CHAPTER XXV

STORMWATER MANAGEMENT

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Part 1

General Provisions

Section 101. Short Title. This Chapter shall be known and may be cited as the "Amity Township Stormwater Management Ordinance". (Ordinance 212, June 7, 2005, Section 1)

Section 102. Statement of Findings. The governing body of the Municipality finds that:

(a) Inadequate management of accelerated stormwater runoff resulting from development throughout a watershed increases flood flows and velocities, contributes to erosion and sedimentation, overtaxes the carrying capacity of existing streams and storm sewers, greatly increases the cost of public facilities to convey and manage 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 stream-beds and stream-banks 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) A comprehensive program of stormwater management (SWM), including minimization of impacts of development, redevelopment and activities causing accelerated erosion, is fundamental to the public health, safety, welfare, and the protection of the people of the Municipality and all the people of the Commonwealth, their resources and the environment.

(d) Inadequate management of accelerated stormwater runoff resulting from development throughout a watershed poses a threat to surface and groundwater quality.

(e) Stormwater can be an important water resource by providing groundwater recharge for water supplies and base flow of streams, which also protects and maintains surface water quality.

(f) Impacts from stormwater runoff can be minimized by using project designs that maintain the natural hydrologic regime, and sustain high water quality, groundwater recharge, stream baseflow and aquatic ecosystems. The most cost effective and environmentally advantageous way to manage storm water runoff is through nonstructural project design, minimizing impervious surfaces and sprawl, avoiding sensitive areas (i.e. stream buffers, floodplains, steep slopes), and designing to topography and soils to maintain the natural hydrologic regime.

(g) Public education on the control of pollution from stormwater is an essential component in successfully addressing stormwater.

(h) 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).

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

(Ordinance 212, June 7, 2005, Section 1)

Section 103. Purpose. The purpose of this Chapter is to promote the public health, safety, and welfare within Amity Township by maintaining the natural hydrologic regime by minimizing the impacts described in Section 102 of this Chapter through provisions designed to:

(a) Promote alternative project designs and layout that minimizes impacts to surface and ground water.

(b) Promote nonstructural Best Management Practices (BMPs).

(c) Minimize increases in stormwater volume.

(d) Minimize impervious surfaces.

(e) Manage accelerated runoff and erosion and sedimentation problems at their source by regulating activities that cause these problems.

(f) Provide review procedures and performance standards for stormwater planning and management.

(g) Utilize and preserve the existing natural drainage systems.

(h) Manage stormwater impacts close to the runoff source, which requires a minimum of structures and relies on natural processes.

(i) Focus on infiltration of stormwater, to maintain groundwater recharge, to prevent degradation of surface and groundwater quality and to otherwise protect water resources.

(j) Maintain existing base flows and quality of streams and watercourses, where possible.

(k) Meet legal water quality requirements under state law, including regulations at 25 Pa. Code Chapter 93.4a to protect and maintain "existing uses" and maintain the level of water quality to support those uses in all streams, and to protect and maintain water quality in "special protection" streams.

(l) Address the quality and quantity of stormwater discharges from the development site.

(m) Provide a mechanism to identify controls necessary to meet the NPDES permit requirements.

(n) Implement an illegal discharge detection and elimination program to address non-stormwater discharges into the Municipality's separate storm sewer system.

(o) Preserve and restore the flood-carrying capacity of streams.

(p) Prevent scour and erosion of streambanks and streambeds.

(q) Provide performance standards and design criteria for watershed-wide stormwater management and planning.

(r) Provide proper operation and maintenance of all permanent stormwater management facilities and BMPs that are implemented in the Municipality.

(Ordinance 212, June 7, 2005, Section 1)

Section 104. Statutory Authority. The Municipality is empowered to regulate land use activities that affect runoff, surface and groundwater quality and quantity by the authority of:

(a) Act of October 4, 1978 32 P.S., P.L. 864 (Act 167) Section 680.1 et seq., as amended, the "Stormwater Management Act" (hereinafter referred to as "the Act").

(b) Water Resources Management Act of 2002, as amended.

(c) Second Class Township Code, 53 PS Section 66501 et seq., 66601 et seq. and the Borough Code 53 PS Section 46201 et seq.

(d) Pennsylvania Municipalities Planning Code (MPC), Act 247, as amended.

(Ordinance 212, June 7, 2005, Section 1)

Section 105. Applicability/Regulated Activities. The following activities are defined as "Regulated Activities" and shall be regulated by this Chapter:

(a) Land development.

(b) Subdivisions.

(c) Alteration of the natural hydrologic regime.

(d) Construction or reconstruction of, or additional impervious or semi-pervious surfaces (driveways, parking lots, roads, etc.) greater than one thousand (1,000) SF.

(e) Construction of new buildings or additions to existing buildings greater than one thousand (1,000) SF.

(f) Redevelopment of a site which will increase runoff or change a discharge point. Any redevelopment that does not increase the runoff must still comply with Section 304 (Nonstructural Project Design), Section 305 (Groundwater Recharge), Section 306 (Water Quality), and Section 307 (Streambank Erosion).

(g) Diversion piping or encroachments in any natural or man-made channel.

(h) Nonstructural and structural storm water management BMPs or appurtenances thereto.

(i) Regulated Earth Disturbance1.

(j) Any of the above Regulated Activities which were approved more than 5 years prior to the effective date of this Chapter and resubmitted for municipal approval.

(Ordinance 212, June 7, 2005, Section 1)

Section 106. Severability. Should any section or provision of this Chapter be declared invalid by a court of competent jurisdiction, such decision shall not affect the validity of any of the remaining provisions of this Chapter. (Ordinance 212, June 7, 2005, Section 1)

Section 107. Compatibility With Other Ordinance Requirements. Approvals issued pursuant to this Chapter do not relieve the Applicant of the responsibility to secure required permits or approvals for activities regulated by any other applicable code, rule, act or ordinance. (Ordinance 212, June 7, 2005, Section 1)

1 Earth Disturbance activities and associated stormwater management controls 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.

Part 2

Definitions

Section 201. Interpretation. 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, unit of government, 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."

(Ordinance 212, June 7, 2005, Section 1)

Section 202. Definitions.

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

(b) Agricultural Activities. The work of producing crops and raising livestock including tillage, plowing, disking, harrowing, pasturing and installation of conservation measures. For purposes of regulation by this Chapter construction of new buildings or impervious area is not considered an agricultural activity.

(c) 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.

(d) As-built Drawings. Those maintained by the Contractor as he constructs the project and upon which he documents the actual locations of the building components and changes to the original contract documents. These, or a copy of same, are turned over to the Engineer at the completion of the project.

(e) Applicant. A person who has filed an application for approval to engage in any Regulated Activities as defined in Section 105 of this Chapter.

(f) Bankfull. The channel at the top-of-bank or point where water begins to overflow onto a floodplain.

(g) Base Flow. Portion of stream discharge derived from groundwater; the sustained discharge that does not result from direct

runoff or from water diversions, reservoir releases, piped discharges, or other human activities.

(h) Bioretention. A stormwater retention area which utilizes woody and herbaceous plants and soils to remove pollutants before infiltration occurs.

(i) BMP (Best Management Practice). Methods, measures or practices to prevent or reduce surface runoff and/or water pollution, including but not limited to, structural and non-structural stormwater management practices and operation and maintenance procedures. See also Non-structured Best Management Practice (BMP).

(j) Board of Supervisors. The Board of Supervisors of the Township of Amity, Berks County, Pennsylvania.

(k) Buffer. The area of land immediately adjacent to any stream, measured perpendicular to and horizontally from the top-of-bank on both sides of a stream. (See Top of Bank)

(l) Channel. A drainage element in which stormwater flows with an open surface. Open channels include, but shall not be limited to, natural and man-made drainage ways, swales, streams, ditches, canals and pipes flowing partly full.

(m) Channel Erosion. The widening, deepening, and headward cutting of small channels and waterways, caused by stormwater runoff or bankfull flows.

(n) Cistern. An underground reservoir or tank for storing rainwater.

(o) Conservation District. The Berks County Conservation District.

(p) Culvert. A structure with appurtenant works, which carries water under or through an embankment or fill.

(q) 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.

(r) Department. The Pennsylvania Department of Environmental Protection.

(s) Designee. The agent of the Berks County Planning Commission, Berks County Conservation District and/or agent of the governing body involved with the administration, review or enforcement of any provisions of this Chapter by contract or memorandum of understanding.

(t) Design Professional (Qualified). A Pennsylvania Registered Professional Engineer, Registered Landscape Architect, Professional Geologist, Qualified Soils Scientist or a Registered Professional Land Surveyor qualified to perform the specific design task at hand based upon the applicable code of ethics.

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

(v) Designated Watershed (ACT 167). A Watershed which is listed under the Pennsylvania Department of Environmental Protection's "Index of Designated Watersheds (Stormwater Management)" pursuant to the Stormwater Management Act P.L. 864, No. 167, October 4, 1978, and published in the Pennsylvania Bulletin on May 31, 1980 and August 9, 1980, as amended on November 19, 1991, April 21, 1992, June 21, 1994, April 16, 1996, April 15, 1997 and December 16, 1997).

(w) Detention Basin. An impoundment designed to collect and retard stormwater runoff by temporarily storing the runoff and releasing it at a predetermined rate. Detention basins are designed to drain completely shortly after any given rainfall event and are dry until the next rainfall event.

(x) Developer. A person that seeks to undertake any Regulated Activities at a project site in the Municipality.

(y) Development. Any human-induced change to improved or unimproved real estate, whether public or private, including but not limited to land development, construction, installation, or expansion of a building or other structure, land division, street construction, drilling, and site alteration such as embankments, dredging, grubbing, grading, paving, parking or storage facilities, excavation, filling, stockpiling, or clearing. As used in this Chapter, development encompasses both new development and redevelopment.

(z) Development Site. The specific tract of land where any Regulated Activities in the Municipality are planned, conducted or maintained.

(aa) Diffused Drainage Discharge. Drainage discharge not confined to a single point location or channel, such as sheet flow or shallow concentrated flow.

(bb) Discharge. (1) (verb) To release water from a project, site, aquifer, drainage basin or other point of interest. (2) (noun) The rate and volume of flow of water such as in a stream, generally expressed in cubic feet per second (volume per unit of time). See also Peak Discharge.

(cc) Discharge Point. The point of discharge for a stormwater facility.

(dd) Disturbed Areas. Unstabilized land area where an earth disturbance activity is occurring or has occurred.

(ee) Ditch. An artificial waterway for irrigation or stormwater conveyance.

(ff) Downslope Property Line. That portion of the property line of the lot, tract, or parcels of land being developed located such that overland or pipe flow from the site would be directed towards it.

(gg) Drainage Conveyance Facility. A Stormwater Management Facility designed to transmit stormwater runoff and shall include channels, swales, pipes, conduits, culverts, storm sewers, etc.

(hh) Drainage Easement. A right granted by a landowner to a grantee, allowing the use of private land for stormwater management purposes.

(ii) Drainage Permit. A permit issued by the Municipal governing body after the drainage plan has been approved.

(jj) 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 Section 403.

(kk) Earth Disturbance Activity. A construction or other human activity which disturbs the surface of land, including, but not limited to, clearing and grubbing, grading, excavations, embankments, land development, agricultural plowing or tilling, timber harvesting activities, road maintenance activities, mineral extraction, and the moving, depositing, stockpiling or storing of soil, rock or earth materials.

(ll) Emergency Spillway. A conveyance area that is used to pass peak discharge greater than the maximum design storm controlled by the stormwater facility.

(mm) Enchroachment. A structure or activity that changes, expands or diminishes the course, current or cross section of a watercourse, floodway or body of water.

(nn) Erosion. The process by which the surface of the land, including channels, is worn away by water, wind, or chemical action.

(oo) Erosion and Sediment Control Plan. A plan for a project site which identifies BMPs to minimize accelerated erosion and sedimentation.

(pp) Exceptional Value Waters. Surface waters of high quality which satisfy Pennsylvania Code Title 25 Environmental Protection, Chapter 93, Water Quality Standards, §93.4b(b) (relating to anti-degradation).

(qq) Existing Conditions. The initial condition of a project site prior to the proposed alteration. 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.

(rr) Flood. A temporary condition of partial or complete inundation of land areas from the overflow of streams, rivers and other waters of this Commonwealth.

(ss) Floodplain. Any land area susceptible to inundation by water from any natural source or delineated by applicable Department of Housing and Urban Development, Federal Insurance Administration Flood Hazard Boundary - Mapped as being a special flood hazard area.

(tt) Floodway. The channel of the watercourse and those portions of the adjoining floodplains, which are reasonably required to carry and discharge the one hundred (100) year frequency flood. Unless otherwise specified, the boundary of the floodway is as indicated on maps and flood insurance studies provided by FEMA. In an area where no FEMA maps or studies have defined the boundary of the one hundred (100) year frequency floodway, it is assumed - absent evidence to the contrary - that the floodway extends from the stream to fifty feet (50') from the top-of-bank.

(uu) Fluvial Geomorphology. The study of landforms associated with river channels and the processes that form them.

(vv) Forest Management/Timber Operations. Planning and activities necessary for the management of forest land with no change of land use proposed. These include timber inventory and preparation of forest management plans, silvicultural treatment, cutting budgets, logging road design and construction, timber harvesting and reforestation.

(ww) Freeboard. A vertical distance between the elevation of the design high-water and the top of a dam, levee, tank, basin, swale or diversion berm. The space is required as a safety margin in a pond or basin.

(xx) 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.

(yy) Grassed Waterway. A natural or constructed waterway, usually broad and shallow, covered with erosion-resistant grasses, used to convey surface water.

(zz) Groundwater. Water beneath the earth's surface, often between saturated soil and rock that supplies wells and springs.

(aaa) Groundwater Recharge. Replenishment of existing natural underground water supplies without degrading groundwater quality.

(bbb) HEC-HMS. The U.S. Army Corps of Engineers, Hydrologic Engineering Center (HEC) - Hydrologic Modeling System (HMS). This model was used to model the Schuylkill River watershed during the ACT 167 Plan development and was the basis for the Standards and Criteria of this Chapter.

(ccc) High Quality Waters. Surface waters having quality which exceeds levels necessary to support propagation of fish, shellfish and wildlife and recreation in and on the water by satisfying Pennsylvania Code Title 25 Environmental Protection, Chapter 93 Water Quality Standards, §93.4b(a).

(ddd) Hotspots. Areas where land use or activities generate highly contaminated runoff, with concentrations of pollutants in excess of those typically found in stormwater.

(eee) Hydrograph. A graph of discharge versus time for a selected point in the drainage system.

(fff) Hydrologic Regime (Natural). The hydrologic cycle or balance that sustains quality and quantity of stormwater, baseflow, storage and groundwater supplies under natural conditions.

(ggg) Hydrologic Soil Group. A classification of soils by the Natural Resources Conservation Service, formerly 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.

(hhh) Impervious Surface. A surface that prevents the infiltration of water into the ground. Impervious surface includes, but is not limited to, any roof, parking or driveway areas, and any new streets and sidewalks. Any surface areas designed to be gravel or crushed stone shall be assumed to be impervious surfaces.

(iii) Impoundment. A retention or detention basin designed to retain stormwater runoff and release it at a controlled rate.

(jjj) Infill. Development that occurs on smaller parcels that remain undeveloped but are within or very close proximity to urban areas. The development relies on existing infrastructure and does not require an extension of water, sewer or other public utilities.

(kkk) Infiltration. Movement of surface water into the soil, where it is absorbed by plant roots, evaporated into the atmosphere, or percolates downward to recharge groundwater.

(lll) Infiltration Structures. A structure designed to direct runoff into the underground water (e.g., french drains, seepage pits, seepage trench).

(mmm) Inlet. The upstream end of any structure through which water may flow.

(nnn) Intermittent Stream. A stream that flows only part of the time. Flow generally occurs for several weeks or months in response to seasonal precipitation, due to groundwater discharge.

(ooo) Land Development. Any of the following activities:

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

(i) A group of two (2) or more residential or nonresidential buildings, whether proposed initially or cumulatively, or a single nonresidential building on a lot or or lots regardless of the number of occupants or tenure, or

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

(2) A subdivision of land;

(3) Development in accordance with Section 503(1.1) of the PA Municipalities Planning Code.

