open channels, including hydraulic capacity.
- (11) Overland drainage paths.

- (12) Stormwater management easements, a minimum of 20 feet in width, around all stormwater management facilities and permanent BMPs.
 - (13) A twenty-foot-wide access easement to provide access for inspection and maintenance of all stormwater management facilities and permanent BMPs.
 - (14) A note on the plan indicating the location and responsibility for maintenance of stormwater management facilities that would be located off site. All off-site facilities shall meet the performance standards and design criteria specified in this chapter.
 - (15) A construction detail of any improvements made to sinkholes and the location of all notes to be posted, as specified in this chapter.
 - (16) A statement, signed by the landowner, acknowledging the stormwater management facilities and BMPs to be permanent fixtures that can be altered or removed only after approval of a revised plan by the municipality.
 - (17) The following signature block for the design engineer: "(Design engineer), on this date (date of signature), have reviewed and hereby certify that the Drainage Plan meets all design standards and criteria of the Camp Hill Borough Stormwater Management Ordinance."
 - (18) An erosion and sediment control plan in accordance with § 174-16.
 - (19) A BMP operations and maintenance plan in accordance with § 174-21.
- C. Supplemental information:
- (1) A written description of the following information shall be submitted:
 - (a) The overall stormwater management concept for the project.
 - (b) Stormwater runoff computations as specified in this chapter.
 - (c) Stormwater management techniques to be applied both during and after development.
 - (d) Expected project time schedule.
 - (2) A soil erosion and sedimentation control plan, where applicable, including all reviews and approvals, as required by DEP and CCCD.
 - (3) A geologic assessment of the effects of runoff on sinkholes as specified in this chapter.
 - (4) The effect of the project (in terms of runoff volumes and peak flows) on adjacent properties and on any existing municipal stormwater collection system that may receive runoff from the project site.
 - (5) A declaration of adequacy and a highway occupancy permit from the PADOT District Office when utilization of a PADOT storm drainage system is proposed.

D. Stormwater management facilities and BMPs.

- (1) All stormwater management facilities and permanent BMPs must be located on a plan and described in detail.
- (2) When groundwater recharge methods such as seepage pits, beds or trenches are used, the locations of existing and proposed on-lot sewage disposal systems and infiltration areas and water supply wells must be shown.
- (3) All calculations, assumptions, and criteria used in the design of the stormwater management facilities and BMPs must be shown.

§ 174-25. Drainage plan submission.

For all activities regulated by this chapter, the steps below shall be followed for submission. For any activities that require a DEP joint permit application and regulated under Chapter 105, Dam Safety and Waterway Management, or Chapter 106, Floodplain Management, of DEP's Rules and Regulations, require a PADOT highway occupancy permit, or require any other permit under applicable state or federal regulations, the permit(s) shall be part of the plan.

- A. The drainage plan and application shall be submitted by the developer as part of the submission for the regulated activity.
- B. If the drainage plan is incorporated in plans submitted as a subdivision or land development (SLD) plan, the drainage plan may be reviewed and approved as part of those plans.
- C. If the drainage plan is submitted independently for a regulated activity, two complete copies of the drainage plan must be submitted.

§ 174-26. Drainage plan review.

- A. The Municipal Engineer shall review the drainage plan for consistency with this chapter. The municipality shall require receipt of a complete plan, as specified in this chapter.
- B. The Municipal Engineer shall review the drainage plan for any submission or land development in accordance with the Municipal Subdivision and Land Development Ordinance provisions not superseded by this chapter.
- C. Disapproval.
 - (1) Should the drainage plan be determined to be inconsistent with the stormwater management plan, the Borough Council will forward a disapproval letter to the developer with a copy to the Municipal Manager citing the reason(s) for the disapproval. Any disapproved drainage plans may be revised by the developer and resubmitted consistent with this chapter.

