

ROSS TOWNSHIP
MONROE COUNTY, PENNSYLVANIA
ORDINANCE NO. 89
STORMWATER MANAGEMENT ORDINANCE

AN ORDINANCE OF ROSS TOWNSHIP, MONROE COUNTY, PENNSYLVANIA TO MINIMIZE THE IMPACTS OF STORMWATER RUNNOFF AND PROVIDING REQUIREMENTS FOR PLANNING, INSTALLATION AND MAINTENANCE OF STORMWATER BEST MANAGEMENT PRACTICES, ESTABLISHING FEES FOR ADMINISTRATION OF THE ORDINANCE AND SPECIFYING PENALITES FOR VIOLATIONS.

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ARTICLE I

General Provisions

§1. Statement of findings.

The Board of Supervisors of the Township 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, increases the thermal impacts to receiving waters, and threatens public health and safety.

- B. A comprehensive program of stormwater management, including reasonable regulation of development and activities causing accelerated erosion, is fundamental to the public health, safety, welfare, and the protection of the people of the Township and all the people of the commonwealth, their resources, and the environment.
- C. Inadequate management of accelerated stormwater runoff resulting from development throughout a watershed poses a threat to surface and groundwater quality.
- D. Through project design, impacts from stormwater runoff can be minimized to 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 stormwater runoff is through nonstructural project design, minimizing impervious surfaces and sprawl, avoiding sensitive areas (i.e., buffers, floodplains, steep slopes), and designing to topography and soils to maintain the natural hydrologic regime.
- E. To effectively monitor the maintenance of base flow within the watershed, a tracking of consumptive use including stormwater discharges and groundwater withdrawals is critical to complying with anti-degradation, the Act's goals and policies, and the regulatory requirement to maintain base flow and stream health.

§2. Purpose.

The purpose of this ordinance is to promote the public health, safety, and welfare in the Township by maintaining the natural hydrologic regime by minimizing the impacts described in §1 (Statement of findings) through provisions designed to:

- A. Promote alternative project designs and layout that minimizes impacts to surface water and groundwater.
- B. Promote nonstructural 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 during construction.
- F. Use and preserve the existing natural drainage systems.
- G. Encourage recharge of groundwater where appropriate and prevent degradation of groundwater quality.
- H. Address the quality and quantity of stormwater discharges from the development site.
- I. Maintain existing baseflow and quality of streams and watercourses in the Township and the commonwealth.
- J. Preserve and restore the flood-carrying capacity of streams.
- K. Provide proper maintenance of all permanent stormwater management facilities that are constructed in the Township.

- L. Provide performance standards and design criteria for watershed-wide stormwater management and planning.

§3. Legislative authority.

The Township is empowered to regulate land use activities that affect runoff, surface and groundwater quality and quantity by the authority of the Act of October 4, 1978, P.L. 864, No. 167, known as the "Storm Water Management Act" (hereinafter referred to as "the Act") found at 32 P.S. §680.1 et seq., as amended; the Act of December 16, 2002, P.L. 1776, No. 220, pertaining to water resources planning, found at 27 Pa. C.S.A. §3101 et seq., and the Pennsylvania Municipalities Planning Code, Act of 1968, P.L. 805, No. 247, all as amended.

§4. Applicability; regulated activities.

- A. This ordinance shall apply to all areas of the Township.
- B. The Pennsylvania Department of Environmental Protection, Bureau of Watershed Management Document Number 363-0300-002, entitled "Pennsylvania Stormwater Best Management Practices Manual" (BMP Manual), effective as of December 30, 2006 (as amended), is incorporated herein by reference.
- C. This ordinance contains stormwater management performance standards and design criteria that are necessary, or desirable, from a watershed-wide perspective.
- D. The Township may, after consultation with DEP, approve alternative methods for meeting the state water quality requirements other than those in this ordinance, provided that they meet the minimum requirements of, and do not conflict with state law, including but not limited to the Clean Streams Law (35 P.S. §691.1 et seq.) and the BMP Manual as revised.
- E. The following activities are defined as "regulated activities" and shall be regulated by this ordinance: (See §18 for exemptions from stormwater management site plan submission requirements.)
- (1) Land development.
 - (2) Subdivisions excluding the combination of existing lots of record and the realignment of lot lines of existing lots of record which do not increase the number of lots.
 - (3) Alteration of the natural hydrologic regime.
 - (4) Construction of/or additional impervious or semi-pervious surfaces (driveways, parking lots, roads).
 - (5) Construction of new buildings or additions to existing buildings.
 - (6) 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 §10 (Water quality and streambank erosion) and §11 (Groundwater recharge, infiltration and bioretention).
 - (7) Diversion piping or encroachments in any natural or man-made channel.
 - (8) Installation or alteration of nonstructural and structural stormwater management BMPs or appurtenances thereto.
 - (9) Stream enhancement or restoration projects.