(ppp) Limiting Zone. A soil horizon or condition in the soil profile or underlying strata which includes one of the following:

(1) A seasonal high water table, whether perched or regional, determined by direct observation of the water table or indicated by soil mottling.

(2) A rock with open joints, fracture or solution channels, or masses of loose rock fragments, including gravel, with insufficient fine soil to fill the voids between the fragments.

(3) A rock formation, other stratum or soil condition which is so slowly permeable that it effectively limits downward passage of water.

(qqq) Lot. A designated parcel, tract or area of land established by a plat or otherwise as permitted by law and to be used, developed or built upon as a unit.

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

(sss) 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.

(ttt) Municipal Engineer. A professional engineer licensed as such in the Commonwealth of Pennsylvania, duly appointed as the engineer for a municipality, planning agency or joint planning commission.

(uuu) Municipality. The Township of Amity, Berks County, Pennsylvania.

(vvv) Natural Condition. Existing conditions.

(www) Natural Hydrologic Regime. (See Hydrologic Regime).

(xxx) Natural Recharge Area. Undisturbed surface area or depression where stormwater collects, and a portion of which infiltrates and replenishes the underground and groundwater.

(yyy) Nonpoint Source Pollution. Pollution that enters a water body from diffuse origins in the watershed and does not result from discernible, confined or discrete conveyances.

(zzz) Non-stormwater Discharges. Water flowing in stormwater collection facilities, such as pipes or swales, which is not the result of a rainfall event or snowmelt.

(aaaa) Nonstructural Best Management Practice (BMPs). Methods of controlling stormwater runoff quantity and quality, such as innovative site planning, impervious area and grading reduction, protection of natural depression areas, temporary ponding on site and other techniques.

(bbbb) 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.

(cccc) NRCS. Natural Resource Conservation Service (previously SCS).

(dddd) Outfall. "Point Source" as described in 40 CFR § 122.2 at the point where the Municipality's storm sewer system discharges to surface waters of the Commonwealth.

(eeee) Outlet. Points of water disposal to a stream, river, lake, tidewater or artificial drain.

(ffff) Parent Tract. The parcel of land from which a land development or subdivision originates, determined from the date of municipal adoption of this Chapter.

(gggg) Parking Lot Storage. Involves the use of parking areas as temporary impoundments with controlled release rates during rainstorms.

(hhhh) Peak Discharge. The maximum rate of stormwater runoff from a specific storm event.

(iiii) Penn State Runoff Model. The computer-based hydrologic model developed at the Pennsylvania State University.

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

(kkkk) Planning Commission. The Planning Commission of Amity Township.

(llll) Point Source. Any discernible, confined and discrete conveyance, including, but not limited to, any pipe, ditch, channel, tunnel or conduit from which stormwater is or may be discharged, as defined in State regulations at 25 Pa. Code § 92.1.

(mmmm) Post Construction. Period after construction where disturbed areas are stabilized, stormwater controls are in place and functioning and all proposed improvements in the approved land development plan are completed.

(nnnn) Pretreatment. Techniques employed in stormwater BMPs to provide storage or filtering to trap coarse materials and other pollutants before they enter the system, but not necessarily meet the water quality volume requirements of this Chapter.

(oooo) Project Site. The specific area of land where any Regulated Earth Disturbance activities in the Municipality are planned, conducted or maintained.

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

(qqqq) Recharge. The replenishment of groundwater through the infiltration of rainfall, other surface waters, or land application of water or treated wastewater.

(rrrr) Reconstruction. Demolition of, and subsequent rebuilding of impervious surface.

(ssss) Redevelopment. The demolition, construction, reconstruction, alteration, or improvement exceeding two thousand (2,000) square feet of land disturbance performed on sites where existing land use is commercial, industrial, institutional, or multifamily residential. Maintenance activities such as top-layer grinding and re-paving are not considered to be redevelopment. Interior remodeling projects and tenant improvements are also not considered to be redevelopment. Utility trenches in streets are not considered redevelopment unless more than fifty percent (50%) of the street width is removed and re-paved.

(tttt) Regulated Activities. Actions or proposed actions that have an impact on stormwater runoff quality or quantity and that are specified in Section 105 of this Chapter.

(uuuu) Regulated Earth Disturbance Activity. Earth disturbance activity one acre or more with a point source discharge to surface waters or the Municipality's storm sewer system, or five (5) acres or more regardless of the planned runoff. This includes earth disturbance on any portion of, part, or during any stage of, a larger common plan of development.

(vvvv) Release Rate. The percentage of existing conditions peak rate of runoff from a site or subarea to which the proposed conditions peak rate of runoff must be reduced to protect downstream areas.

(wwww) Repaving. Replacement of the impervious surface that does not involve reconstruction of an existing paved (impervious) surface.

(xxxx) Replacement Paving. Reconstruction of and full replacement of an existing paved (impervious) surface.

(yyyy) Retention Basin. A structure in which stormwater is stored and not released during the storm event. Retention basins do not have an outlet other than recharge and must infiltrate stored water in no more than four (4) days.

(zzzz) 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 (25) year return period rainfall would be expected to recur on the average of once every twenty-five (25) years.

(aaaaa) 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.

(bbbbb) Road Maintenance. Earth disturbance activities within the existing road cross-section, such as grading and repairing existing unpaved road surfaces, cutting road banks, cleaning or clearing drainage ditches and other similar activities.

(ccccc) Roof Drains. A drainage conduit or pipe that collects water runoff from a roof and leads it away from the structure.

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

(eeeee) Runoff. Any part of precipitation that flows over the land surface.

(fffff) SALDO. The Subdivision and Land Development Ordinance of the Township of Amity.

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

(hhhhh) Sediment Pollution. The placement, discharge or any other introduction of sediment into the waters of the Commonwealth.

(iiiii) Sedimentation. The process by which mineral or organic matter is accumulated or deposited by the movement of water or air.

(jjjjj) 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 underground water.

(kkkkk) Separate Storm Sewer System. A conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels or storm drains) primarily used for collecting and conveying stormwater runoff.

(lllll) Shallow Concentrated Flow. Stormwater runoff flowing in shallow, defined ruts prior to entering a defined channel or waterway.

(mmmmm) Sheet Flow. A flow process associated with broad, shallow water movement on sloping ground surfaces that is not channelized or concentrated.

(nnnnn) 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).

(ooooo) Source Water Protection Areas (SWPA). The zone through which contaminants, if present, are likely to migrate and reach a drinking water well or surface water intake.

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

(qqqqq) Special Protection Subwatersheds. Watersheds for which the receiving waters are exceptional value (EV) or high quality (HQ) waters.

(rrrrr) Spillway. A conveyance that is used to pass the peak discharge of the maximum design storm controlled by the stormwater facility.

(sssss) State Water Quality Requirements. As defined under state regulations -- protection of designated and existing uses (See 25 Pa. Code Chapters 93 and 96)--including:

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

(2) "Existing uses" are those attained as of November 1975, regardless whether they have been designated in Chapter 93. Regulated Earth Disturbance activities must be designed to protect and maintain existing uses and maintain the level of water quality necessary to protect those uses in all streams, and to protect and maintain water quality in special protection streams.

(3) Water quality involves the chemical, biological and physical characteristics of surface water bodies. After Regulated Earth Disturbance activities are complete, these characteristics can be impacted by addition of pollutants such as sediment, and changes in habitat through increased flow volumes and/or rates as a result of changes in land surface area from those activities. Therefore, permanent discharges to surface waters must be managed to protect the stream bank, streambed and structural integrity of the waterway, to prevent these impacts.

(ttttt) 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.

(uuuuu) 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".

(vvvvv) 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.

(wwwww) Stormwater. The surface runoff generated by precipitation reaching the ground surface.

(xxxxx) Stormwater Management District. Those subareas in which some type of detention is required to meet the plan requirements and the goals of Act 167.

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

(zzzzz) Stormwater Management Plan. The plan for managing those land use activities that will influence stormwater runoff quality and quantity and that would impact the Schuylkill River Watershed adopted by Berks County and Schuylkill County as required by the Act of October 4, 1978, P.L. 864, (Act 167), and known as the "Schuylkill River Watershed Act 167 Stormwater Management Plan".

(aaaaaa) Stormwater Management Site Plan. The plan prepared by the Applicant or his representative indicating how stormwater runoff will be managed at the particular site of interest according to this Chapter.

(bbbbbb) Stream. A natural watercourse.

(cccccc) Stream Buffer. The land area adjacent to each side of a stream, essential to maintaining water quality. (See Buffer)

(dddddd) Stream Enclosure. A bridge, culvert or other structure in excess of one hundred feet (100') in length upstream to downstream which encloses a regulated water of this Commonwealth.

(eeeeee) Subarea (Subwatershed). The smallest drainage unit of a watershed for which stormwater management criteria have been established in the Stormwater Management Plan.

(ffffff) Subdivision. The division or redivision of a lot, tract or parcel of land by any means into two (2) or more lots, tracts, parcels or other divisions of land including changes in existing lot lines for the purpose, whether immediate or future, of lease, partition by the court for distribution to heirs or devisees, transfer of ownership, or building or lot development; provided, however, that the subdivision by lease of land for agricultural purposes into parcels of more than ten (10) acres, not involving any new street or easement of access or any residential dwelling, shall be exempted.

(gggggg) Surface 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, or parts thereof, whether natural or artificial, within or on the boundaries of this Commonwealth.

(hhhhhh) Swale. A low lying stretch of land which gathers or carries surface water runoff.

(iiiiii) Timber Operations. See Forest Management.

(jjjjjj) 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.

(kkkkkk) Top-of-Bank. Highest point of elevation in a stream channel cross section at which a rising water level just begins to flow out of the channel and over the floodplain.

(llllll) Vernal Pond. Seasonal depressional wetlands that are covered by shallow water for variable periods from winter to spring, but may be completely dry for most of the summer and fall.

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

(nnnnnn) 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.

(oooooo) Watershed. Region or area drained by a river, watercourse or other body of water, whether natural or artificial.

(pppppp) Wellhead. (1) a structure built over a well, (2) the source of water for a well.

(qqqqqq) Wellhead Protection Area. The surface and subsurface area surrounding a water supply well, well field, spring or infiltration gallery supplying a public water system, through which contaminants are reasonably likely to move toward and reach the water source.

(rrrrrr) Wet Basin. Pond for urban runoff management that is designed to detain urban runoff and always contains water.

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

(Ordinance 212, June 7, 2005, Section 1)

Part 3

Stormwater Management

Section 301. General Requirements.

(a) Applicants proposing regulated activities in the Municipality which do not fall under the exemption criteria shown in Section 402 shall submit a drainage plan consistent with this Chapter to the Municipality for review. These criteria shall apply to the total proposed development even if development is to take place in stages.

(b) The Applicant is required to evaluate practicable alternatives to the surface discharge of stormwater, the creation of impervious surfaces and the degradation of waters of the Commonwealth, and must maintain as much as possible the natural hydrologic regime

(c) The Drainage Plan must be designed consistent with the sequencing provisions of Section 304 to ensure maintenance of the natural hydrologic regime and to promote groundwater recharge and protect groundwater and surface water quality and quantity. The Drainage Plan designer must proceed sequentially in accordance with Part 3 of this Chapter.

(d) 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.

(e) Existing points of concentrated drainage that discharge onto adjacent property shall not be altered in any manner which could cause property damage without permission of the affected property owner(s) and shall be subject to any applicable discharge criteria specified in this Chapter.

(f) 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 drainage discharge is proposed to be concentrated and discharged onto adjacent property, the Applicant must document that adequate downstream conveyance facilities exist to safely transport the concentrated discharge, or otherwise prove that no erosion, sedimentation, flooding or other impacts will result from the concentrated discharge.

(g) Where a development site is traversed by existing watercourses, drainage easements shall be provided conforming to the line of such watercourses. The terms of the easement shall conform to the stream buffer requirements contained in Subsection 306(f) of this Chapter.

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

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

(j) 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 or other structural BMPs.

(k) Roof drains shall not be connected to streets, sanitary or storm sewers or roadside ditches in order 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.

(l) All stormwater runoff shall be pre-treated for water quality prior to discharge to surface or groundwater.

(m) All regulated earth disturbance activities 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 during the earth disturbance activities (e.g., during construction), and

(2) Water quality protection measures after completion of earth disturbance activities (i.e. after construction), including operations and maintenance.

(n) No regulated earth disturbance activities within the Municipality shall commence until the requirements of this Chapter are met.

(o) Post-construction water quality protection shall be addressed as required by Section 306.

(p) Operations and maintenance of permanent stormwater BMPs shall be addressed as required by Part 7.

(q) All best management practices (BMPs) used to meet the requirements of this Chapter shall conform to the State Water Quality Requirements, and any more stringent requirements as determined by the Municipality.

(r) Techniques described in Appendix E (Low Impact Development) of this Chapter are encouraged, because they reduce the costs of complying with the requirements of this Chapter and the State Water Quality Requirements.

(s) In selecting the appropriate BMPs or combinations thereof, the Applicant SHALL consider the following:

(1) Total contributing area.

(2) Permeability and infiltration rate of the site soils.

(3) Slope and depth to bedrock.

(4) Seasonal high water table.

(5) Proximity to building foundations and well heads.

(6) Erodibility of soils.

(7) Land availability and configuration of the topography

(8) Peak discharge and required volume control.

(9) Steam bank erosion.

(10) Efficiency of the BMPs to mitigate potential water quality problems.

(11) The volume of runoff that will be effectively treated.

(12) The nature of the pollutant being removed.

(13) Maintenance requirements.

(14) Creation/protection of aquatic and wildlife habitat.

(15) Recreational value.

(t) Transference of runoff from one DEP designated Act 167 watershed to another shall be prohibited.

(u) The Board of Supervisors may require that a landowner or developer provide reasonable corrective measures to alleviate an existing off-site drainage problem that may be affected by the proposed subdivision and/or land development. It shall be the responsibility of the landowner or developer to obtain all drainage easements on, over, or through other properties, and the Municipality, its agents, workmen, servants and employees shall be indemnified and held harmless from any liability.

(Ordinance 212, June 7, 2005, Section 1)

Section 302. Permit Requirements by Other Government Entities. The following permit requirements may apply to certain regulated earth disturbance activities, and must be met prior to commencement of regulated earth disturbance activities, as applicable:

(a) All regulated earth disturbance activities subject to permit requirements by DEP under regulations at 25 Pa. Code Chapter 102.

(b) Work within natural drainageways subject to permit by DEP 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 DEP under 25 Pa. Code Chapter 105.

(d) Any stormwater management facility that would be located on a State highway right-of-way, or require access from a state highway, shall be subject to approval by the Pennsylvania Department of Transportation (PENNDOT).

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

(Ordinance 212, June 7, 2005, Section 1)

Section 303. Erosion and Sediment Control During Regulated Earth Disturbance Activities.

(a) No Regulated Earth Disturbance activities within the Municipality shall commence until the Municipality receives an approval from the Conservation District of an Erosion and Sediment Control Plan for construction activities.

(b) DEP has regulations that require an Erosion and Sediment Control Plan for any earth disturbance activity of five thousand (5,000) square feet or more, under 25 Pa. Code § 102.4(b).

(c) In addition, under 25 Pa. Code Chapter 92, a DEP "NPDES Construction Activities" permit is required for Regulated Earth Disturbance activities.

(d) Evidence of any necessary permit(s) for Regulated Earth Disturbance activities from the appropriate DEP regional office or County Conservation District must be provided to the Municipality. The issuance of an NPDES Construction Permit (or permit coverage under the statewide General Permit PAG-2) satisfies the requirements Subsection 303(a).

(e) A copy of the Erosion and Sediment Control plan and any required permit, as required by DEP regulations, shall be available at the project site at all times.

(f) Additional erosion and sediment control design standards and criteria are recommended to be applied where infiltration BMPs are proposed shall include the following:

(1) Areas proposed for infiltration BMPs shall be protected from sedimentation and compaction during the construction phase to maintain maximum infiltration capacity.