- (2) In lieu of a disapproval letter, the Municipal Engineer may provide a list of comments that will bring the plan into an approvable format, if adequately addressed.
- D. For regulated activities requiring a DEP joint permit application, the Municipal Engineer shall notify DEP whether the drainage plan is consistent with the stormwater management plan and forward a copy of the review letter to the Municipal Manager and the developer. DEP may consider the Municipal Engineer's review comments in determining whether to issue a permit.
- E. The municipality shall not approve any subdivision or land development for regulated activities specified in § 174-5 of this chapter if the drainage plan has been found to be inconsistent with the stormwater management plan, as determined by the Municipal Engineer. All required permits from DEP must be obtained prior to approval or as a condition of approval.
- F. The Municipal Building Official and/or Zoning Officer shall not issue a permit for any regulated activity specified in § 174-5 of this chapter until a drainage plan has been approved by the Municipal Engineer. All required permits from DEP must be obtained prior to issuance of a permit.
- G. The developer shall be responsible for completing an as-built survey of all stormwater management facilities and BMPs included in the approved drainage plan. The as-built survey and an explanation of any discrepancies with the design plans shall be submitted to the Municipal Engineer for final approval. In no case shall the municipality approve the as-built survey until the municipality receives a copy of an approved declaration of adequacy, highway occupancy permit from the PADOT district office, and any applicable permits from PADEP.
- H. The municipality's approval of a drainage plan shall be valid for a period not to exceed one year. This one-year time period shall commence on the date that the municipality signs the approved drainage plan. If stormwater management facilities included in the approved drainage plan have not been constructed or if an as-built survey of these facilities has not been approved within this one-year time period, then the municipality may consider the drainage plan disapproved and may revoke any and all permits. Drainage plans that are considered disapproved by the municipality shall be resubmitted in accordance with § 174-25 of this chapter. The municipality may, at its discretion, grant time extensions for completion of work on approved drainage plans. Nothing in this section shall supersede a developer's rights under the Pennsylvania Municipalities Planning Code to pursue approved plans.

§ 174-27. Modification of plans.

- A. A modification to a submitted drainage plan for a development site that involves a change in stormwater management facilities or techniques, that involves the relocation or redesign of stormwater management facilities, or that is necessary because soil or other conditions are not as stated on the drainage plan, as determined by the Municipal Engineer, shall require a resubmission of the modified drainage plan consistent with § 174-25 of this chapter and be subject to review as specified in § 174-26 of this chapter.

- B. A modification to an already approved or disapproved drainage plan shall be submitted to the municipality, accompanied by the applicable municipal review fee. A modification to a drainage plan, for which a formal action has not been taken by the municipality, shall be submitted to the municipality, accompanied by the applicable municipal review fee.

§ 174-28. Resubmission of disapproved drainage plans.

A disapproved drainage plan may be resubmitted, with the revisions addressing the Municipal Engineer's concerns documented in writing, to the Municipal Engineer in accordance with § 174-25 of this chapter and be subject to review as specified in § 174-26 of this chapter. The applicable municipal review fee must accompany a resubmission of a disapproved drainage plan.

§ 174-29. Recording of documents.

The owner of any property upon which stormwater management facilities or permanent BMPs will be placed, constructed or implemented, as described on the drainage plan, shall record or cause to have recorded the following documents in the office of the Recorder of Deeds for Cumberland County prior to the start of any site construction:

- A. The approved drainage plan.
- B. The BMP operations and maintenance plan, if such is not included in a recorded drainage plan.
- C. Stormwater facilities and BMP maintenance and monitoring agreement.

ARTICLE V
Inspections

§ 174-30. Schedule of inspections.