§5. Compatibility with other provisions.

Permits and approvals issued pursuant to this ordinance do not relieve the applicant of the responsibility to

secure required permits or approvals for activities regulated by any other applicable code, rule, act, or ordinance. If more stringent requirements concerning regulation of stormwater or erosion and sediment pollution control or activities in wetlands, lakes, ponds or streams are contained in any other code, rule, act or ordinance, the more stringent regulation shall apply.

ARTICLE II Terminology

§6. Word usage.

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

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

§7. Definitions.

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

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

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

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

APPLICANT — A person who has filed an application for approval to engage in any regulated activities as defined in §4 (Applicability; regulated activities).

ARTIFICIAL WATERCOURSE — A man-made watercourse which was constructed to convey water as part of a stormwater conveyance/ management facility, including but not limited to drainage swales, detention/retention basins, property line swales, BMPs, and other stormwater conveyance/management facilities as identified by the Township Board of Supervisors after consultation with the Township Engineer.

AS-BUILT PLANS — Those plans prepared and maintained by the contractor(s), as the contractor(s) constructs the project and upon which the contractor documents the actual locations of the constructed components and changes to the original contract documents. These, or a copy of same, signed by the contractor and notarized as a ". . .true, correct and accurate representation of the constructed components. . ." are turned over to the

Township's Engineer at the completion of the project.

BANKFULL — The channel at the top-of-bank or point where water begins to overflow onto a floodplain.

BASE FLOW — The portion of stream flow that is sustained by groundwater discharge.

BIORETENTION — A stormwater retention area which uses woody and herbaceous plants and soils to remove pollutants before infiltration occurs.

BMP (BEST MANAGEMENT PRACTICE) — Stormwater structures, facilities and techniques to control, maintain or improve the quantity and quality of surface runoff and groundwater recharge.

BOARD OF SUPERVISORS — The RossTownship Boardof Supervisors.

BUFFER — The area of land immediately adjacent to any wetland, lake, pond, or stream, measured perpendicular to and horizontally from the delineated edge of the wetland, lake, pond, or the top-of-bank on both sides of a stream.

CHANNEL EROSION — The widening, deepening, and headward cutting of small channels and waterways caused by stormwater runoff or bankfull flows.

CISTERN — An underground reservoir or tank for storing rainwater.

CONSERVATION DISTRICT — The Monroe County Conservation District.

CONSUMPTIVE WATER USE — That part of water removed from the immediate water environment not available for other purposes such as water supply, maintenance of stream flows, water quality, fisheries and recreation, as opposed to water that is used nonconsumptively, which is returned to surface water, where practicable, and groundwater.

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

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

DEPARTMENT — The PennsylvaniaDepartment of Environmental Protection.

DESIGNEE — The agent of the Monroe County Planning Commission, Monroe County Conservation District and/or agent of the Township involved with the administration, review or enforcement of any provisions of this ordinance by contract or memorandum of understanding.

DESIGN PROFESSIONAL (QUALIFIED) — A Pennsylvania-registered professional engineer, Pennsylvania-registered landscape architect or a Pennsylvania-registered professional land surveyor trained to develop stormwater management plans.

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

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

DETENTION DISTRICT — Those subareas in which some type of detention is required to meet the Stormwater

Management Plan requirements and the goals of Act 167.