(2) Infiltration BMPs shall not be constructed nor receive runoff until the entire contributory drainage area to the infiltration BMP has achieved final stabilization.

(Ordinance 212, June 7, 2005, Section 1)

Section 304. Nonstructural Project Design (Sequencing to Minimize Stormwater Impacts).

(a) The design of all Regulated Activities shall include the following steps in sequence to minimize stormwater impacts.

(1) The Applicant is required to evaluate practicable alternatives to the surface discharge of stormwater, the creation of impervious surfaces and the degradation of waters of the Commonwealth, and must maintain as much as possible the natural hydrologic regime of the site.

(2) An alternative is practicable if it is available and capable of being done after taking into consideration cost, existing technology and logistics in light of overall project purposes, and other municipal requirements.

(3) All practicable alternatives to the discharge of stormwater are presumed to have less adverse impact on quantity and quality of waters of the Commonwealth unless otherwise demonstrated.

(b) The Applicant shall demonstrate that they designed the Regulated Activities in the following sequence to minimize the increases in stormwater runoff and impacts to water quality:

(1) Prepare an Existing Resource and Site Analysis Map (ERSAM), showing environmentally sensitive areas including, but not limited to, steep slopes, ponds, lakes, streams, wetlands, hydric soils, vernal pools, flood plains, stream buffer zones, hydrologic soil groups A and B (areas conducive to infiltration), special geologic features, any existing recharge areas and any other requirements outlined in the municipal Subdivision and Land Development Ordinance.

(2) Establish appropriate buffers for each of the delineated environmentally sensitive areas in accordance with all applicable ordinances (See Subsection 306(f) for stream buffers and Subsection 310(k) for special geologic feature buffers).

(3) Prepare a draft project layout avoiding sensitive areas identified in Subsection 304(b)(1).

(4) Identify site specific existing conditions drainage areas, discharge points, recharge areas and hydrologic soil groups A and B.

(5) Evaluate Nonstructural Stormwater Management Alternatives:

(i) Minimize earth disturbance.

(ii) Minimize impervious surfaces.

(iii) Break up large impervious surfaces.

(6) Satisfy infiltration objective (Section 305) and provide for stormwater pretreatment prior to infiltration. Pretreatment may not be necessary for rooftop runoff which enters the infiltration facility directly from a roof leader.

(7) Satisfy water quality (Section 306) and streambank erosion protection objective (Section 307).

(8) Determine what Management District the site falls into (Appendix D) and conduct an existing conditions runoff analysis.

(9) Prepare final project design to maintain existing conditions drainage areas and discharge points, to minimize earth disturbance and impervious surfaces, and to the maximum extent possible, to ensure the remaining site development has no surface or point discharge.

(10) Conduct a proposed conditions runoff analysis based on the final design and to meet the release rate and in turn the overbank flow and extreme event requirements (Section 308).

(11) Manage any remaining runoff through treatment prior to discharge, as part of detention, bioretention, direct discharge or other structural control.

(Ordinance 212, June 7, 2005, Section 1)

Section 305. Ground Water Recharge (Infiltration/Recharge/Bioretention). Maximizing the ground water recharge capacity of the area being developed is required. Design of the infiltration stormwater management facilities shall give consideration to providing ground water recharge to compensate for the reduction in the percolation that occurs when the ground surface is disturbed or impervious surface is created. It is recommended that roof runoff be directed to infiltration BMPs which can be over-designed to compensate for the infiltration losses due to parking areas. These measures are required to be consistent with Section 103, and take advantage of utilizing any existing recharge areas.

Infiltration may not be feasible on every site due to site-specific limitations such as soil type. If it cannot be physically accomplished, due to seasonal high water table, soil permeability rate, soil depth or setback distances from special geologic features, then the design professional shall be responsible to show that this cannot be **physically** accomplished. If it can be physically accomplished, then the volume of runoff to be infiltrated shall be determined from Subsection 305(a)(3) depending on demonstrated site conditions and shall be the greater of the two (2) volumes.

(a) Infiltration BMPs shall meet the following minimum requirements:

(1) Infiltration Requirements:

(i) Regulated activities will be required to infiltrate, where site conditions permit, a portion of the runoff created by the development as part of an overall stormwater management plan designed for the site. The volume of runoff to be infiltrated shall be determined from Subsections 305(a)(3) or 305(a)(3)(ii), depending upon demonstrated site conditions.

(2) Infiltration BMPs intended to receive runoff from developed areas shall be selected based on suitability of soils and site conditions and shall be constructed on soils that have the following characteristics:

(i) A minimum depth of twenty-four inches (24") between the bottom of the BMP and the limiting zone.

(ii) An infiltration and/or percolation rate sufficient to accept the additional stormwater load and drain completely as determined by field tests conducted by the Applicant's design professional.

(iii) The infiltration facility shall be capable of completely infiltrating the required retention (infiltration) volume within four (4) days (ninety-six (96) hours).

(iv) Pretreatment shall be provided prior to infiltration.

(3) The size of the infiltration facility shall be based upon the following volume criteria:

(i) NRCS Curve Number equation.

The NRCS runoff equation shall be utilized to calculate infiltration requirements (I) in inches.

I (Infiltration requirement, in inches) = (200 / CN) - 2
Eqn: 305.1

Where:

CN = SCS (NRCS) curve number of existing conditions contributing to the infiltration facility.

This equation is displayed graphically in, and the infiltration requirement can be determined from Figure 305.1.

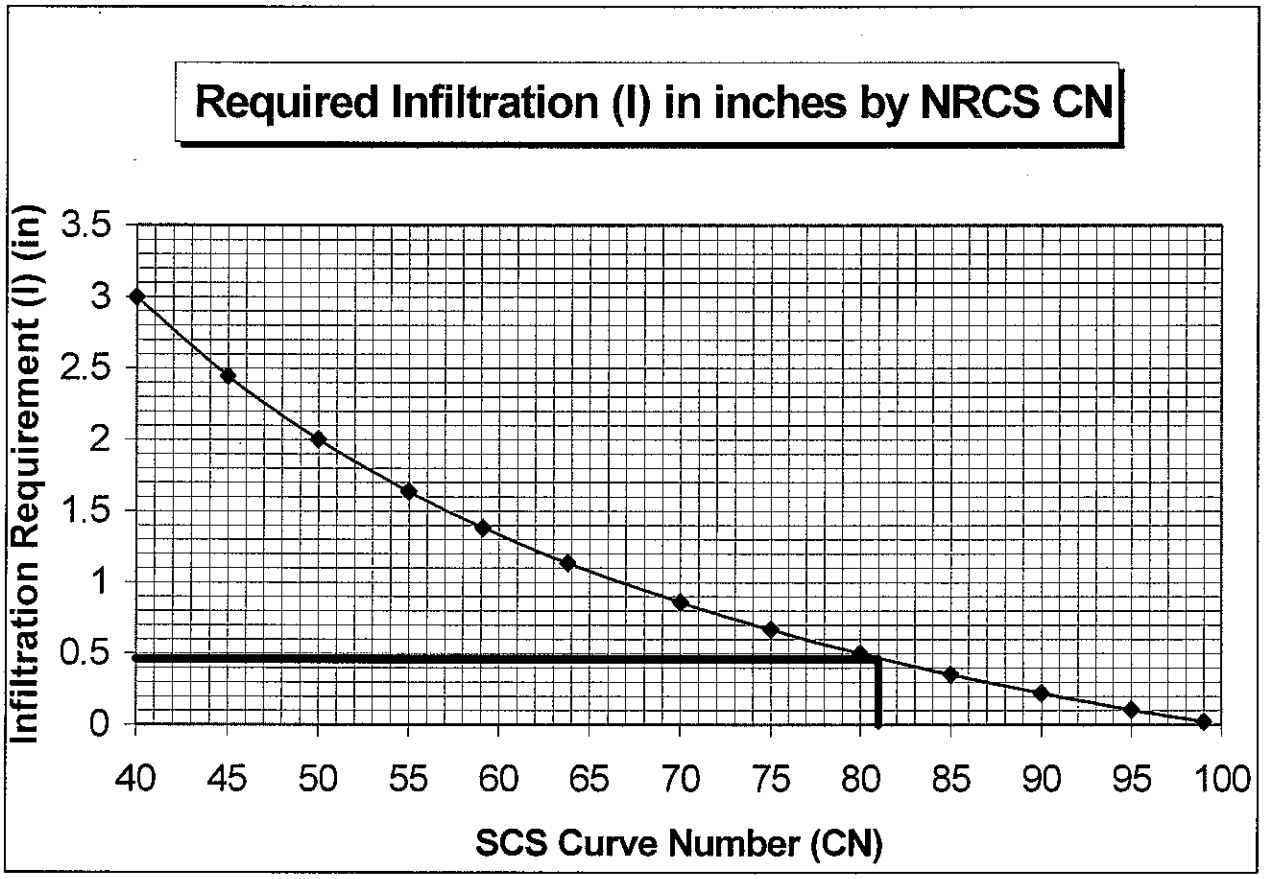


Figure 305.1. Infiltration Requirement Based Upon NRCS Curve Number

The retention (infiltration) volume (Re_v) required to meet the infiltration requirement would therefore be computed as:

Re_v = I * impervious area (square feet) / (12 in/ft) = Cubic Feet
Eqn: 305.2

Where:

I = infiltration requirements (in inches.)

(4) Annual Recharge - Water Budget Approach.

It has been determined that infiltrating 0.46 inches of runoff from the impervious areas will aid in maintaining the

hydrologic regime of the watershed. If the goals of Subsections 306(a)(2)(ii) cannot be achieved, then 0.46 inches of rainfall shall be infiltrated from all impervious areas, up to a an existing site conditions curve number of 81. Above a curve number of 81, Equation 305.1 or the curve in Figure 305.1 should be used to determine the infiltration requirement.

The retention (infiltration) volume (Re_v) required again would therefore be computed as:

Re_v = (0.46 or I, whichever is less) * impervious area (sq.ft.) / (12in/ft) = Cubic Feet.

(b) Soils - A detailed soils evaluation of the project site shall be required where practicable to determine the suitability of infiltration facilities. The evaluation shall be performed by a qualified design professional and shall be reviewed and approved by the Municipal Engineer. At a minimum, testing shall address soil permeability, depth to bedrock and subgrade stability. The general process for designing the infiltration BMP shall be:

(1) Analyze hydrologic soil groups as well as natural and man-made features within the site to determine general areas of suitability for infiltration practices. In areas where development on fill material is under consideration, conduct geotechnical investigations of sub-grade stability; infiltration is not permitted to be ruled out without conducting these tests.

(2) Provide infiltration field tests (at the level of the proposed infiltration surface) to determine the appropriate hydraulic conductivity rate.

(3) Design the infiltration structure for the required retention (Re_v) volume based on field determined capacity at the level of the proposed infiltration surface.

(4) If on-lot infiltration structures are proposed by the Applicant's design professional, it must be demonstrated to the municipality that the soils are conducive to infiltrate on the lots identified.

(c) Carbonate Areas - The Applicant is required to investigate the ability of all areas on the site which are not underlain by carbonate rock to meet the infiltration requirements of Subsection 305(a). If this investigation proves infeasible, infiltration can occur on areas underlain by carbonate rock by following the recommended procedure below in conjunction with Figure B-4 in Chapter Appendix B. *However, the Applicant is not required to use infiltration in carbonate areas even if the site falls into the "Recommended" range on Figure B-4 in Chapter Appendix B.* If infiltration is not proposed, the calculated infiltration volume (Subsection 305(a)) shall be treated by an acceptable BMP.

Infiltration BMP loading rate percentages in Figure B-4 in Chapter Appendix B shall be calculated as follows:

$$\left(\frac{\text{Area tributary to the infiltration BMP}}{\text{Base Area of the infiltration BMP}}\right)*100\%$$

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

Area Description	Weighting
All disturbed area to be made impervious	100%
All disturbed areas to be made pervious	50%
All undisturbed impervious areas	100%
All undisturbed pervious areas	0%

Soil thickness is to be measured from the bottom of any proposed infiltration BMP. The effective soil thickness in Figure B-4 in Appendix B is the measured soil thickness multiplied by the thickness factor based on soil permeability, as follows:

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

No infiltration structure in non-carbonate areas shall be within 50 feet of a boundary with carbonate rock, except when a preliminary site investigation has been done showing the absence of special geologic features within 50 feet of the proposed infiltration area.

(d) Stormwater Hotspots - Following is a list of examples of designated hotspots. If a site is designated as a hotspot, it has important implications for how stormwater is managed. First and foremost, untreated stormwater runoff from hotspots shall not be allowed to recharge into groundwater where it may contaminate water supplies. Therefore, the Rev requirement shall NOT be applied to development sites that fit into the hotspot category (the entire WQv must still be treated). Second, a greater level of stormwater treatment shall be considered at hotspot sites to prevent pollutant washoff after construction. EPA's NPDES stormwater program requires some industrial sites to prepare and implement a stormwater pollution prevention plan.

Examples of Hotspots:

- Vehicle salvage yards and recycling facilities
- Vehicle fueling stations
- Vehicle service and maintenance facilities
- Vehicle and equipment cleaning facilities
- Fleet storage areas (bus, truck, etc.)
- Industrial sites (based on Standard Industrial Codes)
- Marinas (service and maintenance)
- Outdoor liquid container storage
- Outdoor loading/unloading facilities
- Public works storage areas
- Facilities that generate or store hazardous materials
- Commercial container nursery
- Other land uses and activities as designated by an appropriate review authority

The following land uses and activities are not normally considered hotspots:

- Residential streets and rural highways
- Residential development
- Institutional development
- Office developments
- Non-industrial rooftops

- Pervious areas, except golf courses and nurseries (which may need an Integrated Pest Management (IPM) Plan).

Large highways (average daily traffic volume (ADT) greater than thirty thousand (30,000)) are not designated as a stormwater hotspot; however, it is important to ensure that highway stormwater management plans adequately protect groundwater.

(e) Extreme caution shall be exercised where infiltration is proposed in Source Water Protection Areas as defined by the local Municipality or Water Authority.

(f) Infiltration facilities shall be used in conjunction with other innovative or traditional BMPs, stormwater control facilities, and nonstructural stormwater management alternatives.

(g) Extreme caution shall be exercised where salt or chloride (municipal salt storage) would be a pollutant since soils do little to filter this pollutant and it may contaminate the groundwater. The qualified design professional shall evaluate the possibility of groundwater contamination from the proposed infiltration facility and perform a hydrogeologic justification study if necessary.

(h) The infiltration requirement in High Quality or Exceptional Value waters shall be subject to the Department's Chapter 93 Antidegradation Regulations.

(i) An impermeable liner will be required in detention basins where the possibility of groundwater contamination exists. A detailed hydrogeologic investigation may be required by the municipality.

(j) The municipality shall require the Applicant to provide safeguards against groundwater contamination for land uses that may cause groundwater contamination should there be a mishap or spill.

(k) Infiltration Design Criteria

(1) All infiltration systems shall have appropriate positive overflow controls to prevent storage within one foot (1') of the finished surface or grade.

(2) All infiltration systems shall have a minimum setback of fifteen feet (15') from principal structures, ten feet (10') from property lines, and one hundred feet (100') from wells, and fifty feet (50') from septic system drain fields. Care should be taken to prevent any seepage into subgrade structures.

(3) Surface inflows shall be treated to prevent the direct discharge of sediment and pollutants into the infiltration system; accumulated sediment reduces stormwater storage capacity and ultimately clogs the infiltration mechanism.

(4) No sand or other particulate matter may be applied to a porous paving surface for winter ice conditions.

(5) During site construction, all recharge system components shall be protected from compaction due to heavy equipment operation or storage of fill or construction material. Recharge areas shall be protected from sedimentation. All areas designated for recharge shall not receive runoff until the contributory drainage area has achieved final stabilization.

(6) The following procedures and materials shall be required during the construction of all subsurface facilities:

(i) Excavation for the infiltration facility shall be performed with equipment which will not compact the bottom of the seepage bed/trench, or like facility.

(ii) The bottom of the bed and/or trench shall be scarified prior to the placement of aggregate.

(iii) Only clean aggregate, free of fines, shall be allowed.