- A. The Municipal Engineer or his designee shall be permitted to inspect all phases of the installation of the permanent stormwater management facilities and BMPs.
- B. The Municipal Engineer or his designee shall be permitted to inspect all phases of the site development work in progress, to insure compliance with erosion and sediment control requirements. Inspection functions under this section may be delegated by the municipality to another entity, if such agreement is entered into by the municipality.
- C. During any stage of the work, if the Municipal Engineer determines that the permanent stormwater management facilities or BMPs are not being installed in accordance with the approved drainage plan, the municipality shall revoke any existing municipal permits and/or issue a stop-work order until a revised drainage plan is submitted and approved, as specified in this chapter.

§ 174-31. Right of entry.

- A. Upon presentation of proper credentials, duly authorized representatives of the municipality may enter at reasonable times upon any property within the municipality to inspect the implementation, condition or operation of the stormwater BMPs in regard to any aspect governed by this chapter.
- B. BMP owners and operators shall allow persons working on behalf of the municipality ready access to all parts of the premises for the purposes of determining compliance with this chapter.
- C. Persons working on behalf of the municipality shall have the right to temporarily locate on any BMP in the municipality such devices as are necessary to conduct monitoring and/or sampling of the discharges from such BMP.
- D. Unreasonable delays in allowing the municipality access to a BMP is a violation of this article.

ARTICLE VI**Fees and Expenses; Performance Guarantee; Maintenance and Monitoring****§ 174-32. Reimbursement of costs for review of plan.**

The applicant shall reimburse the municipality for the costs incurred by the municipality and the Municipal Engineer for review of the plan. All fees shall be paid by the applicant prior to recording the plan.

§ 174-33. Expenses covered by fees.

The fees required by this chapter shall, at a minimum, cover:

- A. Administrative costs.
- B. The review of the drainage plan by the municipality and the Municipal Engineer.
- C. Fees and expenses to record plans at the County Recorder of Deeds office.
- D. Preconstruction meetings and site inspections.
- E. The inspection of stormwater management facilities and BMPs during construction.
- F. The final inspection upon completion of the stormwater management facilities and BMPs presented in the drainage plan.
- G. Work required to monitor and enforce provisions of this chapter, to correct violations, and to assure proper completion of remedial actions.

§ 174-34. Additional costs.

The developer will be invoiced for any additional costs incurred by the municipality in the course of reviewing the drainage plan. These costs may include, but are not limited to, special studies by qualified engineers or surveyors, field reconnaissance, and testing.

§ 174-35. Performance guarantee.

The applicant shall provide a financial guarantee to the municipality for the timely installation and proper construction of all stormwater management controls as required by the approved stormwater plan and this chapter equal to the full construction cost of the required controls.

§ 174-36. Maintenance responsibilities.

- A. The plan for the development site shall contain an operation and maintenance plan prepared by the developer and approved by the Municipal Engineer. The operation and maintenance plan shall outline required routine maintenance actions schedules necessary to insure proper operation of the facility(ies) and the identity of the person(s) responsible for operation and maintenance.
- B. The plan for the development site shall establish responsibilities for the continuing operation and maintenance of all proposed stormwater control facilities consistent with the following principals:
 - (1) If a development consists of structures or lots that are to be separately owned and in which streets, sewers and other public improvements are to be dedicated to the municipality, stormwater control facilities may also be dedicated to and maintained by the municipality.
 - (2) If a development site is to be maintained in a single ownership or if sewers and other public improvements are to be privately owned and maintained, then the ownership and maintenance of stormwater control facilities shall be the responsibility of the owner or private management entity.
- C. The municipality, upon recommendation of the Municipal Engineer, shall make the final determination on the continuing maintenance responsibilities prior to final approval of the stormwater management plan.

§ 174-37. Postconstruction maintenance and monitoring inspections.

- A. BMPs shall be inspected by the landowner/developer or responsible entity (including the Municipal Engineer for dedicated BMPs) on the following basis:
 - (1) Annually for the first five years.
 - (2) Once every three years thereafter.
 - (3) During or immediately after the cessation of a one-hundred-year or greater storm event.