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

DIFFUSED DRAINAGE DISCHARGE — Drainage discharge not confined to a single-point location or channel, such as sheet flow or shallow concentrated flow.

DISTURBED AREAS — Land area where an earth disturbance activity is occurring or has occurred.

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

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

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

DRAINAGE PERMIT — A permit issued by the Township after the stormwater management site plan has been approved.

DRAINAGE PLAN — See "stormwater management site plan."

EARTH DISTURBANCE — A construction or other human activity which disturbs the surface of land, including, but not limited to, clearing and grubbing, grading, excavations, embankments, 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.

EMERGENCY SPILLWAY — A conveyance area that is used to pass peak discharge greater than the maximum design storm controlled by the stormwater facility.

ENCROACHMENT — A structure or activity that changes, expands or diminishes the course, current or cross section of a watercourse, floodway or body of water.

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

EROSION AND SEDIMENT CONTROL PLAN — A site-specific plan that is designed to minimize accelerated erosion and sedimentation during construction.

EXCEPTIONAL VALUE WATERS — Surface waters of exceptionally high quality which satisfy Pennsylvania Code, Title 25, Environmental Protection, Chapter 93, Water Quality Standards, §93.4b(b) (relating to antidegradation), as amended.

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.

EXISTING RESOURCE AND SITE ANALYSIS MAP (ERSAM) — A map of the subject parcel showing environmentally sensitive areas, including, but not limited to, steep slopes, ponds, lakes, streams, wetlands, hydric soils, floodplains, buffer areas, hydrologic soil groups A and B (areas conducive to infiltration), any existing recharge areas, existing structures, property boundary line, areas of impervious surface, soils lines and descriptions from the most recent Monroe County Soil Survey, existing well locations, existing septic systems, existing contours, soil testing locations keyed to testing results, existing drainage structures, photograph location (if available), and the

ratio of disturbed area to the entire site area and measures taken to minimize earth disturbance.

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

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

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

FOREST MANAGEMENT/TIMBER OPERATIONS — Planning and activities necessary for the management of forestland 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.

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.

GRADE —

- A. A slope, usually of a road, channel or natural ground specified in percent and shown on plans as specified herein.
- B. To finish the surface of a roadbed, top of embankment or bottom of excavation to the elevation noted on the plan.

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

GROUNDWATER RECHARGE — Replenishment of existing natural underground water supplies without degrading groundwater quality.

HEC-HMS — The United States Army Corps of Engineers, Hydrologic Engineering Center (HEC) – Hydrologic Modeling System (HMS) computer program.

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), as amended.

HYDROLOGIC REGIME (NATURAL) — The hydrologic cycle or balance that sustains quality and quantity of stormwater, baseflow, storage and groundwater supply under natural conditions.

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 more runoff.

IMPERVIOUS SURFACE — A surface that prevents the percolation of water into the ground such as rooftops, pavement, sidewalks, driveways, gravel drives, roads and parking, and compacted fill, earth or turf to be used as such.

IMPOUNDMENT — A retention or detention basin designed to retain stormwater runoff and release it at a controlled rate, either to the groundwater (retention basin) or surface discharge (detention basin).

INFILL — Development that occurs on smaller parcels that are undeveloped but are within or in 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.

INFILTRATION — For stormwater to pass through the soil from the surface.

INFILTRATION STRUCTURES — A structure designed to direct runoff into the underground water (e.g., French drains, seepage pits, seepage trench).

INLET — The upstream end of any structure through which water may flow.

LAND DEVELOPMENT — Any of the following activities:

- A. The improvement of one lot or two or more contiguous lots, tracts or parcels of land for any purpose involving:
 1. A group of two or more residential or nonresidential buildings, whether proposed initially or cumulatively, or a single nonresidential building on a lot or lots regardless of the number of occupants or tenure; or,
 2. The division or allocation of land or space, whether initially or cumulatively, between or among two (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.
- B. A subdivision of land.