(iv) The top and sides of all seepage beds, trenches, or like facilities shall be covered with drainage filtration fabric. Fabric shall meet the specifications of PennDOT Publication 408, Section 735, Construction Class 1.

(v) Perforated distribution pipes connected to centralized catch basins and/or manholes with provision for the collection of debris shall be provided in all facilities. The perforated pipes shall distribute stormwater throughout the entire seepage bed/trench, or like facility.

(7) All infiltration facilities which service more than one (1) lot and are considered a common facility shall have an easement provided to the Municipality for future access if necessary.

(8) No more than fifty percent (50%) of the required infiltration volume may be provided in detention basin bottoms. The remaining fifty percent (50%) of infiltration volumes shall be provided at or near the proposed impervious coverage.

(Ordinance 212, June 7, 2005, Section 1).

Section 306. Water Quality Requirements. The applicant shall comply with the following water quality requirements of this Part. No regulated earth disturbance activities within the Municipality shall commence until approval by the Municipality of a plan which demonstrates compliance with State Water Quality Requirements post-construction is complete.

(a) The BMPs shall be designed, implemented and maintained to meet State Water Quality Requirements, and any other more stringent requirements as determined by the Municipality.

(b) To control post-construction stormwater impacts from regulated earth disturbance activities, State Water Quality Requirements can be met by BMPs, including site design, which provide for replication of pre-construction stormwater infiltration and runoff conditions, so that post-construction stormwater discharges do not degrade the physical, chemical or biological characteristics of the receiving waters. As described in the DEP Comprehensive Stormwater Management Policy (#392-0300-002, September 28, 2002), this may be achieved by the following:

(1) Infiltration: replication of pre-construction stormwater infiltration conditions,

(2) Treatment: use of water quality treatment BMPs to ensure filtering out of the chemical and physical pollutants from the stormwater runoff, and

(3) Streambank and Streambed Protection: management of volume and rate of post-construction stormwater discharges to prevent physical degradation of receiving waters (e.g., from scouring).

(c) Developed areas shall provide adequate storage and treatment facilities necessary to capture and treat stormwater runoff. The infiltration volume computed under Section 305 may be a component of the water quality volume if the Applicant chooses to manage both components in a single facility. If the infiltration volume is less than the water quality volume, the remaining water quality volume may be captured and treated by methods other than infiltration BMPs. The required water quality volume (WQv) is the storage capacity needed to capture and treat a portion of stormwater runoff from the developed areas of the site.

To achieve this goal, the following criterion is established: The following calculation formula is to be used to determine the water quality storage volume, (WQv), in acre-feet of storage.

$WQv=[(P)(Rv)(A)]/12$ Eqn: 306.1

WQv = Water Quality Volume (acre-feet)
P = 1 inch
A = Total contributing drainage area to the water quality BMP (acres)
Rv = 0.05 + 0.009(I) where I is the percent of the area that is impervious surface ((impervious area/A)*100)

This volume requirement can be accomplished by the permanent volume of a wet basin or the detained volume from other BMPs.

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 provide for protection from clogging and unwanted sedimentation.

(d) For areas within defined Special Protection subwatersheds which include Exceptional Value (EV) and High Quality (HQ) waters, the temperature and quality of water and streams shall be maintained through the use of temperature sensitive BMPs and stormwater conveyance systems.

(e) To accomplish the above, the Applicant shall 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).

(f) If a perennial or intermittent stream passes through the site, the applicant shall create a stream buffer easement extending a minimum of fifty feet (50') to either side of the top-of-bank of the channel. The buffer area shall be maintained with and encouraged to use appropriate native vegetation (Reference to Appendix H of Pennsylvania Handbook of Best Management Practices for Developing Area for plant lists). If an existing buffer is legally prescribed (i.e. deed, covenant, easement, etc.) and it exceeds the requirements of this Chapter, the existing buffer shall be maintained. This does not include lakes or wetlands.

(g) Evidence of any necessary permit(s) for regulated earth disturbance activities from the appropriate DEP regional office must be provided to the Municipality. The issuance of an NPDES Construction Permit (or permit coverage under the statewide General Permit PAG-2) satisfies the requirements of Subsection 306(a).

(Ordinance 212, June 7, 2005, Section 1)

Section 307. Streambank Erosion Requirements. In addition to control of the water quality volume, in order to minimize the impact of stormwater runoff on downstream streambank erosion, the primary requirement is to design a BMP to detain the proposed conditions two (2) year, twenty-four (24) hour design storm to the existing conditions one (1) year flow using the SCS Type II distribution. Additionally, provisions shall be made (such as adding a small orifice at the bottom of the outlet structure) so that the proposed conditions one (1) year storm takes a minimum of twenty-four (24) hours to drain from the facility from a point where the maximum volume of water from the one (1) year storm is captured. (i.e., the maximum water surface elevation is achieved in the facility). 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 minimum orifice size in the outlet structure to the BMP shall be a three inches (3") diameter orifice and a trash rack shall be installed to prevent clogging. On sites with small contributing drainage areas to this BMP that do not provide enough runoff volume to allow a 24 hour attenuation with the three inches (3") orifice, the calculations shall be submitted showing this condition. Orifice sizes less than three inches (3") can be utilized provided that the design will prevent clogging of the intake.

(Ordinance 212, June 7, 2005, Section 1)

Section 308. Stormwater Release Rates.

(a) Standard 1: After installation of impervious cover and assuming full compliance with Sections 305 and 306, the peak rate of stormwater discharges from the site for the 5-year, 10-year, 25-year, 50-year and 100-year frequency storms shall not exceed the peak rate of discharge from the site of the same storm before disturbance.

(b) Standard 2: If full compliance with Sections 305 and 306 cannot be achieved, then the peak rate standards are modified so that post-development peak rate discharges from the site for the 5-year and 10-year frequency storms shall not exceed fifty percent (50%) of the respective peak rates for these storms in the predevelopment condition.

(c) 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.

(d) Site Areas - Where the site area to be impacted by a proposed development activity differs significantly from the total site area, only the proposed impact area utilizing stormwater management measures shall be subject to the requirements of this Chapter. In other words, unimpacted areas bypassing the stormwater management facilities would not be subject to the requirements of this Chapter.

(e) "No Harm" Option - For any proposed development site not located in a provisional direct discharge district, the Applicant has the option of using a less restrictive runoff control (including no detention) if the Applicant can prove that "no harm" would be caused by discharging at a higher runoff rate than that specified by the Stormwater Management Plan. The "no harm" option is used when an Applicant can prove that the proposed condition hydrographs can match existing conditions hydrographs, or if it can be proved that the proposed conditions will not cause increases in peaks at all points downstream. Proof of "no harm" must be shown based upon the following "Downstream Impact Evaluation" which shall

include a "downstream hydraulic capacity analysis" consistent with Section 308(f) to determine if adequate hydraulic capacity exists. The Applicant shall submit to the municipality this evaluation of the impacts due to increased downstream stormwater flows in the watershed.

(1) The Hydrologic Regime of the site must be maintained.

(2) The "Downstream Impact Evaluation" shall include hydrologic and hydraulic calculations necessary to determine the impact of hydrograph timing modifications due to the proposed development upon a dam, highway, structure, natural point of restricted streamflow or any stream channel section, established with the concurrence of the Municipality.

(3) The evaluation shall continue downstream until the increase in flow diminishes due to additional flow from tributaries and/or stream attenuation.

(4) The peak flow values to be used for downstream areas for the design return period storms (2, 5, 10, 25, 50, and 100-year) shall be the values from the calibrated model for the Schuylkill River Watershed. These flow values can be obtained from the original Act 167 watershed storm water management plans.

(5) Applicant-proposed runoff controls which would generate increased peak flow rates at storm drainage problem areas would, by definition, be precluded from successful attempts to prove "no-harm", except in conjunction with proposed capacity improvements for the problem areas consistent with Subsection 303(h).

(6) A financial distress shall not constitute grounds for the Municipality to approve the use of the "no-harm" option.

(7) Capacity improvements may be provided as necessary to implement the "no harm" option which proposes specific capacity improvements to provide that a less stringent discharge control would not create any harm downstream.

(8) Any "no harm" justifications shall be submitted by the Applicant as part of the Drainage Plan submission per Part 4.

(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 2-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 increased 25-year return period runoff without creating any hazard to persons or property.

(3) Culverts, bridges, storm sewers or any other facilities which must pass or convey flows from the tributary area must be designed in accordance with DEP Chapter 105 regulations (if applicable) and, at minimum, pass the increased 25-year return period runoff.

(g) Hardship Option - The Municipality may hear requests for waivers where it is alleged that the provisions of this (Act 167) Chapter inflict unnecessary hardship upon the applicant. The waiver request shall be in writing and accompanied by the requisite fee based upon a fee schedule adopted by the municipality. A copy of the waiver request shall be provided to each of the following: municipality, municipal engineer and municipal solicitor. The request shall fully document the nature of the alleged hardship.

The Municipality may grant a waiver provided that all of the following findings are made in a given case:

(1) That there are unique physical circumstances or conditions, including irregularity of lot size or shape, or exceptional topographical or other physical conditions peculiar to the particular property, and that the unnecessary hardship is due to such conditions, and not the circumstances or conditions generally created by the provisions of this Chapter in the Stormwater Management District in which the property is located;

(2) That because of such physical circumstances or conditions, there is no possibility that the property can be developed in strict conformity with the provisions of this Chapter, including the "no harm" provisions, and that the authorization of a waiver

(3) That such unnecessary hardship has not been created by the applicant;

(4) That the waiver, if authorized, will represent the minimum waiver that will afford relief and will represent the least modification possible of the regulation in issue; and

(5) That financial hardship is not the criteria for granting of a hardship waiver. In granting any waiver, the municipality may attach such conditions and safeguards as it may deem necessary to implement the purposes of Act 167 and this Chapter. If a Hardship Waiver is granted, the applicant must still manage the quantity, velocity, direction and quality of resulting storm runoff as is necessary to prevent injury to health, safety or other property.

(i) For regulated activities in Subsection 105(a) and (b), the Board of Supervisors of the Township of Amity shall hear requests for and decide on hardship waiver requests on behalf of the Municipality.

(ii) For regulated activities in Subsection 105(d), (e), (f), (g) and (h), the Zoning Hearing Board shall hear requests for and decide on hardship waiver requests on behalf of the Municipality.

(iii) The municipality shall not waive the water quality provisions of this Chapter.

(Ordinance 212, June 7, 2005, Section 1)

Section 309. Calculation Methodology.

(a) Stormwater runoff from all development sites with a drainage area of greater than two hundred (200) acres shall be calculated using a

generally accepted calculation technique that is based on the NRCS soil cover complex method. Table 309-1 summarizes acceptable computation methods and the method selected by the design professional shall be based on the individual limitations and suitability of each method for a particular site. The Municipality may allow the use of the Rational Method to estimate peak discharges from drainage areas that contain less than five (5) acres. The Soil Complex Method shall be used for drainage areas greater than five (5) acres.

TABLE 309-1
Acceptable Computation Methodologies For
Stormwater Management Plans

METHOD	METHOD DEVELOPED BY	APPLICABILITY
TR-20 (or commercial computer package based on TR-20)	USDA NRCS	Applicable where use of full hydrology computer model is desirable or necessary.
TR-55 (or commercial computer package based on TR-55)	USDA NRCS	Applicable for land development plans within limitations described in TR-55.
HEC-1 / HEC-HMS	US Army Corps of Engineers	Applicable where use of full hydrologic computer model is desirable or necessary.
PSRM	Penn State University	Applicable where use of a hydrologic computer model is desirable or necessary; simpler than TR-20 or HEC-1.
Rational Method or commercial computer package based on Rational Method)	Emil Kuichling(1889)	For sites less than 5 acres and with time of concentration less than 60 minutes (tc< 60 min), or as approved by the Municipality and/or Municipal Engineer
Other Methods	Varies	Other computation methodologies approved by the Municipality and/or 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 according to the region in which they are located as presented in Table B-1 in Appendix B of this Chapter. If a hydrologic computer model such as PSRM or HEC-1 / HEC-HMS is used for stormwater runoff calculations, then the duration of rainfall shall be twenty-four (24) hours. The SCS 'S' curve shown in Figure B-1, Appendix B of this Chapter shall be used for the rainfall distribution.

(c) For the purposes of existing conditions flow rate determination, undeveloped land shall be considered as "meadow" in good condition, unless the natural ground cover generates a lower curve number or Rational 'C' value (i.e., forest), as listed in Table B-2 or B-3 in Appendix B of this Chapter.

(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 PA Department of Transportation Design Rainfall Curves (1986) (Figures B-2 to B-4). 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.

(e) Runoff Curve Numbers (CN) for both existing and proposed conditions to be used in the soil cover complex method shall be obtained from Table B-2 in Appendix B of this Chapter.

(f) Runoff coefficients (c) for both existing and proposed conditions for use in the Rational method shall be obtained from Table B-3 in Appendix B 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 B-4 in Appendix B 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 5 acres in size, the design storm hydrograph shall be computed using a calculation method that produces a full hydrograph (i.e. TR-20, TR-55, HEC-1, PSRM). 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.

(Ordinance 212, June 7, 2005, Section 1)

Section 310. Other Requirements.

(a) Any stormwater facility located on State highway rights-of-way shall be subject to approval by the Pennsylvania Department of Transportation (PennDOT).

(b) Pretreatment shall be provided prior to infiltration.

(c) All wet basin designs shall incorporate biologic controls consistent with the West Nile Guidance found in Appendix F.

(d) Should any stormwater management facility require a dam safety permit under PaDEP 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 the 100-year event.

(e) Any facilities that constitute water obstructions (e.g., culverts, bridges, outfalls, or stream enclosures), and any work involving wetlands governed by PaDEP Chapter 105 regulations (as amended or replaced

from time to time by PaDEP), shall be designed in accordance with Chapter 105 and will require a permit from PaDEP.

(f) 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 25-year design storm with a minimum 1.0 foot of freeboard measured below the lowest point along the top of the roadway. Any facility that constitutes a dam as defined in PaDEP Chapter 105 regulations may require a permit under dam safety regulations. Any facility located within a PennDOT right-of-way must meet PennDOT minimum design standards and permit submission requirements.

(g) Conveyance facilities to or exiting from stormwater management facilities (i.e., detention basins) shall be designed to convey the design flow to or from that structure. Roadway crossings located within designated floodplain areas must be able to convey runoff from a 100-year design storm. Any facility located within a PennDOT right-of-way must meet PennDOT minimum design standards and permit submission requirements.

(h) Storm sewers must be able to convey proposed conditions runoff from 25-year design storm without surcharging inlets, where appropriate.

(i) Adequate erosion protection shall be provided along all open channels, and at all points of discharge.

(j) The design of all stormwater management facilities shall incorporate sound engineering principles and practices. The Municipality reserves the right to disapprove any design that would result in the construction in or continuation of a stormwater problem area.

(k) No stormwater detention facility shall be placed within fifty feet (50') of a special geologic feature. No stormwater conveyance facility shall be constructed within fifty feet (50') of a special geologic feature, unless it is constructed of concrete pipe utilizing watertight joints, or an approved equal.

(Ordinance 212, June 7, 2007, Section 1)

Section 311. NPDES Requirements. Federal regulations approved October 1999 require operators of small municipal separate storm sewer systems (MS4s) to obtain NPDES Phase II permits from DEP by March 2003. (NPDES II is an acronym for the National Pollutant Discharge Elimination System Phase II Stormwater Permitting Regulations.) This program affects all municipalities in "urbanized areas" of the state. This definition applies to all Schuylkill River watershed municipalities identified in Table III-1 of the Schuylkill River Stormwater Management Plan Volume II as NPDES Phase II municipalities. Therefore, these identified municipalities will be subject to the NPDES Phase II requirements mandated by the Federal Clean Water Act as administered by DEP. For more information on NPDES II requirements, contact the DEP Regional Office. (Ordinance 212, June 7, 2007, Section 1)

Section 312. Standards for Detention Basins.

(a) The following criteria shall be used for the design of detention and wet basins. Any reference to detention basin shall also include wet basins.