- B. Stormwater facilities and permanent BMPs must be inspected in accordance with the O & M plan. The property owner shall employ a qualified registered professional to conduct the inspections and prepare and submit a report to the municipality within one month following completion of the inspection. The report will present documentation regarding the condition of the facility and recommending necessary repairs, if needed. Any needed repairs shall be implemented by the owner within one month of the report issuance date.

ARTICLE VII Prohibitions

§ 174-38. Prohibited discharges.

- A. No person shall allow, or cause to allow, discharges into the municipality's separate storm sewer system which are not composed entirely of stormwater, except:
- (1) As provided in Subsection B below; and
 - (2) Discharges allowed under a state or federal permit.
- B. Discharges which may be allowed, based on a finding by the municipality that the discharge(s) do not significantly contribute to pollution to surface waters of the commonwealth, are:
- (1) Discharges from fire-fighting activities.
 - (2) Potable water sources, including dechlorinated water line and fire hydrant flushing.
 - (3) Irrigation drainage.
 - (4) Routine external building washing which does not use detergents or other cleaning agents.
 - (5) Air-conditioning condensate.
 - (6) Water from individual residential car washing.
 - (7) Springs.
 - (8) Uncontaminated water from foundation or footing drains and crawl space or basement sump pumps.
 - (9) Flows from riparian habitats and wetlands.
 - (10) Lawn watering.
 - (11) Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (unless all spill material has been removed) and where detergents are not used.
 - (12) Dechlorinated swimming pool discharges.

- (13) Uncontaminated groundwater.
- C. In the event that the municipality 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 municipality will notify the responsible person to cease discharge.
- D. Upon notice provided by the municipality under Subsection C, the discharger will have a reasonable time, as determined by the municipality, to cease the discharge, consistent with the degree of pollution caused by the discharge.
- E. Nothing in this section shall affect a discharger's responsibilities under state law.

§ 174-39. Prohibited connections.

- A. The following connections are prohibited, except as provided in § 174-38B above:
 - (1) Any drain or conveyance, whether on the surface or subsurface, which allows any nonstormwater discharge, including sewage, process wastewater and wash water, to enter the separate storm sewer system, and any connections to the storm drain system from indoor drains and sinks; and
 - (2) Any drain or conveyance connected from a commercial or industrial use to the separate storm sewer system which has not been documented in plans, maps or equivalent records and approved by the municipality.
- B. This prohibition expressly includes, without limitation, connections made in the past, regardless of whether the connection, drain or conveyance was previously allowed, permitted, or approved by a government agency or otherwise permissible under law or practices applicable or prevailing at the time of connection.

§ 174-40. Roof drains.

- A. Roof drains shall not be connected to streets, sanitary or storm sewers, or roadside swales, except as provided in Subsection B.
- B. When it is more advantageous to connect roof drains directly to streets, storm sewers or roadside swales, such connections may be permitted by the municipality.
- C. Roof drains shall discharge to infiltration areas or vegetative BMPs to the maximum extent practicable.

§ 174-41. Waste disposal prohibitions.

No person shall throw, deposit, leave, maintain, keep, or permit to be thrown, deposited, left, or maintained, in or upon any public or private property, driveway, parking area, street, alley, sidewalk, or other component of the municipality's separate storm sewer system, any refuse, rubbish, garbage, litter, or other discarded or abandoned objects, articles, and accumulations,

so that the same may cause or contribute to pollution. Wastes deposited in streets in proper waste receptacles for the purposes of collection are exempted from this prohibition.

§ 174-42. Alteration of BMPs.

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

ARTICLE VIII
Enforcement and Penalties

§ 174-43. Notification.

In the event that a person fails to comply with the requirements of this chapter or fails to conform to the requirements of any permit issued hereunder, the municipality shall provide written notification of the violation. Such notification shall set forth the nature of the violation(s) and establish a time limit for correction of these violations(s). Failure to comply within the time specified shall subject such person to the penalty provision of this chapter. All such penalties shall be deemed cumulative and shall not prevent the municipality from pursuing any and all other remedies. It shall be the responsibility of the owner of the real property on which any regulated activity is proposed to occur, is occurring, or has occurred to comply with the terms and conditions of this chapter.