The following are examples of applications that shall be considered a land development:

- A. A new principal building intended to be occupied by a commercial, institutional, industrial or other nonresidential use.
- B. The division of an existing building into a dwelling and a principal commercial use, or two or more commercial uses.
- C. A mobile home park.
- D. An apartment building.

The definition of *land development* shall not include the following:

- A. The conversion of an existing single-family detached dwelling or single-family semidetached dwelling into not more than three residential units, unless such units are intended to be a condominium.

- B. The addition of an accessory building, including farm buildings, on a lot or lots subordinate to an existing principal building.
- C. The addition or conversion of buildings or rides within the confines of an enterprise which would be considered an amusement park. For purposes of this subsection, an *amusement park* is defined as a tract or area used principally as a location for permanent amusement structures or rides. This exclusion shall not apply to newly acquired acreage by an amusement park until initial plans for the expanded area have been approved by the Township.

LIMITING ZONE — A soil horizon or condition in the soil profile or underlying strata which includes one of the following:

- A. A seasonal high water table, whether perched or regional, determined by direct observation of the water table or indicated by soil mottling;
- B. 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; or
- C. A rock formation, other stratum or soil condition which is so slowly permeable that it effectively limits downward passage of water.

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.

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.

NATURAL HYDROLOGIC REGIME — See "hydrologic regime."

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.

NONSTRUCTURAL 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.

NRCS — Natural Resource Conservation Service (previously SCS).

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

ORDINANCE — Ross Township Act 167 Stormwater Management Ordinance (this ordinance).

OUTFALL — Point where water flows from a conduit, stream, or drain.

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

PARENT TRACT — Any lot or parcel of property which was legally in existence and properly on file with the County Recorder of Deeds prior to the effective date of the original Township Subdivision and Land Development Ordinance and from which a lot or lots have been subdivided or are proposed for subdivision.

PARKING LOT STORAGE — Involves the use of parking areas as temporary impoundments with controlled release

rates during rainstorms.

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

PENN STATE RUNOFF MODEL (CALIBRATED) — The computer-based hydrologic modeling technique adapted to the Brodhead/McMichael watershed for the Act 167 Plan. The model has been "calibrated" to reflect actual recorded flow values by adjoining key model input parameters.

PERFORMANCE GUARANTEE — A security which may be accepted by the Township in lieu of a requirement that certain improvements be made by the developer before the plan is approved.

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

PLANNING COMMISSION — The Ross Township Planning Commission.

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

PRACTICABLE ALTERNATIVE — An alternative that is available and capable of being done after taking into consideration cost, existing technology and logistics considering overall project purposes.

PREDEVELOPMENT — Undeveloped/natural condition.

PRETREATMENT — Techniques employed in structural and nonstructural stormwater BMPs to provide storage or filtering to help trap coarse materials and other pollutants before they enter the system, but not necessarily meet the water quality volume requirements of §10 (Water quality; streambank erosion).

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

RECHARGE AREA — Undisturbed or reconditioned surface area or depression where stormwater collects, and a portion of which infiltrates and replenishes the underground and groundwater.

REDEVELOPMENT — Any construction, alteration, or improvement exceeding 5,000 square feet of impervious surface on sites where existing land use is commercial, industrial, institutional, or multifamily residential.

REGULATED ACTIVITIES — Actions or proposed actions that have an impact on stormwater runoff quality and quantity and that are specified in §4 (Applicability; regulated activities).

RELEASE RATE — The percentage of existing conditions peak rate of runoff from a site or subarea to which the post-development peak rate of runoff must be reduced to protect downstream areas.

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 days.

RETURN PERIOD — The average interval, in years, within which a storm event of a given magnitude can be expected to recur.

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

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

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

SALDO — The Subdivision and Land Development Ordinance of the Township of Ross.

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

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.

SEDIMENT POLLUTION — The placement, discharge or any other introduction of sediment into the waters of the commonwealth.

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 groundwater.

SHEET FLOW — Runoff that flows over the ground surface as a thin, even layer.

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)."

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.

SPECIAL PROTECTION SUBWATERSHEDS — Watersheds for which the receiving waters are exceptional value (EV) or high quality (HQ) waters.