(1) When detention basins are provided, they shall be designed to utilize the natural contours of the land wherever possible. When such design is impracticable, the construction of the basin shall utilize slopes as flat as possible to blend the

structure into the terrain. All basins shall have maximum side slope of three (3) horizontal to one (1) vertical (3:1).

(2) A routed hydrograph and calculations shall be furnished for each storm through the detention basin.

(3) Emergency overflow facilities (i.e., emergency spillway) shall be provided for all detention facilities which shall pass a one hundred (100) year storm under orifice block conditions.

(b) In the design of detention basins, the following items listed below shall be submitted to the Municipality for review. Any reference to detention basin shall also include retention basin.

(1) Design computations for the sizing of the outlet device.

(2) A stage-storage curve for said detention/retention basin.

(3) Flood routing and/or storage requirement calculations.

(4) A plan showing the berm embankment and outlet structure. The plan shall indicate top of berm elevations, width of the top of the berm, side slopes, emergency spillway elevation, and elevations of the outlet structure, including riser, dimensions and spacing of anti-seep collars.

(5) A cross section through the outlet structure, emergency spillway and berm embankment.

(6) A detailed plan of the trash rack and anti-vortex device (if required).

(7) The maximum side slope of earthen detention embankments shall be three (3) horizontal to one (1) vertical (3:1). The top and/or toe (whichever is closer to a property line) of any slope shall be located a minimum of twenty-five feet (25') from any property line. Whenever possible, the side slopes and basin shape shall conform to the natural topography.

(8) The minimum top width of the detention basin berm shall be ten feet (10'). A cutoff trench (key-way) of impervious material shall be provided under all embankments that require fill material. The cutoff trench shall be a minimum of eight feet (8') wide, two feet (2') deep and minimum of two feet (2') over the pipe, and have maximum side slopes of one (1) horizontal to one (1) vertical (1:1).

(9) In order to insure proper drainage on the floor of the basin, a minimum grade of two percent (2%) shall be maintained for areas of sheet flow. For channel flow, a minimum grade of one percent (1%) shall be maintained. Under certain circumstances, such as continuous seasonal flow, the Municipality may require a low flow channel to be constructed. Wet basins may be designed with a flat bottom upon approval by the Municipal Engineer.

(10) All detention basin embankments shall be placed in a maximum of eight inch (8") lifts to a minimum of ninety-five percent (95%) of maximum dry density as established by ASTM D-1557. Prior to proceeding to the next lift, the compaction shall be checked by the Municipal Engineer or the Soils Engineer. The developer's contractor shall obtain the services of a qualified laboratory technician to conduct compaction tests on the leading and the

trailing edge of the berm along with the top of the berm. All tests shall be furnished to the Municipality for review.

(11) Whenever possible, the emergency spillway for detention basins shall be constructed on undisturbed ground. Emergency spillways shall be constructed of reinforced concrete checker blocks or other permanent material approved by the Municipal Engineer. All emergency spillways shall be constructed so that the detention basin berm is protected against erosion. The minimum capacity of all emergency spillways shall be the peak flow rate from the one hundred (100) year design storm after development. The construction material of the emergency spillway shall extend along the upstream and downstream berm embankment slopes. Construction material on the upstream slope of the emergency spillway shall extend to a minimum of two feet (2') below the spillway crest elevation. The downstream slope of the spillway shall as a minimum extend to the toe of the berm embankment. The emergency spillway shall not discharge over earthen fill and/or easily erodible material.

(12) A minimum freeboard of one foot (1") shall be provided between the one hundred (100) year design stormwater elevation and the invert of the emergency spillway, and between the design flow through the emergency spillway and the top of the berm.

(13) Anti-seep collars shall be installed around the pipe barrel within the normal saturation zone of the detention basin berms. The anti-seep collars and their connections to the pipe barrel shall be watertight. The anti-seep collars shall extend a minimum of two feet (2') beyond the outside of the principal pipe barrel. The maximum spacing between collars shall be fourteen (14) times the minimum projection of the collar measured perpendicular to the pipe. A minimum of two (2) anti-seep collars shall be installed on each pipe outlet.

(14) All outlet pipes through the basin berm shall be reinforced concrete pipe having O-ring joints. All outlet structures shall be concrete.

(15) Energy dissipating devices shall be placed at all basin outlets.

(16) Easements of all basins shall be provided.

(17) Permanent detention basins outlet structures shall be designed to incorporate multiple stage outlet release devices.

(18) A cross-section through the basin from the proposed pipe termination into the basin to the termination of the outlet pipe shall be provided.

(19) At the discretion of the Municipality, the perimeter of the detention/retention pond shall be enclosed with a standard chain link security fence or approved equal with a minimum height of four feet (4') with locking gates. Each basin shall be provided with two gates, one (1) wide enough for maintenance vehicles and a second gate for pedestrian access. The security fence and gate shall be subject to the approval of the Municipality.

(20) Permanent plantings for wet ponds shall be designed by a wetland biologist to have a mixture of plants that thrive in wet areas.

(Ordinance 212, June 7, 2007, Section 1)

Section 313. Stormwater Collection and Conveyance Standards.

(a) Drainage easements shall be provided to accommodate all storm drainage requirements and shall be a minimum of twenty feet (20') in width. Easements shall be provided for all watercourses and storm drainage piping that are not located within street rights-of-way.

(b) Storm sewers, as required, shall be placed in the cartway of curbed streets and parallel to the roadway shoulders of streets without curbs. When located in undedicated land with approval by the Board of Supervisors, storm sewers shall be placed within an easement not less than twenty feet (20') wide.

(c) Storm Drainage Pipes. The minimum diameter of all storm drainage pipes shall be fifteen inches (15") or an equivalent thereto. All storm drainage piping shall be laid in a straight line. Storm drainage piping shall not be permitted under buildings or structures. The minimum grade of piping shall be one-half of one percent (0.5%). All pipe shall be reinforced concrete with O-rings joints, or smooth bore high density polyethylene pipe. All structures exposed to the surface shall be reinforced concrete.

(d) When proposed, manholes and inlets (catch basins) shall not be spaced more than four hundred feet (400') apart for pipes of less than or equal to twenty-four inch (24") diameter and five hundred feet (500') apart for pipes of greater than twenty-four inch (24") diameter. Additional, manholes or inlets shall be placed at all changes in alignment, grade or pipe size, and at all points of convergence of two (2) or more influent storm sewer lines. Inlets may be substituted for manholes where they will serve a useful purpose. In addition, the following standards shall apply:

(1) Manholes and inlets must conform to the standards established by the Pennsylvania Department of Transportation and must be supplied by a PennDOT Bulletin 15 approved supplier. Such requirement shall be listed on the plan.

(2) At street intersections, inlets shall be placed to prevent the flow of water across intersections.

(3) Inlets shall be spaced to limit the gutter spread to within the parking lane, not more than eight feet (8') during the ten (10) year storm. Capacity of the inlets shall not exceed four (4) cubic feet per second (cfs) for four foot (4') inlets and five (5) cfs for six foot (6') inlets in non-ponding areas.

(4) Inlets with a depth greater than five feet (5') must be provided with ladder rungs and noted on the plan as such.

(5) When there is a change in pipe size in the inlet, the elevation of the top of pipes shall be the same or the smaller pipe higher. A minimum drop of two inches (2") shall be provided at the inlet pipe invert elevation and the outlet pipe elevation.

(6) Inlets shall contain a marker which discourages the discharge of anything other than stormwater into the inlet.

(7) Inlets in paved areas shall be equipped with bicycle safe grates. Inlets in non-paved areas shall be equipped with standard grates.

(8) Manhole covers shall have the word "STORM" cast on the top of the cover.

(e) Properly designed, graded and lined drainage swales may be permitted in lieu of storm sewers in commercial, industrial and residential areas where approved by the Municipality. Swale lining must meet the County Soil Conservation design standards. All drainage channels shall have a maximum side slope grade of three (3) horizontal to one (1) vertical (3:1). All drainage swales shall be provided with a minimum six-inch (6") freeboard, measured from the top of the design storm flow to the top of the swale.

(f) Curb requirements shall vary according to street hierarchy and intensity of the proposed development. Curbing may also be required for any one or more of the following reasons:

(1) For stormwater management.

(2) To stabilize the pavement/cartway edge.

(3) To delineate parking areas.

(4) To delineate vehicular access lanes.

(5) At intersections, corners and tight radii.

(g) The maximum encroachment of water on the roadway pavement shall not exceed four inches (4") in depth at the curb line during a ten (10) year frequency storm. Inlets shall be provided to control the encroachment of water on the pavement.

(h) Pipe underdrains and/or pavement base drains shall be provided in areas delineated as having a "seasonal high water table" and in areas deemed necessary by the Municipal Engineer during the construction phase of the project. The installation of the underdrain system shall be approved by the Municipal Engineer and paid for by the developer. Pipe underdrains and pavement base drains shall be constructed in accordance with PennDOT Pub. 408, Section 610, as amended.

(i) Pipe end sections and/or head walls shall be utilized at all terminated pipe segments.

(j) All drainage structures located within a State highway right-of-way shall be reviewed and approved by the Pennsylvania Department of Transportation (PennDOT). A letter from PennDOT indicating such approval shall be submitted to the Municipality prior to municipal approval.

(k) Energy dissipaters shall be provided shall be provided at all pipe end treatments.

(l) At the discretion of the Municipality, in situations in which the design standards and requirements do not apply to the site conditions, the Municipal Engineer shall suggest or provide additional and/or alternative design methods to meet the objectives of this Chapter.

(Ordinance 212, June 7, 2007, Section 1)

Part 4

Drainage Plan Requirements

Section 401. General Requirements. For any of the activities regulated by this Chapter, the preliminary or final approval of subdivision and/or land development plans, the issuance of any building permit, or the commencement of any earth disturbance activity may not proceed until the Property Owner or Applicant or his/her agent has received approval of a Drainage Plan from the Municipality and an adequate Erosion and Sediment Control Plan review by the Conservation District. (Ordinance 212, June 7, 2007, Section 1)

Section 402. Exemptions.

(a) General Exemptions. The following land use activities are exempt from the drainage plan submission requirements of this Chapter.

(1) Use of land for gardening for home consumption.

(2) Agriculture when operated in accordance with a Conservation Plan or Erosion and Sediment Control Plan (E & S) found adequate by the Conservation District.

(3) Forest Management operations which are following the Department of Environmental Protection's management practices contained in its publication "Soil Erosion and Sedimentation Control Guidelines for Forestry" and are operating under an approved E&S Plan and must comply with stream buffer requirements in Subsection 306(f). A copy of the approved E&S Plan shall be submitted to the Municipality to prove exemption from the requirements of this Chapter.

(b) Stormwater Quantity Control Exemption. Any Regulated Activity that meets the impervious area exemption criteria in Table 402-1 shall not be required to submit a drainage plan implementing the stormwater quantity controls, specified in Section 308 of this Chapter. These criteria shall apply to the total development even if development is to take place in 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. Impervious areas existing on the "parent tract" prior to adoption of this Chapter shall not be considered in cumulative impervious area calculations for exemption purposes.

TABLE 402-1
Impervious Area Exemption Criteria

Total Parcel Size	Impervious Area Exemption (sq.ft.)
≤ 1/4 acre	2,500 sq. ft.
>1/4 to acre	5,000 sq. ft.
>1 to 2 acres	10,000 sq. ft
> 2 acres	15,000 sq. ft.

Applicants whose activities are exempted under Section 402(b) above shall still be required to meet the groundwater recharge (Section 305),

water quality (Section 306), and streambank erosion (Section 307) controls of this Chapter. Drainage plans in accordance with Subsections 403(a)(2), 403(b)(7), (8), (11), (15), and (22) and 403(d)(2) must still be submitted. Applicants whose proposed impervious area is less than one thousand (1,000) SF are exempt from all requirements of this Chapter. Any exemption must first be approved by the Municipality.

(c) Additional exemption criteria:

(1) Exemption responsibilities - An exemption shall not relieve the Applicant from implementing such measures as are necessary to protect the public health, safety, and property. An exemption shall not relieve the Applicant from providing adequate stormwater management for Regulated Activities to meet the purpose of this Chapter; however, drainage plans will not have to be submitted to the Municipality.

(2) HQ and EV streams - This exemption shall not relieve the Applicant from meeting the special requirements for watersheds draining to high quality (HQ) or exceptional value (EV) waters, identified and Source Water Protection Areas (SWPA) and requirements for nonstructural project design sequencing (Section 304), groundwater recharge (Section 305), water quality (Section 306), and streambank erosion (Section 307).

(3) Drainage Problems - If a drainage problem is documented or known to exist downstream of, or expected from the proposed activity, then the Municipality may require a drainage plan submittal.

(Ordinance 212, June 7, 2007, Section 1)

Section 403. Drainage Plan Contents. The Drainage Plan shall consist of a general description of the project including sequencing items described in Section 304, calculations, maps and plans. A note on the maps shall refer to the associated computations and erosion and sediment control plan by title and date. The cover sheet of the computations and erosion and sediment 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 not be accepted for review and shall be returned to the Applicant.

The following items shall be included in the Drainage Plan:

(a) General.

(1) General description of the project including those areas described in Section 304.

(2) General description of permanent stormwater management techniques, including construction specifications of the materials to be used for stormwater management facilities.

(3) Complete hydrologic, hydraulic, and structural computations for all stormwater management facilities, including pre and post development drainage area maps with time of concentration flow paths shown.

(4) An Erosion and Sediment Control Plan, including all reviews and approvals by the Conservation District.

(5) A general description of nonpoint source pollution controls.

(b) Maps. Map(s) of the project area shall be submitted on twenty-four inch by thirty-six inch (24" x 36") sheets and/or shall be prepared in a form that meets the requirements for recording at the offices of the Recorder of Deeds of Berks County. If the Subdivision and Land Development Ordinance (SALDO) has more stringent criteria then the more stringent criteria shall apply. The contents of the map(s) shall include, but not be limited to:

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

(2) Existing contours at intervals of two feet (2'). In areas of steep slopes (greater than fifteen percent (15%)), five feet (5') contour intervals may be used.

(3) Existing streams, lakes, ponds or other Waters of the Commonwealth within the project area.

(4) Other physical features including 100-year floodplain boundaries, wetlands, stream buffers, existing drainage courses, areas of natural vegetation to be preserved, and the total extent of the upstream area draining through the site.

(5) The locations of all existing and proposed utilities, sanitary sewers and water lines within fifty feet (50') of property lines.

(6) An overlay showing soil names and boundaries.

(7) Limits of earth disturbance, including the type and amount of impervious area that would be added.

(8) Proposed structures, roads, paved areas and buildings, with first floor elevations for all buildings.

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

(10) 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.

(11) The date of submission.

(12) A graphic and written scale of one inch (1") equals no more than fifty feet (50'); for tracts of twenty (20) acres or more, the scale shall be one inch (1") equals no more than one hundred feet (100').

(13) A north arrow.

(14) The total tract boundary and size with distances marked to the nearest foot and bearings to the nearest degree.

(15) Existing and proposed land use(s).

(16) A key map showing all existing man-made features beyond the property boundary that would be affected by the project.

(17) Location of all open channels.

(18) Overland drainage patterns and swales.

(19) A twenty foot wide access easement around all stormwater management facilities that would provide ingress to and egress from a public right-of-way.

(20) The location of all erosion and sediment control facilities.

(21) A note on the plan indicating the location and responsibility for maintenance of stormwater management facilities that would be located on/off-site. All on/off-site facilities shall meet the performance standards and design criteria specified in this Chapter.

(22) A statement, signed by the landowner, acknowledging that any revision to the approved Drainage Plan must be approved by the Municipality and the Conservation District.

(23) The following signature block for the Design Engineer:

> "I, (Design Engineer), on this date (date of signature), hereby certify that the Drainage Plan meets all design standards and criteria of the Amity Township Stormwater Management Ordinance."

(c) Supplemental Information.

(1) A written description of the following information shall be submitted.

(i) The overall stormwater management concept for the project designed in accordance with Section 304.

(ii) Stormwater runoff computations as specified in this Chapter.

(iii) Stormwater management techniques to be applied both during and after development.

(iv) Expected project time schedule.

(v) Development stages (project phases) if so proposed.