§ 174-44. Enforcement.

The municipal governing body is hereby authorized and directed to enforce all of the provisions of this chapter. All inspections regarding compliance with the drainage plan shall be the responsibility of the Municipal Engineer or other qualified persons designated by the municipality.

- A. A copy of the drainage plan approved by the municipality shall be on file at the site throughout the duration of the construction activity. Periodic inspections may be made by the municipality or designee during construction.
- B. Adherence to approved plan. It shall be unlawful for any person, firm or corporation to undertake any regulated activity under § 174-5 on any property except as provided for in the approved drainage plan and pursuant to the requirements of this chapter. It shall be unlawful to alter or remove any control structure required by the drainage plan pursuant to this chapter or to allow the property to remain in a condition which does not conform to the approved drainage plan.
- C. At the completion of the project, and as a prerequisite for the final approval, the owner or his representatives shall:

- (1) Provide a certification of completion from an engineer, architect, surveyor or other qualified person verifying that all permanent facilities have been constructed according to the approved drainage plan, plans and specifications and approved revisions thereto.
 - (2) Provide a set of as-built drawings.
- D. After receipt of the certification by the municipality, a final inspection shall be conducted to certify compliance with this chapter.
- E. Suspension and revocation of permits.
- (1) Any municipal permit issued under this chapter may be suspended or revoked or a stop-work order may be issued by the municipality for:
 - (a) Noncompliance with or failure to implement any provision of the permit.
 - (b) A violation of any provision of this chapter or any other applicable law, ordinance, rule or regulation relating to the project.
 - (c) The creation of any condition or the commission of any act during construction or development which constitutes or creates a hazard or nuisance or pollution or which endangers the life or property of others, or as outlined in Article IX of this chapter.
 - (2) A suspended permit shall be reinstated by the municipality when:
 - (a) The Municipal Engineer or his designee has inspected and approved the corrections to the stormwater management and erosion and sediment control BMPs or the elimination of the hazard or nuisance; and/or
 - (b) The municipality is satisfied that the violation of this chapter, law, or rule and regulation has been corrected.
 - (3) A permit that has been revoked by the governing body cannot be reinstated. The applicant may apply for a new permit under the procedures outlined in this chapter.
- F. Certificate of occupancy. A certificate of occupancy shall not be issued unless all requirements of this chapter have been met.

§ 174-45. Violations; public nuisance.

- A. The violation of any provision of this chapter is hereby deemed a public nuisance.
- B. Each day that a violation continues shall constitute a separate violation.

§ 174-46. Notice to comply; failure to comply.

- A. Whenever the municipality finds that a person has violated a prohibition or failed to meet a requirement of this chapter, the municipality 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. Such notification shall set forth the nature of the violation(s) and establish a time limit for correction of these violation(s). Said notice may further advise that, if applicable, should the violator fail to take the required action within the established deadline, the work will be done by the municipality or designee and the expense thereof shall be charged to the violator.
- C. Failure to comply within the time specified shall also subject such person to the penalty provisions of this chapter. All such penalties shall be deemed cumulative and shall not prevent the municipality from pursuing any and all other remedies available in law or equity.

§ 174-47. Violations and penalties.

- A. Anyone violating the provisions of this chapter shall, upon conviction thereof by a summary proceeding action brought before a District Justice in accordance with Section 3301 of the Borough Code,⁹ be subject to a fine of not more than \$500 for each violation plus court costs. Each day that the violation continues shall be a separate offense.
- B. In addition, the municipality, through its Solicitor, may institute injunctive, mandamus or any other appropriate action or proceeding at law or in equity for the enforcement of this chapter. 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. In any action brought under this subsection, the municipality shall be entitled to recover, in addition to any other available relief, reasonable attorneys' fees and actual costs of the litigation.