SPILLWAY — A conveyance that is used to pass the peak discharge of the maximum design storm controlled by the stormwater facility.

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

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

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

STORMWATER — The surface runoff generated by precipitation reaching the ground surface.

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

STORMWATER MANAGEMENT PLAN — The plan for managing those land use activities that will influence stormwater runoff rate and volume and water quality.

STORMWATER MANAGEMENT SITE PLAN — The plans and documentation prepared by the applicant, or his representative, indicating how stormwater runoff will be managed at the site of interest according to this ordinance.

STREAM — A natural watercourse.

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

SUBAREA (SUBWATERSHED) — The smallest drainage unit of a watershed for which stormwater management criteria have been established in the Stormwater Management Plan.

SUBDIVISION — The division or redivision of a lot, tract, or parcel of land by any means into two or more lots, tracts, parcels or other divisions of land including changes in existing lot lines for the purpose, whether immediate or future, of lease, 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 10 acres, not involving any new street or easement of access or any residential dwelling, shall be exempted.

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

TIMBER OPERATIONS — See "forest management."

TIME-OF-CONCENTRATION (T_c) — 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.

TOWNSHIP — Ross Township, Monroe County, Pennsylvania.

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

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.

WELLHEAD — The point at which a groundwater well bore hole meets the surface of the ground.

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.

WETLAND — Those areas that are inundated or saturated by surface water 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.

ZONING ORDINANCE — The Zoning Ordinance of the Township of Ross.

ARTICLE III Stormwater Management

§8. General requirements.

- A. Applicants proposing regulated activities which do not fall under the exemption criteria shown in §18 (Exemptions; NPDES Permit supersedes) shall submit a stormwater management site plan compliant with this ordinance to the Township 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 perform an alternatives analysis to find 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 stormwater management site plan must be designed through an alternatives analysis and a site analysis performed as shown in Chapter 4 of the Pennsylvania Stormwater Best Management Practices Manual, as amended, compliant with the sequencing provisions of §9 (Nonstructural project design sequencing to minimize stormwater impacts), to ensure maintenance of the natural hydrologic regime and to promote groundwater recharge and protect groundwater and surface water quality and quantity. The stormwater management site plan designer must proceed sequentially in accord with Article III.
- 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 compliant with this ordinance.
- E. The 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 ordinance.
- 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 ordinance. 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 §10I(8) .
- H. All stormwater management site plans shall include a consumptive use tracking report as required in §16 (Consumptive use tracking report).
- I. Any stormwater management facilities regulated by this ordinance that would be in or adjacent to waters of the commonwealth or wetlands shall be subject to approval by PA DEP through the joint permit application process, or, where deemed appropriate by PA DEP, 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 PA DEP.
- J. Any stormwater management facilities regulated by this ordinance that would be located on state highway rights-of-way shall be subject to approval by the Pennsylvania Department of Transportation (PennDOT).
- K. Infiltration of runoff through seepage beds, infiltration trenches, etc., where soil conditions permit, and minimization of impervious surfaces to the extent permitted by the Zoning Ordinance, are encouraged to reduce the size or eliminate the need for detention facilities or other structural BMPs.
- L. Roof drains should not be connected to streets, sanitary or storm sewers or roadside ditches in order to promote overland flow and infiltration/percolation of stormwater. Considering potential pollutant loading, roof drain runoff in most cases will not require pretreatment.

- M. All stormwater runoff, other than rooftop runoff discussed in §8L, shall be treated for water quality prior to discharge to surface or groundwater.