(vi) An operation and maintenance plan in accordance with Section 702 of this Chapter when required.

(2) An erosion and sediment control plan.

(3) 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.

(4) A Declaration of Adequacy and Highway Occupancy Permit from the PennDOT District Office when utilization of a PennDOT storm drainage system is proposed.

(d) Stormwater Management Facilities.

(1) All stormwater management facilities must be located on a plan and described in detail.

(2) When infiltration facilities such as seepage pits, beds or trenches are used, the locations of existing and proposed septic tank infiltration areas and wells must be shown.

(3) All calculations, assumptions, and criteria used in the design of the stormwater management facilities must be shown.

(4) Construction details must be provided for all proposed stormwater management facilities.

(Ordinance 212, June 7, 2007, Section 1)

Section 404. Plan Submission. The Municipality shall require receipt of a complete plan, as specified in this Chapter. For any activities that require an NPDES Permit for Stormwater Discharges from Construction Activities, a PaDEP Joint Permit Application, a PennDOT Highway Occupancy Permit, or any other permit under applicable state or federal regulations are regulated under Chapter 105 (Dam Safety and Waterway Management) or Chapter 106 (Floodplain Management) of PaDEP's Rules and Regulations, or, the proof of application for said permit(s) or approvals shall be part of the plan. The plan shall be coordinated with the state and federal permit process and the municipal SALDO review process.

(a) For projects which require SALDO approval, the Drainage Plan shall be submitted by the Applicant as part of the Preliminary Plan submission where applicable for the Regulated Activity. Such plans and associated reports must be signed and sealed by a registered professional.

(b) For these regulated activities that do not require SALDO approval.

(c) Three (3) copies of the Drainage Plan shall be submitted and distributed as follows:

(1) Two (2) copies to the Municipality accompanied by the requisite Municipal Review Fee, as specified in this Chapter.

(2) One (1) copy to the Municipal Engineer.

(Ordinance 212, June 7, 2007, Section 1)

Section 405. Drainage Plan Review.

(a) The Municipal Engineer shall review the Drainage Plan for consistency with this Chapter.

(b) The Municipal Engineer shall review the Drainage Plan for any subdivision or land development for consistency with this Chapter.

(c) The County Conservation District shall review and approve the E & S Plan for consistency with PaDEP's Chapter 102 regulations.

(d) For activities regulated by this Chapter, the Municipal Engineer shall notify the Applicant and the Municipality in writing, within forty-five (45) calendar days, whether the Drainage Plan is consistent with the Stormwater Management Plan.

(1) Should the Drainage Plan be determined to be consistent with the Stormwater Management Plan, the Municipal Engineer shall forward an approval letter to the Municipal Secretary who will then forward a copy to the Applicant.

(2) Should the Drainage Plan be determined to be inconsistent with the Stormwater Management Plan, the Municipal Engineer shall forward a disapproval letter to the Municipal Secretary who will then forward a copy to the Applicant. The disapproval letter shall cite the reason(s) and specific Chapter sections for the disapproval. Disapproval may be due to inadequate information to make a reasonable judgment as to compliance with the stormwater management plan. Any disapproved Drainage Plans may be revised by the Applicant and resubmitted consistent with this Chapter.

(e) For Regulated Activities specified in Section 104 of this Chapter, which require a building permit, the Municipal Engineer shall notify the Municipal Building Permit Officer in writing, within a time frame consistent with the Municipal Building Code and/or Municipal Subdivision Ordinance, whether the Drainage Plan is consistent with the Stormwater Management Plan and forward a copy of the approval/disapproval letter to the Applicant. Any disapproved drainage plan may be revised by the Applicant and resubmitted consistent with this Chapter.

(f) For regulated activities under this Chapter that require an NPDES Permit Application, the Applicant shall forward a copy of the Municipal Engineer's letter stating that the Drainage Plan is consistent with the stormwater management plan to the Conservation District. PaDEP and the Conservation District may consider the Municipal Engineer's review comments in determining whether to issue a permit.

(g) The Municipality shall not grant preliminary approval to any subdivision or land development for Regulated Activities specified in Section 105 of this Chapter if the Drainage Plan has been found to be inconsistent with this Chapter, as determined by the Municipal Engineer. All required permits from PaDEP must be obtained prior to final approval of any subdivision or land development.

(h) No building permits for any Regulated Activity specified in Section 105 of this Chapter shall be issued if the Drainage Plan has been found to be inconsistent with this Chapter, as determined by the Municipal Engineer. All required permits from PaDEP must be obtained prior to issuance of a building permit.

(i) The Municipality's approval of a Drainage Plan shall be valid for a period not to exceed five (5) years, commencing 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, within this five (5) 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 Section 407 of this Chapter.

(Ordinance 212, June 7, 2007, Section 1)

Section 406. Modification of Plans.

(a) A modification to a Drainage Plan under review by the municipality for a development site that involves a change in stormwater

management facilities or techniques, or that involves the relocation or re-design 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 Section 404 of this Chapter and be subject to review as specified in Section 405 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 and Inspection 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 and Inspection Fee.

(Ordinance 212, June 7, 2007, Section 1)

Section 407. Resubmission of Disapproved Drainage Plans. A disapproved Drainage Plan may be resubmitted, with the revisions addressing the Municipal Engineer's concerns documented in writing and addressed to the Municipal Secretary in accordance with Section 404 of this Chapter and distributed accordingly and be subject to review as specified in Section 405 of this Chapter. The applicable Municipal Review and Inspection Fee must accompany a resubmission of a disapproved Drainage Plan. (Ordinance 212, June 7, 2007, Section 1)

Part 5

Inspections

Section 501. Schedule of Inspections.

(a) The Municipal Engineer or his municipal designee shall inspect all phases of the installation of the permanent stormwater management facilities as deemed appropriate by the Municipal Engineer.

(b) During any stage of the work, if the Municipal Engineer or his municipal designee determines that the permanent stormwater management facilities are not being installed in accordance with the approved Stormwater Management Plan, the Municipality shall revoke any existing building permits and issue a cease and desist order until a revised Drainage Plan is submitted and approved, as specified in this Chapter.

(c) A final inspection of all stormwater management facilities shall be conducted by the Municipal Engineer or his municipal designee and to confirm compliance with the approved Drainage Plan prior to the issuance of any Occupancy Permit.

(Ordinance 212, June 7, 2005, Section 1)

Part 6

Fees and Expenses

Section 601. Municipality Drainage Plan Review and Inspection Fee. Fees shall be established by the Municipality to defray plan review and construction inspection costs incurred by the Municipality. All fees shall be paid by the Applicant at the time of Drainage Plan submission. Review and Inspection Fee Schedule shall be established by resolution of the municipal governing body based on the size of the Regulated Activity and based on the Municipality's costs for reviewing Drainage Plans and conducting inspections pursuant to Section 501. The Municipality shall periodically update the Review and Inspection Fee Schedule to ensure that review costs are adequately reimbursed. (Ordinance 212, June 7, 2005, Section 1)

Section 602. 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) The site inspections.

(d) The inspection of stormwater management facilities and drainage improvements during construction.

(e) The final inspection upon completion of the stormwater management facilities and drainage improvements presented in the Drainage Plan.

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

(Ordinance 212, June 7, 2005, Section 1)

Part 7

Maintenance Responsibilities

Section 701. Performance Guarantee.

(a) For subdivisions and land developments the Applicant shall provide a financial guarantee to the Municipality for the timely installation and proper construction of all stormwater management controls as: (1) Required by the approved drainage plan equal to or greater than the full construction cost of the required controls or (2) in the amount and method of payment provided for in the Subdivision and Land Development Ordinance.

(b) For other regulated activities, the Municipality may require a financial guarantee from the Applicant.

(c) At the completion of the project, and as a prerequisite for the release of the performance guarantee, the Applicant 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 plans and specifications and approved revisions thereto.

(2) Provide a set of as-built drawings.

(d) After the municipality receives the certification, a final inspection shall be conducted by the municipal engineer or designee to certify compliance with this Chapter.

(Ordinance 212, June 7, 2005, Section 1)

Section 702. Responsibilities for Operations and Maintenance of Stormwater Controls and BMPs.

(a) No Regulated Earth Disturbance activities within the Municipality shall commence until approval by the Municipality of a Stormwater Control and BMP Operations and Maintenance plan which describes how the permanent (e.g., post-construction) stormwater controls and BMPs will be properly operated and maintained. An Operations and Maintenance Plan will not be required for facilities which serve less than three (3) residential lots/units.

(b) The following items shall be included in the Stormwater Control and BMP Operations and Maintenance Plan:

(1) Map(s) of the project area, in a form that meets the requirements for recording at the offices of the Recorder of Deeds of Berks County, and shall be submitted on twenty-four inches by thirty-six inches (24" x 36") sheets. The contents of the maps(s) shall include, but not be limited to:

(i) Clear identification of the location and nature of permanent stormwater controls and BMPs,

(ii) The location of the project site relative to highways, municipal boundaries or other identifiable landmarks,

(iii) Existing and final contours at intervals of two feet (2'), or others as appropriate,

(iv) Existing streams, lakes, ponds or other bodies of water within the project site area,

(v) Other physical features including flood hazard boundaries, sinkholes, streams, existing drainage courses and areas of natural vegetation to be preserved,

(vi) The locations of all existing and proposed utilities, sanitary sewers, and water lines within fifty feet (50') of property lines of the project site,

(vii) Proposed final changes to the land surface and vegetative cover, including the type and amount of impervious area that would be added,

(viii) Proposed final structures, roads, paved areas and buildings, and

(ix) A twenty feet (20') wide access easement around all stormwater controls and BMPs that would provide ingress to and egress from a public right-of-way.

(2) A description of how each permanent stormwater control and BMP will be operated and maintained, and the identity of the person(s) responsible for operations and maintenance,

(3) The name of the project site, the name and address of the owner of the property, and the name of the individual or firm preparing the plan, and

(4) A statement, signed by the landowner, acknowledging that the stormwater controls and BMPs are fixtures that can be altered or removed only after approval by the Municipality.

(c) The Stormwater Control and BMP Operations and Maintenance Plan for the project site shall establish responsibilities for the continuing operation and maintenance of all permanent stormwater controls 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 controls and BMPs may also be dedicated to and maintained by the Municipality;

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

(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 controls and BMPs.

(Ordinance 212, June 7, 2005, Section 1)

Section 703. Municipality Review of Stormwater Control and BMP Operations and Maintenance Plan.

(a) The Municipality shall review the Stormwater Control and BMP Operations and Maintenance Plan for consistency with the purposes and requirements of this Chapter, and any permits issued by DEP.

(b) The Municipality shall notify the Applicant in writing whether the Stormwater Control and BMP Operations and Maintenance Plan is approved.

(Ordinance 212, June 7, 2005, Section 1)

Section 704. Adherence to Approved Stormwater Control and BMP Operations and Maintenance Plan. It shall be unlawful to alter or remove any permanent stormwater control and BMP required by an approved Stormwater Control and BMP Operations and Maintenance Plan, or to allow the property to remain in a condition which does not conform to an approved Stormwater Control and BMP Operations and Maintenance Plan. (Ordinance 212, June 7, 2005, Section 1)

Section 705. Operations and Maintenance Agreement for Privately Owned Stormwater Controls and BMPs.

(a) The property owner shall sign an operations and maintenance agreement with the Municipality covering all stormwater controls and BMPs that are to be privately owned. The agreement shall be substantially the same as the agreement in Appendix A of this Chapter.

(b) Other items may be included in the agreement where determined necessary to guarantee the satisfactory operation and maintenance of all permanent stormwater controls and BMPs. The agreement shall be subject to the review and approval of the Municipality.

(Ordinance 212, June 7, 2005, Section 1)

Section 706. Stormwater Management Easements.

(a) Stormwater management easements are required for all areas used for off-site stormwater control, unless a waiver is granted by the Municipal Engineer.

(b) Stormwater management easements shall be provided by the property owner if necessary for (1) access for inspections and maintenance, or (2) preservation of stormwater runoff conveyance, infiltration, and detention areas and other stormwater controls and BMPs, by persons other than the property owner. The purpose of the easement shall be specified in any agreement under Section 705.

(Ordinance 212, June 7, 2005, Section 1)

Section 707. Maintenance Agreement for Privately Owned Stormwater Facilities.

(a) Prior to final approval of the site's Drainage Plan, the Applicant shall sign and record the Maintenance Agreement contained in Appendix A which is attached and made part hereof, covering all stormwater control facilities that are to be privately owned.

(b) Other items may be included in the agreement where determined necessary to guarantee the satisfactory maintenance of all facilities.

The Maintenance Agreement shall be subject to the review and approval of the municipal solicitor and the Board of Supervisors.

(Ordinance 212, June 7, 2005, Section 1)

Section 708. Recording of Approved Stormwater Control and BMP Operations and Maintenance Plan and Related Agreements.

(a) The owner of any land upon which permanent stormwater controls and BMPs will be placed, constructed or implemented, as described in the Stormwater Control and BMP Operations and Maintenance Plan, shall record the following documents in the Office of the Recorder of Deeds for Berks County, within ninety (90) days of approval of the Stormwater Control and BMP Operations Plan by the Municipality:

(1) The Operations and Maintenance Plan, or a summary thereof,

(2) Operations and Maintenance Agreements under Section 705, and

(3) Easements under Section 706.

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

(Ordinance 212, June 7, 2005, Section 1)

Section 709. Municipal Stormwater Control and BMP Operation and Maintenance Fund.

(a) Persons installing stormwater controls or BMPs shall be required to pay a specified amount to the Municipal Stormwater Control and BMP Operation and Maintenance Fund to help defray costs of periodic inspections and maintenance expenses. The amount of the deposit shall be determined as follows:

(1) If the stormwater control or BMP is to be privately owned and maintained, the deposit shall cover the cost of periodic inspections performed by the Municipality for a period of ten (10) years, as estimated by the Municipal Engineer. After that period of time, inspections will be performed at the expense of the Municipality.

(2) If the stormwater control or BMP is to be owned and maintained by the Municipality, the deposit shall cover the estimated costs for maintenance and inspections for ten (10) years. The municipality may require applicants to pay a fee to the Municipal Stormwater Maintenance Fund to cover long-term maintenance of stormwater controls and best management practices. The Municipal Engineer will establish the estimated costs utilizing information submitted by the Applicant.

(3) The amount of the deposit to the fund shall be converted to present worth of the annual series values. The municipal engineer shall determine the present worth equivalents, which shall be subject to the approval of the Board of Supervisors.

(Ordinance 212, June 7, 2005, Section 1)

Part 8

Prohibitions

Section 801. Prohibited Discharges.

(a) No person in the Municipality shall allow, or cause to allow, stormwater 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:

Discharges from fire fighting activities	Uncontaminated water from foundation or from footing drains
Potable water sources including dechlorinated water line and fire hydrant flushings	Flows from riparian habitats and wetlands
Irrigation drainage	Lawn watering
Routine external building Washdown (which does not use detergents or other compounds)	Pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spill material has been removed) and where detergents are not used
Air conditioning condensate	
Water from individual residential car washing	Dechlorinated swimming pool discharges
Spring water from crawl space pumps	Uncontaminated groundwater

(c) In the event that the Municipality determines that any of the discharges identified in Subsection 801(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 the discharge.

(d) Upon notice provided by the Municipality under Subsection 801(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.

(Ordinance 212, June 7, 2005, Section 1)

Section 802. Prohibited Connections.

(a) The following connections are prohibited, except as provided in Subsection 801(b) above:

(1) Any drain or conveyance, whether on the surface or subsurface, which allows any non-stormwater discharge including sewage, process wastewater, and wash water, to enter the separate

storm sewer system, and any connections to the storm drain system from indoor drains and sinks; and

(2) Any drain or conveyance connected from a commercial or industrial land use to the separate storm sewer system which has not been documented in plans, maps or equivalent records, and approved by the Municipality.

(Ordinance 212, June 7, 2005, Section 1)

Section 803. Roof Drains.

(a) Roof drains shall not be connected to streets, sanitary or storm sewers or roadside ditches in order 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.

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

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

(Ordinance 212, June 7, 2005, Section 1)

Section 804. Alteration of BMPs.