§ 174-48. Appeals.

- A. Any person aggrieved by any action of the municipality or its designee relevant the provisions of this chapter may appeal to the municipal governing body within 30 days of that action.

9. Editor's Note: See 53 P.S. 48301.

- B. Any person aggrieved by any decision of the municipal governing body relevant to the provisions of this chapter may appeal to the County Court of Common Pleas in the county where the activity has taken place within 30 days of the governing body's decision.

STORMWATER MANAGEMENT

174 Attachment 1

Borough of Camp Hill

Appendix A

Low-Impact Development Practices

Alternative Approach for Managing Stormwater Runoff

Natural hydrologic conditions may be altered radically by poorly planned development practices. Deleterious activities include 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 in a detention basin in accordance with the local regulations. This approach leads ultimately to the 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 postdevelopment runoff rates and volumes, which will minimize needs for artificial conveyance and storage facilities. To simulate predevelopment 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 for 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 modern developments. 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. 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 minimize 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.

CAMP HILL CODE

- **Avoiding introduction of impervious areas.** A 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 backyards, 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 driveways 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.

STORMWATER MANAGEMENT

In summary, a careful consideration of the existing topography and implementation of a combination of the above-mentioned techniques may avoid construction of costly stormwater control measures. Other benefits include reduced potential of downstream flooding, water quality degradation of receiving streams/water bodies, and enhancement of aesthetics and reduction of development costs. Beneficial results include more stable base flows in receiving streams, improved groundwater recharge, reduced flood flows, reduced pollutant loads, and reduced costs for conveyance and storage.

Note: This information has been developed from various sections presented in the Pennsylvania Handbook of BMPs for Developing Areas, prepared by CH2M HILL under a contract with PACD.

STORMWATER MANAGEMENT

174 Attachment 2

Borough of Camp Hill

**Appendix C
Stormwater Management Design Criteria**

**Table C-1
Design Storm Rainfall Amount (inches)
for Twenty-Four-Hour Storm Event**

Return Frequency (years)	Precipitation (inches)
1	2.40
2	2.90
5	3.55
10	4.45
25	5.40
50	6.60
100	7.60

Source: Pennsylvania Department of Transportation "Storm Intensity-Duration-Frequency Charts," May 1986.

CAMP HILL CODE

Table C-2
Runoff Curve Numbers
[From NRCS (SCS) TR-55]

Land Use	Hydrologic Condition	Runoff Curve Number for Hydrologic Soil Group			
		A	B	C	D
Open space:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas					
Paved parking lots, roof, driveways		98	98	98	98
Streets and roads:					
Paved; with curbs and storm sewers		98	98	98	98
Paved; with open ditches		83	89	92	93
Gravel		76	85	89	91
Dirt		72	82	87	89
Urban districts:					
Commercial and business		81	92	94	95
Residential districts by average lot size:					
1/8 acre or less (townhouses)		77	85	90	92
1/4 acre		61	75	83	87
1/3 acre		57	72	81	86
1/2 acre		54	70	80	85
1 acre		51	68	79	84
2 acres		47	66	77	82
Newly graded areas (pervious area, no vegetation)		81	89	93	95
Agricultural lands:					
Fallow:					
Bare soil		77	86	91	94
Crop residue cover	Poor	76	85	90	93
Crop residue cover	Good	74	83	88	90
Pasture, grassland, or range	Poor	68	79	86	89
Pasture, grassland, or range	Fair	49	69	79	84