§9. 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 find practicable alternatives to the surface discharge of stormwater, the creation of impervious surfaces and the degradation of waters of the commonwealth and must maintain 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 existing technology and logistics considering overall project purposes and cost.
 - (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. Applicants 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, floodplains, buffer areas, hydrologic soil groups A and B (areas conducive to infiltration), any existing recharge areas, existing structures, property boundary line, areas of impervious surface, soils lines and descriptions from the most recent Monroe County Soil Survey, existing well locations, existing septic systems, existing contours, soil testing locations keyed to testing results, existing drainage structures, photograph location (if available), and the ratio of disturbed area to the entire site area and measures taken to minimize earth disturbance.
 - (2) Establish buffers according to §10 (Water quality and stream-bank erosion).
 - (3) Prepare a draft project layout avoiding earth disturbance in sensitive areas identified in §9B(1) and minimizing total site earth disturbance.
 - (4) Identify site-specific predevelopment drainage areas, discharge points, recharge areas to be preserved and hydrologic soil groups A and B to be used for recharge.
 - (5) Evaluate nonstructural stormwater management alternatives to:
 - (a) Minimize earth disturbance,
 - (b) Minimize impervious surfaces, and
 - (c) Break up large impervious surfaces.
 - (6) Satisfy water quality and stream-bank erosion protection objective (§10 - Water quality and stream-bank erosion).
 - (7) Satisfy groundwater recharge (infiltration) objective (§11 - Groundwater recharge, infiltration and bioretention) and provide for stormwater treatment prior to infiltration.
 - (8) Determine what management district the site falls into (§12 - Stormwater management districts) and conduct a predevelopment runoff analysis.
 - (9) Prepare final project design to maintain predevelopment drainage areas and discharge points; minimize

earth disturbance and impervious surfaces; and reduce runoff to the maximum extent possible.

- (10) Conduct a post-development runoff analysis based on the final design to meet the required release rate and, in turn, the over-bank flow and extreme event requirements (§12 - Stormwater management districts).
- (11) Manage any remaining runoff through treatment prior to discharge, as part of detention, bioretention, direct discharge or other structural control.

§10. Water quality and stream-bank erosion.

In addition to the performance standards and design criteria requirements of this ordinance, the applicant shall comply with the following water quality requirements of this section.

A. Objective for design; BMPs; release of water.

- (1) For water quality and stream-bank erosion, the objective is to design a water quality BMP to detain the proposed conditions' two-year, twenty-four-hour design storm flow to the existing conditions' one-year, twenty-four-hour design storm flow using the NRCS 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-year, 24-hour design storm flow takes a minimum of 24 hours to drain from the facility, from a point where the maximum volume of water from the one-year, twenty-four-hour design storm is captured (i.e., the maximum water surface elevation is achieved in the facility).
- (2) Wet basins and other BMPs shall be used for water quality control in accord with the requirements found in the Pennsylvania Stormwater BMP Manual, as revised, and incorporated herein by reference.
- (3) Release of water can begin at the start of the storm (i.e., the invert of the water quality orifice is at the invert of the facility). The design of the facility shall consider and minimize the chances of clogging and sedimentation. Orifices smaller than four inches diameter shall not be used unless the design professional can provide proof that the smaller orifices are protected from clogging by use of trash racks, etc.

B. 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 wellheads.
- (6) Erodibility of soils.
- (7) Land availability and configuration of the topography
- (8) Peak discharge and required volume control.
- (9) Stream-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.
- C. For areas within defined special protection subwatersheds which includes exceptional value (EV) and high quality (HQ) waters, the temperature and quality of water and streams shall be maintained using temperature sensitive BMPs and stormwater conveyance systems.
- D. The applicant shall consider the guidelines found in the references specified in the Pennsylvania Stormwater BMP Manual, as amended, for constructed wetlands, where proposed.
- E. Pretreatment in accord with §8L and §8M shall be provided prior to infiltration.
- F. Stream-bank restoration projects shall include the following:
- (1) No restoration or stabilization projects may be undertaken without examining the fluvial geomorphology of stable reaches above and below the unstable reach.
 - (2) Restoration project design must then consider maintenance of stability in the adjacent stable reaches of the stream channel.
 - (3) An erosion and sediment control plan approved by the Conservation District must be provided by the applicant.
 - (4) All applicable state and federal permits must be obtained.
- G. Biology shall be incorporated into the design of all wet basins in accord with the West Nile Virus Guidance.
- H. To accomplish the above, the applicant shall submit original and innovative designs to the Township Engineer for review and approval. Such designs may achieve the water quality objectives through a combination of BMPs (best management practices).
- I. Buffers.
- (1) In addition to the other restrictions of this section, buffers shall be provided in accord with this §10I.
 - (2) Where resource buffers overlap, the more restrictive requirements shall apply.
 - (3) Preexisting lots or parcels/development in buffers. In the case of legally preexisting lots or parcels (approved prior to the effective date of this ordinance) where the usable area of a lot or parcel lies within a buffer area, rendering the lot or parcel unable to be developed in accord with the allowable use per Township zoning, the development may only be permitted if a modification is granted by the Board of Supervisors.
 - (4) Improvements to existing structures in buffers. The provisions of this §10I do not require any changes or improvements to be made to lawfully existing structures in buffers. However, when any improvement to a structure is proposed which results in a horizontal expansion of that structure within the buffer or which would result in the percentage impervious area to exceed that allowed by this ordinance, the improvement will only be permitted if a modification is first granted by the Board of Supervisors.