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

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

(Ordinance 212, June 7, 2005, Section 1)

Part 9

Enforcement and Penalties

Section 901. 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 and maintenance of the stormwater controls or BMPs in regard to any aspect governed by this Chapter.

(b) Stormwater control and 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 stormwater control or BMP in the Municipality such devices as are necessary to conduct monitoring and/or sampling of the discharges from such stormwater control or BMP.

(d) Unreasonable delays in allowing the Municipality access to a stormwater control or BMP is a violation of this Part.

(Ordinance 212, June 7, 2005, Section 1)

Section 902. 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.

(Ordinance 212, June 7, 2005, Section 1)

Section 903. Enforcement Generally.

(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 controls and BMPs; and

(7) Operation and maintenance of stormwater controls and BMPs.

(b) Such notification shall set forth the nature of the violation(s) and establish a time limit for correction of these violations(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.

(Ordinance 212, June 7, 2005, Section 1)

Section 904. Suspension and Revocation of Permits and Approvals.

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

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

(2) A violation of any provision of this Chapter; or

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

(b) A suspended permit or approval shall be reinstated by the Municipality when:

(1) The Municipal Engineer or designee has inspected and approved the corrections to the stormwater controls and BMPs, or the elimination of the hazard or nuisance, and/or;

(2) The Municipality is satisfied that the violation of the Chapter, law, or rule and regulation has been corrected.

(c) A permit or approval which has been revoked by the Municipality cannot be reinstated. The applicant may apply for a new permit under the procedures outlined in this Chapter.

(Ordinance 212, June 7, 2005, Section 1)

Section 905. Penalties.

(a) Any person violating the provisions of this Chapter shall be guilty of a summary offense, and upon conviction shall be subject to a fine of not more than One Thousand Dollars ($1,000.00) for each violation, recoverable with costs, and may prescribe imprisonment to the extent allowed by law for the punishment of summary offenses. 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.

(Ordinance 212, June 7, 2005, Section 1)

Section 906. 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 violation(s). Failure to comply within the time specified shall 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 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. (Ordinance 212, June 7, 2005, Section 1)

Section 907. Enforcement. The Board of Supervisors 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 set of design plans 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 Section 105 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 release of the performance guarantee, 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 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 by the Municipal Engineer or designated representative to certify compliance with this Chapter

(e) Prior to revocation or suspension of a permit and at the request of the applicant, the Board of Supervisors will schedule a hearing to discuss the non-compliance if there is no immediate danger to life, public health or property. The expense of a hearing shall be the owner's responsibility.

(Ordinance 212, June 7, 2005, Section 1)

Section 908. Appeals.

(a) Any person aggrieved by any action of the Municipality or its designee may appeal to Amity Township Board of Supervisors within thirty (30) days of that action.

(b) Any person aggrieved by any decision of the Amity Township Board of Supervisors may appeal to the County Court of Common Pleas in the County where the activity has taken place within thirty (30) days of the municipal decision.

(Ordinance 212, June 7, 2005, Section 1)

Part 10

Apppendices

Section 1001. Appendix A - Stormwater Control and Best Management Practices Operations and Maintenance Agreement. (Ordinance 212, June 7, 2005, Section 1)

APPENDIX A

STORMWATER CONTROLS AND BEST MANAGEMENT
PRACTICES OPERATIONS AND MAINTENANCE AGREEMENT

THIS STORMWATER CONTROLS AND BEST MANAGEMENT PRACTICES OPERATIONS AND MAINTENANCE AGREEMENT ("Agreement") is made and entered into this _____ day of _____, 200____, by and between _____ _____ (hereinafter the "Landowner"), and THE TOWNSHIP OF AMITY, BERKS COUNTY, PENNSYLVANIA (hereinafter the "Municipality");

WITNESSETH:

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

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

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

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

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

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

Infiltration Trench. A BMP surface structure designed, constructed, and maintained for the purpose of providing infiltration or recharge of stormwater into the soil and/or groundwater aquifer.

Seepage Pit. An underground BMP structure designed, constructed, and maintained for the purpose of providing infiltration or recharge of stormwater into the soil and/or groundwater aquifer.

Rain Garden. A BMP overlain with appropriate mulch and suitable vegetation designed, constructed, and maintained for the purpose of providing infiltration or recharge of stormwater into the soil and/or underground aquifer; and

WHEREAS, the Municipality requires, through the implementation of the Plan, that stormwater management BMPs as required by said Plan and the Municipal Stormwater Management Ordinance be constructed and adequately operated and maintained by the Landowner, his successors and assigns.

NOW, THEREFORE, in consideration of the foregoing promises, the mutual covenants contained herein, and the following terms and conditions, AND INTENDING TO BE LEGALLY BOUND HEREBY, the parties hereto agree as follows:

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

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

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

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

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

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

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

8. The Municipality shall inspect the BMP(s) at a minimum of once every three (3) years to ensure their continued functioning.

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

MUNICIPALITY: TOWNSHIP OF AMITY,
BERKS COUNTY, PENNSYLVANIA

By: _____
Title:

[SEAL] Attest: _____
Title:

LANDOWNER: _____

By: _____
Title:

Attest: _____
Title:

OR

Witnesses:

_____ _____(SEAL)
Print Name: Print Name:

_____ _____(SEAL)
Print Name: Print Name:

COMMONWEALTH OF PENNSYLVANIA :
: SS.
COUNTY OF BERKS :

On this _____ day of _____, 200____, before me, a Notary Public in and for the County and State aforesaid, personally appeared _____ who acknowledged himself/herself to be the _____ of the TOWNSHIP OF AMITY, BERKS COUNTY, PENNSYLVANIA, a Pennsylvania municipality, and that he/she as such _____ and being authorized to do so, executed the foregoing Stormwater Controls and Best Management Practices Operations and Maintenance Agreement for the purposes therein contained by signing the name of the Township by himself/herself as such _____.

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

_____
Notary Public

COMMONWEALTH OF PENNSYLVANIA :
: SS.
COUNTY OF BERKS :

On this _____ day of _____, 200____, before me, a Notary Public in and for the County and State aforesaid, personally appeared _____ who acknowledged himself/herself to be the _____ of _____, a _____, and that he/she as such _____ and being authorized to do so, executed the foregoing Stormwater Controls and Best Management Practices Operations and Maintenance Agreement for the purposes therein contained by signing the name of the Township by himself/herself as such _____.

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

_____
Notary Public

- OR -

COMMONWEALTH OF PENNSYLVANIA :
: SS.
COUNTY OF BERKS :

On this _____ day of _____, 200____, before me, a Notary Public in and for the County and State aforesaid, personally appeared _____, known to me (or satisfactorily proven) to be the person(s) who executed the foregoing Stormwater Controls and Best Management Practices Operations and Maintenance Agreement and acknowledged that he/she/they executed the same for the purposes therein contained.

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

_____
Notary Public

Section 1002. Appendix B - Stormwater Management Design Criteria. (Ordinance 212, June 7, 2005, Section 1)

APPENDIX B

See Sections 1003 through 1010 below.

Section 1003. Table B-1 - Region 4 - Design Storm Rainfall Amount.
(Ordinance 212, June 7, 2005, Section 1)

TABLE B-1

REGION 4 - DESIGN STORM RAINFALL AMOUNT (INCHES)

The design storm rainfall amount chosen for design should be obtained from the PennDOT region in which the site is located according to Figure B-2.

Source: "Field Manual of Pennsylvania Department of Transportation"
STORM INTENSITY-DURATION-FREQUENCY CHARTS
P D T - I D F May 1986.

Region 4

Precipitation Depth (in)

Duration	1 Yr.	1.5 Yr.	2 Yr.	5 Yr.	10 Yr.	25 Yr.	50 Yr.	100 Yr.
5 min.	0.30	0.33	0.35	0.41	0.45	0.50	0.55	0.61
15 min.	0.58	0.63	0.68	0.80	0.93	1.03	1.13	1.25
1 hr.	1.01	1.12	1.22	1.48	1.70	1.91	2.16	2.41
2 hr.	1.24	1.37	1.50	1.84	2.14	2.46	2.80	3.18
3 hr.	1.38	1.55	1.71	2.10	2.43	2.82	3.24	3.69
6 hr.	1.68	1.86	2.04	2.52	3.06	3.60	4.14	4.74
12 hr.	2.04	2.28	2.52	3.00	3.84	4.56	5.16	6.00
24 hr.	2.40	2.64	2.88	3.60	4.56	5.76	6.48	7.44

Section 1004. Figure B-1 - NRCS (SCS) Type II Rainfall Distribution - S Curve. (Ordinance 212, June 7, 2005, Section 1)

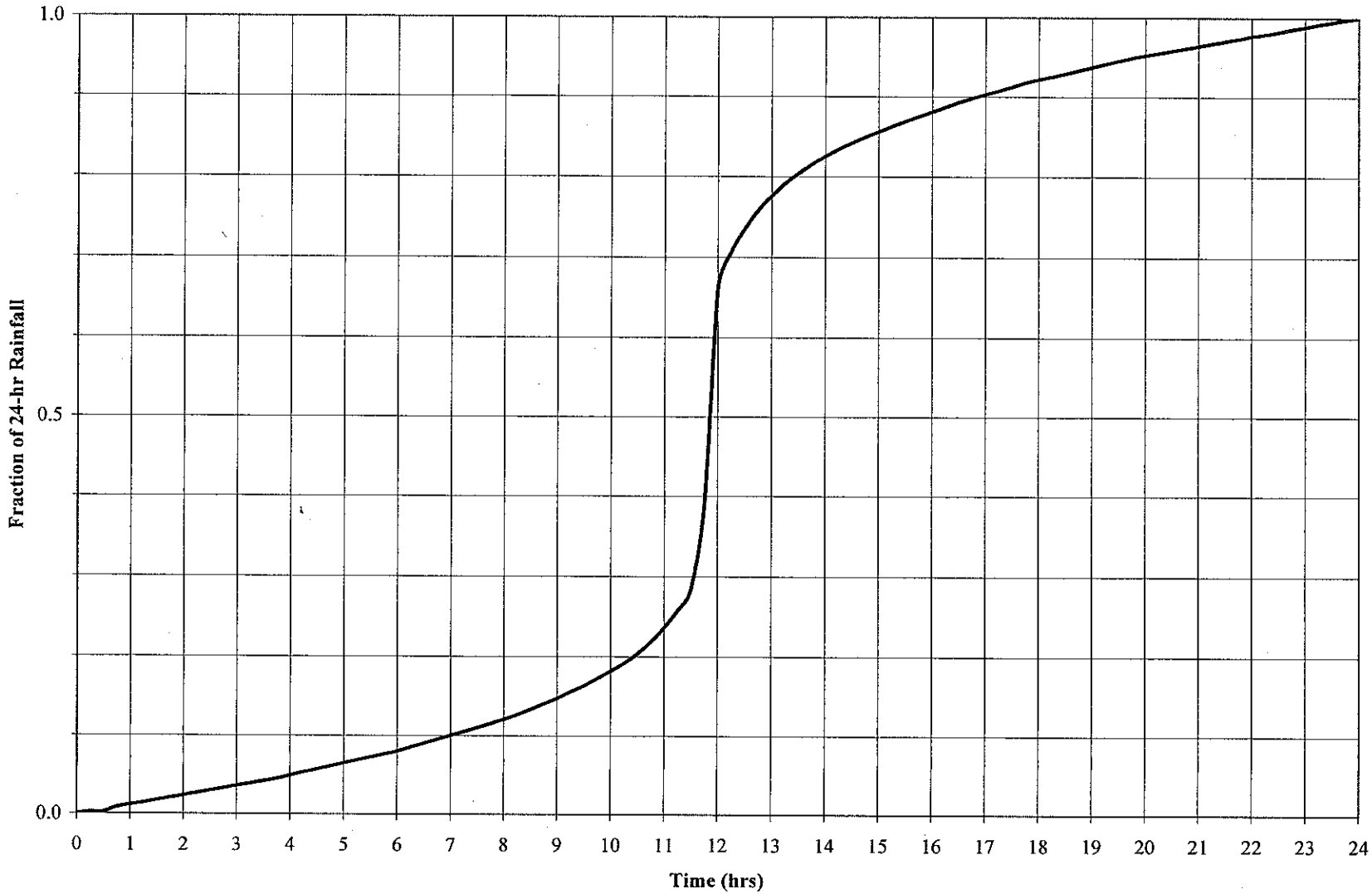
FIGURE B-1

NRCS (SCS) TYPE II RAINFALL DISTRIBUTION - S CURVE

Source: NRCS, TR-55, June 1986

[SEE NEXT PAGE]

FIGURE B-1
NRCS (SCS) TYPE II RAINFALL DISTRIBUTION - S CURVE



Section 1005. Figure B-2 - PennDOT Delineated Regions. (Ordinance 212, June 7, 2005, Section 1)

FIGURE B-2

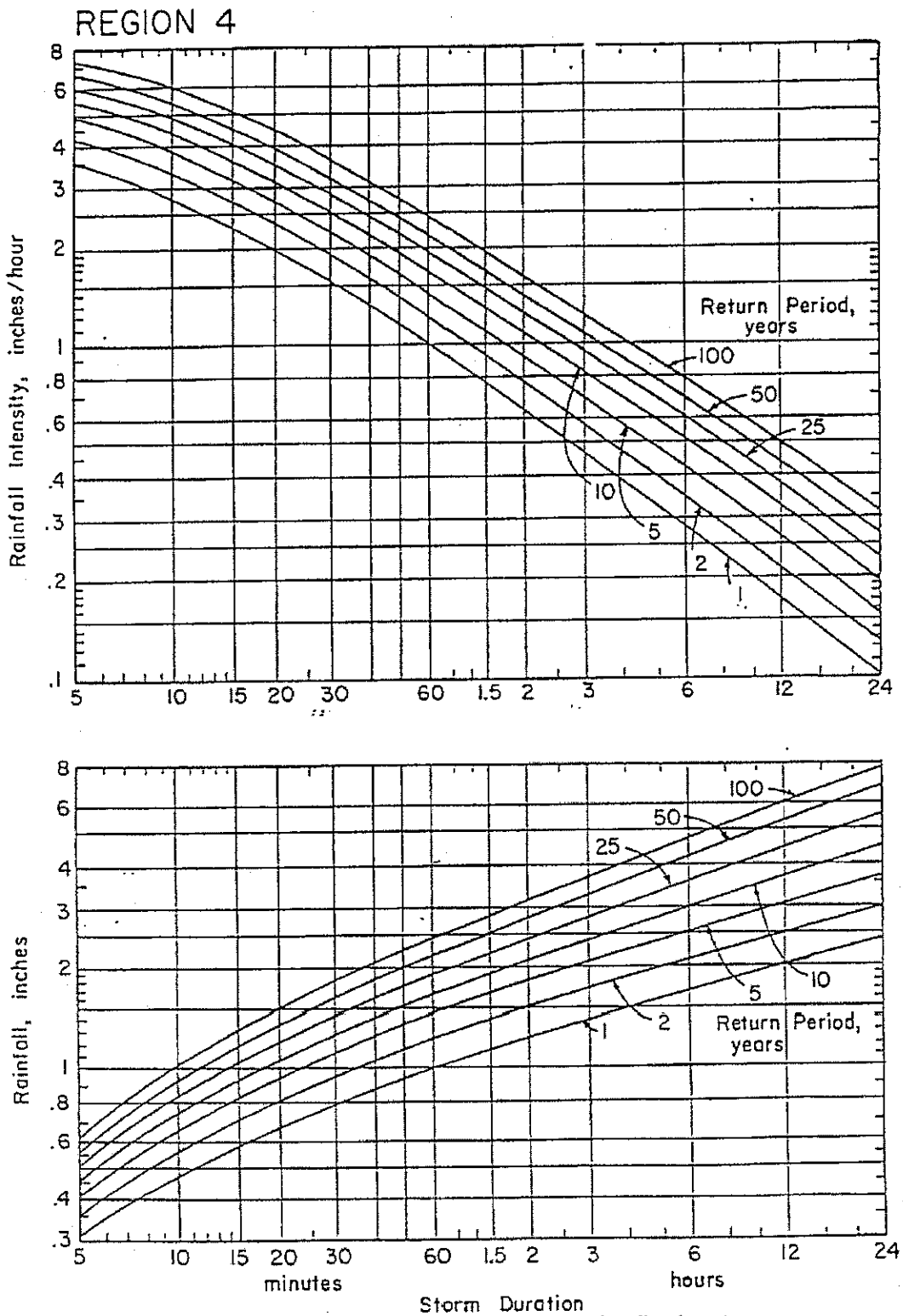
PENNDOT DELINEATED REGIONS

Source: "Field Manual of Pennsylvania Department of Transportation"
STORM INTENSITY-DURATION-FREQUENCY CHARTS
P D T - I D F May 1986.