STORMWATER MANAGEMENT

Land Use	Hydrologic Condition	Runoff Curve Number for Hydrologic Soil Group			
		A	B	C	D
Agricultural lands (cont'd):					
Pasture, grassland, or range	Good	39	61	74	80
Row crops:					
Straight row	Poor	72	81	88	91
Straight row	Good	67	78	85	89
Straight row and crop residue cover	Poor	71	80	87	90
Straight row and crop residue cover	Good	64	75	82	85
Contoured	Poor	70	79	84	88
Contoured	Good	65	75	82	86
Contoured and crop residue cover	Poor	69	78	83	87
Contoured and crop residue cover	Good	64	74	81	85
Contoured and terraced	Poor	66	74	80	82
Contoured and terraced	Good	62	71	78	81
Contoured, terraced, and crop residue	Poor	65	73	79	81
Contoured, terraced, and crop residue	Good	61	70	77	80
Small grain:					
Straight row	Poor	65	76	84	88
Straight row	Good	63	75	83	87
Straight row and crop residue	Poor	64	75	83	86
Straight row and crop residue	Good	60	72	80	84
Contoured	Poor	63	74	80	85
Contoured	Good	61	73	81	84
Contoured and crop residue	Poor	62	73	81	84
Contoured and crop residue	Good	60	72	80	83
Contoured and terraced	Poor	61	72	79	82
Contoured and terraced	Good	59	70	78	81
Contoured, terraced, and crop residue	Poor	60	71	78	81
Contoured, terraced, and crop residue	Good	58	69	77	80
Meadow or legumes:					
Straight row	Poor	66	77	85	89

CAMP HILL CODE

Land Use	Hydrologic Condition	Runoff Curve Number for Hydrologic Soil Group			
		A	B	C	D
Agricultural lands (cont'd):					
Straight row	Good	58	72	81	85
Contoured	Poor	64	75	83	85
Contoured	Good	55	69	78	83
Contoured and terraced	Poor	63	73	80	83
Contoured and terraced	Good	51	67	76	80
Meadow, continuous grass, protected from grazing and mowed for hay		30	58	71	78
Brush: brush/weed mixture	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30	48	65	73
Woods and grass combination (orchard)	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30	55	70	77
Farmsteads: buildings, lanes, driveways, and surrounding lots		59	74	82	86

STORMWATER MANAGEMENT

**Table C-3
Rational Formula Runoff Coefficients**

Type of Drainage Area	Runoff Coefficient
Lawns:	
Sandy soil, flat, <2%	0.05 to 0.10
Sandy soil, average, 2% to 7%	0.10 to 0.15
Sandy soil, steep, >7%	0.15 to 0.20
Heavy soil, flat, <2%	0.13 to 0.17
Heavy soil, average, 2% to 7%	0.18 to 0.22
Heavy soil, steep, >7%	0.25 to 0.35
Business:	
Downtown areas	0.70 to 0.95
Neighborhood areas	0.50 to 0.70
Residential:	
Single-family areas	0.30 to 0.50
Multiunits, detached	0.40 to 0.60
Multiunits, attached	0.60 to 0.75
Suburban	0.25 to 0.40
Apartment dwelling areas	0.50 to 0.70
Industrial:	
Light areas	0.50 to 0.80
Heavy areas	0.60 to 0.90
Parks, cemeteries	0.10 to 0.25
Playgrounds	0.20 to 0.35
Railroad yard areas	0.20 to 0.40
Unimproved areas	0.10 to 0.30
Streets:	
Asphaltic	0.70 to 0.95
Concrete	0.08 to 0.95
Brick	0.70 to 0.85
Drives and walks	0.75 to 0.85
Roofs	0.75 to 0.95

CAMP HILL CODE

Table C-4
Manning Roughness Coefficients

Pipe Material or Channel Lining	Roughness Coefficient
Cast-iron pipe	0.013
Concrete pipe	0.012
Corrugated metal pipe	0.024
Corrugated metal pipe – paved invert	0.019
High-density polyethylene pipe (HDPE) – smooth lined	0.012
High-density polyethylene pipe (HDPE) – corrugated	0.018
Plastic pipe (PVC, SDR, S&D)	0.011
Earth-lined channel (few rocks)	0.020
Earth-bottomed channel with rock sides	0.030
Grass-lined channel	0.050