(5) Site-specific buffer. Where the applicant proposes to determine a site-specific buffer, a detailed analysis of site conditions, may be substituted for the standard buffer in §10I(6)(b), §10I(7)(a) and §10I (8)(a).

(6) Wetlands.

(a) Wetland identification. Wetlands shall be identified in accord with the 1987 United States Army Corps of Engineers Manual for Identifying and Delineating Wetlands, as amended, and properly flagged and surveyed on site to ensure they are protected.

[1] Wetlands in an artificial watercourse. Wetlands contained within the banks of an artificial watercourse shall not be considered for buffer delineation purposes.

[2] Wetlands in a natural watercourse. For wetlands contained within the banks of a natural watercourse, only the stream buffer shall apply.

(b) Wetland buffer delineation. A 50-foot buffer, measured perpendicular to and horizontally from the edge of the delineated wetland, shall be maintained for all wetlands.

[1] Permitted activities/development. Earth disturbance, grading, filling, buildings, structures, new construction, or development shall not be permitted within the wetland buffer except:

[a] Stormwater conveyance required by the Township or other body or agency having jurisdiction,

[b] buffer maintenance and restoration,

[c] the correction of hazardous conditions,

[d] stream crossings permitted by DEP, and,

[e] passive, unpaved, stabilized trails.

[2] Buffer alteration. The area of the wetland buffer altered by activities permitted in accord with §10I(6)(b)[1] shall be minimized to the greatest extent practicable as determined by the Township. In no case shall more than 20 percent of the cumulative wetland buffer on the subject parcel be altered by the activities permitted in accord with §10I(6)(b)[1]. This 20-percent disturbance shall include both the disturbance created by the applicant and any subsequent owner of the parcel or a portion of the parcel developed by the applicant (i.e., lot owner).

(7) Lakes and ponds.

(a) Lake and pond buffer delineation. A 50-foot buffer measured perpendicular to and horizontally from the edge of any lake or pond, shall be maintained around any lake or pond.

(b) Permitted activities/development. Earth disturbance, grading, filling, buildings, structures, new construction, or development shall not be permitted within the lake or pond buffer except:

[1] Stormwater conveyance required by the Township or other body or agency having jurisdiction;

[2] buffer maintenance and restoration;

[3] the correction of hazardous conditions;

[4] boat docks; and,

[5] passive, unpaved, stabilized trails.

- (c) Buffer alteration. The area of the buffer altered by activities permitted in accord with §10I(7)(b) shall be minimized to the greatest extent practicable, as determined by the Township. In no case shall more than 35 percent of the cumulative lake and pond buffer on the subject parcel be altered by the activities permitted in accord with §10I(7)(b). This 35-percent disturbance shall include both the disturbance created by the applicant and any subsequent owner of the parcel or a portion of the parcel developed by the applicant (i.e., lot owner).

(8) Streams.