Section 1006. Figure B-3 - PennDOT Region 4 Storm Intensity-Duration-Frequency Curve. (Ordinance 212, June 7, 2005, Section 1)

FIGURE B-3
PENNDOT REGION 4 STORM INTENSITY-DURATION-FREQUENCY CURVE

Source: "Field Manual of Pennsylvania Department of Transportation"
STORM INTENSITY-DURATION-FREQUENCY CHARTS
P D T - I D F May 1986.



Section 1007. Table B-2 - Runoff Curve Numbers. (Ordinance 212, June 7, 2005, Section 1)

TABLE B-2

RUNOFF CURVE NUMBERS
(From NRCS (SCS) TR-55)

Source: NRCS (SCS) TR-55

		HYDROLOGIC SOIL GROUP			
LAND USE DESCRIPTION		**A**	**B**	**C**	**D**
Open Space		44	65	77	82
Meadow/Orchard		30	58	71	78
Agricultural		59	71	79	83
Forest		36	60	73	79
Commercial (85% Impervious)		89	92	94	95
Industrial (72% Impervious)		81	88	91	93
Institutional (50% Impervious)		71	82	88	90
Residential					
Average Lot Size	% impervious				
1/8 acre or less*	65	77	85	90	92
1/8 - 1/3 acre	34	59	74	82	87
1/3 - 1 acre	23	53	69	80	85
1 - 4 acres	12	46	66	78	82
Farmstead		59	74	82	86
Smooth Surfaces (Concrete, Asphalt, Gravel or Bare Compacted Soil)		98	98	98	98
Water		98	98	98	98
Mining/Newly Graded Areas (Pervious Areas Only)		77	86	91	94

*Includes Multi-Family Housing unless justified lower density can be provided.

Note: Existing site conditions of bare earth or fallow ground shall be considered as meadow when choosing a CN value.

Section 1008. Table B-3 - Rational Runoff Coefficients. (Ordinance 212, June 7, 2005, Section 1)

TABLE B-3

RATIONAL RUNOFF COEFFICIENTS

Source: NRCS (SCS) TR-55

Section 1009. Table B-4 - Manning Roughness Coefficients. (Ordinance 212, June 7, 2005, Section 1)

TABLE B-4

Roughness Coefficients (Manning's "n") For Overland Flow
(U.S. Army Corps Of Engineers, HEC-1 Users Manual)

Surface Description	n		
Dense Growth	0.4	-	0.5
Pasture	0.3	-	0.4
Lawns	0.2	-	0.3
Bluegrass Sod	0.2	-	0.5
Short Grass Prairie	0.1	-	0.2
Sparse Vegetation	0.05	-	0.13
Bare Clay-Loam Soil (eroded)	0.01	-	0.03
Concrete/Asphalt - very shallow depths (less than 1/4 inch)	0.10	-	0.15
- small depths (1/4 inch to several inches)	0.05	-	0.10

Roughness Coefficients (Manning's "n") For Channel Flow

Reach Description	n
Natural stream, clean, straight, no rifts or pools	0.03
Natural stream, clean, winding, some pools or shoals	0.04
Natural stream, winding, pools, shoals, stony with some weeds	0.05
Natural stream, sluggish deep pools and weeds	0.07
Natural stream or swale, very weedy or with timber underbrush	0.10
Concrete pipe, culvert or channel	0.012
Corrugated metal pipe	0.012-0.027(1)
High Density Polyethylene (HDPE) Pipe	
Corrugated	0.021-0.029(2)
Smooth Lined	0.012-0.020(2)

(1) Depending upon type, coating and diameter

(2) Values recommended by the American Concrete Pipe Association, check Manufacturer's recommended value.

Section 1010. Figure B-4 - Recommendation Chart for Infiltration Stormwater Management BMPs in Carbonate Areas. (Ordinance 212, June 7, 2005, Section 1)

FIGURE B-4
RECOMMENDATION CHART FOR INFILTRATION STORMWATER MANAGEMENT BMPS IN CARBONATE AREAS

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

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

RECOMMENDED

NOT RECOMMENDED

* Special Geologic Feature Buffer widths are as follows:

Low Buffer is less than 50 feet

Medium Buffer is 50 feet to 100 feet

High Buffer is greater than 100 feet

** Rates greater than 500% not recommended.

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

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

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

Source: Little Lehigh Creek Watershed ACT 167 - Stormwater Management Ordinance. May 2004

Section 1011. Appendix C - Reserved for Future Use. (Ordinance 212, June 7, 2005, Section 1)

APPENDIX C

RESERVED FOR FUTURE USE

Section 1012. Appendix D - Reserved for Future Use. (Ordinance 212, June 7, 2005, Section 1)

APPENDIX D

RESERVED FOR FUTURE USE

Section 1013. Appendix E - Low Impact Development (LID) Practices. (Ordinance 212, June 7, 2005, Section 1)

APPENDIX E

LOW IMPACT DEVELOPMENT (LID) PRACTICES

ALTERNATIVE APPROACH FOR MANAGING STORMWATER RUNOFF

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

The recommended alternative approach is to promote practices that will minimize proposed conditions runoff rates and volumes, which will minimize needs for artificial conveyance and storage facilities. To simulate pre-development hydrologic conditions, infiltration is often necessary to offset the loss of infiltration by creation of impervious surfaces. The ability of the ground to infiltrate depends upon the soil types and its conditions.

Preserving natural hydrologic conditions requires careful alternative site design considerations. Site design practices include preserving natural drainage features, minimizing impervious surface area, reducing the hydraulic connectivity of impervious surfaces, and protecting natural depression storage. A well-designed site will contain a mix of all those features. The following describes various techniques to achieve the alternative approach:

- **Preserving Natural Drainage Features.** Protecting natural drainage features, particularly vegetated drainage swales and channels, is desirable because of their ability to infiltrate and attenuate flows and to filter pollutants. However, this objective is often not accomplished in land development. In fact, commonly held drainage philosophy encourages just the opposite pattern -- streets and adjacent storm sewers typically are located in the natural headwater valleys and swales, thereby replacing natural drainage functions with a completely impervious system. As a result, runoff and pollutants generated from impervious surfaces flow directly into storm sewers with no opportunity for attenuation, infiltration, or filtration. Developments designed to fit site topography also minimizes the amount of grading on site.

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

- **Avoiding Introduction of Impervious Areas.** Careful site planning should consider reducing impervious coverage to the maximum

extent possible. Building footprints, sidewalks, driveways and other features producing impervious surfaces should be evaluated to minimize impacts on runoff.

- **Reducing the Hydraulic Connectivity of Impervious Surfaces.** Impervious surfaces are significantly less of a problem if they are not directly connected to an impervious conveyance system (such as storm sewer). Two (2) basic ways to reduce hydraulic connectivity are routing of roof runoff over lawns and reducing the use of storm sewers. Site grading should promote increasing travel time of stormwater runoff, and should help reduce concentration of runoff to a single point in the development.

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

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

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

- **Limiting Sidewalks to One Side of the Street.** A sidewalk on one (1) side of the street may suffice in low-traffic neighborhoods. The lost sidewalk could be replaced with bicycle/recreational trails that follow back-of-lot lines. Where appropriate, backyard trails should be constructed using pervious materials.

- **Using Permeable Paving Materials.** These materials include permeable interlocking concrete paving blocks or porous bituminous concrete. Such materials should be considered as alternatives to conventional pavement surfaces, especially for low use surfaces such as driveways, overflow parking lots, and emergency access roads.

- **Reducing Building Setbacks.** Reducing building setbacks reduces driveway and entry walks and is most readily accomplished along low-traffic streets where traffic noise is not a problem.

- **Constructing Cluster Developments.** Cluster developments can also reduce the amount of impervious area for a given number of lots. The biggest savings is in street length, which also will reduce costs of the development. Cluster development clusters the construction activity onto less-sensitive areas without substantially affecting the gross density of development.

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 baseflows in receiving streams, improved groundwater recharge, reduced flood flows, reduced pollutant loads, and reduced costs for conveyance and storage.

Section 1014. Appendix F - West Nile Virus Guidance. (Ordinance 212, June 7, 2005, Section 1)

APPENDIX F

WEST NILE VIRUS GUIDANCE

(This source is from the Monroe County, Pennsylvania Conservation District who researched the potential of West Nile Virus problems from BMPs due to a number of calls they were receiving)

Monroe County Conservation District Guidance:
Stormwater Management and West Nile Virus
Source: Brodhead McMichaels Creeks Watershed Act 167 Stormwater Management Ordinance 2/23/04

The Monroe County Conservation District recognizes the need to address the problem of non-point source pollution impacts caused by runoff from impervious surfaces. The new stormwater policy being integrated into Act 167 Stormwater Management regulations by the PA Department of Environmental Protection (DEP) will make non-point pollution controls an important component of all future plans and updates to existing plans. In addition, to meet post-construction anti-degradation standards under the state National Pollution Discharge Elimination System (NPDES) permitting program, applicants will be required to employ Best Management Practices (BMPs) to address non-point pollution concerns.

Studies conducted throughout the United States have shown that wet basins and in particular constructed wetlands are effective in traditional stormwater management areas such as channel stability and flood control, and are one of the most effective ways to remove stormwater pollutants (United States Environmental Protection Agency 1991, Center for Watershed Protection 2000). From Maryland to Oregon, studies have shown that as urbanization and impervious surface increase in a watershed, the streams in those watersheds become degraded (CWP 2000). Although there is debate over the threshold of impervious cover when degradation becomes apparent (some studies show as little as six percent (6%) while others show closer to twenty percent (20%)), there is agreement that impervious surfaces cause non-point pollution in urban and urbanizing watersheds, and that degradation is ensured if stormwater BMPs are not implemented.

Although constructed wetlands and ponds are desirable from a water quality perspective there may be concerns about the possibility of these stormwater management structures becoming breeding grounds for mosquitoes. The Conservation District feels that although it may be a valid concern, municipalities should not adopt ordinance provisions prohibiting wet basins for stormwater management.

Mosquitoes

The questions surrounding mosquito production in wetlands and ponds have intensified in recent years by the outbreak of the mosquito-borne West Nile Virus. As is the case with all vector-borne maladies, the life cycle of West Nile Virus is complicated, traveling from mosquito to bird, back to mosquito and then to other animals including humans. *Culex pipiens* was identified as the vector species in the first documented cases from New York in 1999. This species is still considered the primary transmitter of the disease across its range. Today there are some sixty (60) species of mosquitoes that inhabit Pennsylvania. Along with *C. pipiens*, three other species have been identified as vectors of West Nile Virus while four (4) more have been identified as potential vectors.

The four (4) known vectors in NE Pennsylvania are *Culex pipiens, C. restuans, C. salinarius* and *Ochlerotatus japonicus*. All four of these species prefer, and almost exclusively use, artificial containers (old tires, rain gutters, birdbaths, etc.) as larval habitats. In the case of *C. pipiens*, the most notorious of the vector mosquitoes, the dirtier the water the better they like it. The important factor is that these species do not thrive in functioning wetlands where competition for resources and predation by larger aquatic and terrestrial organisms is high.

The remaining four species, *Aedes vexans, Ochlerotatus Canadensis, O. triseriatus* and *O. trivittatus* are currently considered potential vectors due to laboratory tests (except the *O. trivittatus*, which did have one confirmed vector pool for West Nile Virus in Pennsylvania during 2002). All four (4) of these species prefer vernal habitats and ponded woodland areas following heavy summer rains. These species may be the greatest threat of disease transmission around stormwater basins that pond water for more than four (4) days. This can be mitigated however by establishing ecologically functioning wetlands.

Stormwater Facilities

If a stormwater wetland or pond is constructed properly and a diverse ecological community develops, mosquitoes should not become a problem. Wet basins and wetlands constructed as stormwater management facilities, should be designed to attract a diverse wildlife community. If a wetland is planned, proper hydrologic soil conditions and the establishment of hydrophytic vegetation will promote the population of the wetland by amphibians and other mosquito predators. In natural wetlands, predatory insects and amphibians are effective at keeping mosquito populations in check during the larval stage of development while birds and bats prey on adult mosquitoes.

The design of a stormwater wetland must include the selection of hydrophytic plant species for their pollutant uptake capabilities and for not contributing to the potential for vector mosquito breeding. In particular, species of emergent vegetation with little submerged growth are preferable. By limiting the vegetation growing below the water surface, larvae lose protective cover and there is less chance of anaerobic conditions occurring in the water.

Stormwater ponds can be designed for multiple purposes. When incorporated into an open space design a pond can serve as a stormwater management facility and a community amenity. Aeration fountains and stocked fish should be added to keep larval mosquito populations in check.

Publications from the Pennsylvania Department of Health and the Penn State Cooperative Extension concerning West Nile Virus identify aggressive public education about the risks posed by standing water in artificial containers (tires, trash cans, rain gutters, bird baths) as the most effective method to control vector mosquitoes.

Conclusion

The Conservation District understands the pressure faced by municipalities when dealing with multifaceted issues such as stormwater management and encourages the incorporation of water quality management techniques into stormwater designs. As Monroe County continues to grow, conservation design, groundwater recharge and constructed wetlands and ponds should be among the preferred design options to reduce the impacts of increases in impervious surfaces. When designed and constructed appropriately, the runoff mitigation benefits to the community from these design options will far out weigh their potential to become breeding grounds for mosquitoes.

Section 1015. Appendix G - References. (Ordinance 212, June 7, 2005, Section 1)

APPENDIX G

REFERENCES

BMP Manuals

California
California Stormwater BMP Handbook: New Development and Redevelopment (January 2003) - separate file available at http://www.cabmphandbooks.org/Development.asp

Georgia
Georgia Stormwater Management Manual Volume 2: Technical Handbook (August 2001) separate file (http://www.georgiastormwater.com/)

Maryland
2000 Maryland Stormwater Design Manual - http://www.mde.state.md.us/Programs/Waterprograms/SedimentandStormwater/stormwater_design/index.asp

Massachusetts
Stormwater Management, Volume Two: Stormwater Technical Handbook (Massachusetts, 1997) - separate file available at http://www.state.ma.us/dep/brp/stormwtr/stormpub.htm

Minnesota
Minnesota Urban Small Sites BMP Manual: Stormwater Best Management Practices for Cold Climates (July 2001) - http://www.metrocouncil.org/environment/Watershed/BMP/manual.htm

New Jersey
Revised Manual for New Jersey: Best Management Practices for Control of Non-point Source Pollution from Stormwater (Fifth Draft May 2000) - http://www.state.nj.us/dep/watershedmgt/bmpmanual.htm

New York
New York State Stormwater Management Design Manual (2001) - http://www.dec.state.ny.us/website/dow/swmanual/swmanual.html

Pennsylvania
Pennsylvania Association of Conservation Districts, Pennsylvania Handbook of Best Management Practices for Developing Areas, November 14, 1997.

Washington
Stormwater Management Manual for Western Washington (August 2001) - http://www.ecy.wa.gov/programs/wq/stormwater/manual.html

Federal
Stormwater Best Management Practices in an Ultra-Urban Setting: Selection and Monitoring (FHWA) - http://www.fhwa.dot.gov/environment/ultraurb/3fs1.htm
USEPA Infiltration Trench Fact Sheet (September 1999) - http://cfpub.epa.gov/npdes/stormwater/menuofbmps/post.cfm

Riparian Buffer References

Alliance for the Chesapeake Bay, Pennsylvania Department of Environmental Protection, September 2000. *Forest Buffer Toolkit*, Stream ReLeaf Program.

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