- (a) Stream buffer delineation. A 50-foot buffer measured perpendicular to and horizontally from the top-of-bank on all sides of any stream, but 75 feet for Aquashicola Creek, Buckwha Creek and Princess Run, shall be maintained.
- (b) Permitted activities/development. Earth disturbance, grading, filling, buildings, structures, new construction, or development shall not be permitted within the stream buffer except:
- [1] Stormwater conveyance required by the Township or other body or agency having jurisdiction;
 - [2] buffer maintenance and restoration;
 - [3] the correction of hazardous conditions;
 - [4] stream crossings permitted by DEP;
 - [5] fish hatcheries, wildlife sanctuaries and boat launch sites constructed so as not to increase the floodplain elevation; and,
 - [6] passive, unpaved, stabilized trails.
- (c) Buffer alteration. The area of the buffer altered by activities permitted in accord with §10I(8)(b) shall be minimized to the greatest extent practicable, as determined by the Township. In no case shall more than 20 percent of the cumulative stream buffer on the subject parcel be altered by the activities permitted in accord with §10I(8)(b). This 20-percent disturbance shall include both the disturbance created by the applicant and any subsequent owner of the parcel or a portion of the parcel developed by the applicant (i.e., lot owner).

§11. Groundwater recharge, infiltration and bioretention.

Maximizing the groundwater recharge capacity of the area being developed is required. Design of the infiltration/recharge stormwater management facilities shall consider providing groundwater 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 may be designed to compensate for the runoff from parking areas. These measures are required to be compliant with §2 (Purpose) and take advantage of utilizing any existing recharge areas.

A. Infiltration BMPs shall meet the following minimum requirements:

- (1) Maximum infiltration requirements. Regulated activities will be required to recharge (infiltrate), where practicable, 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 recharged shall be determined from §11A(3)(a) or §11A(3)(b), 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:
 - (a) A minimum depth of 24 inches between the bottom of the BMP and the limiting zone.
 - (b) 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.
 - (c) The recharge facility shall be capable of completely infiltrating the recharge volume within four days.

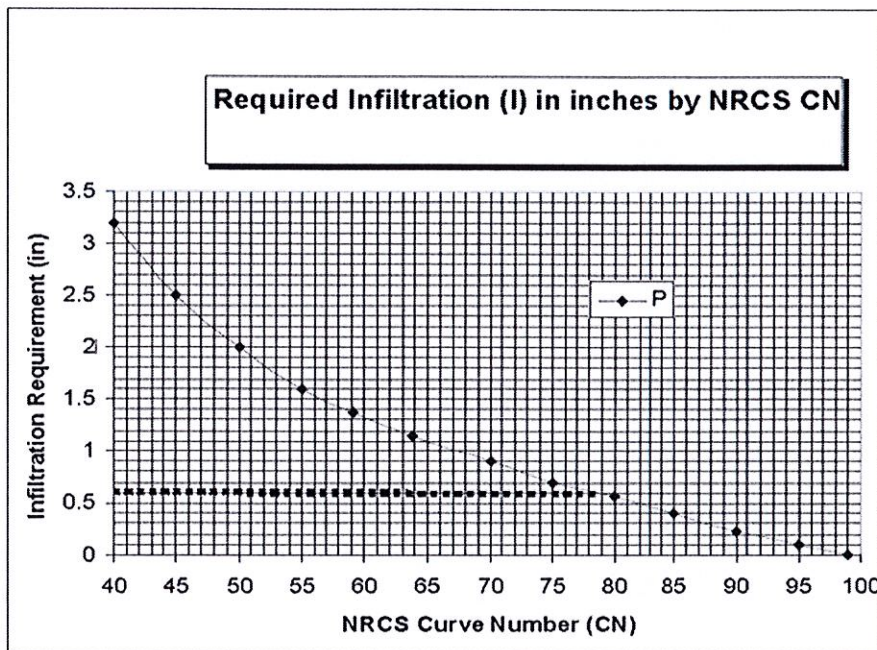


Figure 11A - Infiltration Requirement Based Upon NRCS Curve Number

- (d) Pretreatment in accord with §8L and §8M shall be provided prior to infiltration.

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

(a) NRCS Curve Number Equation.

[1] The NRCS runoff equation shall be used to calculate infiltration requirements (P) in inches.

For zero runoff: $P = I \text{ (Infiltration) (in.)} = (200/CN) - 2$ [Equation 11.1]

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

[2] This equation is displayed graphically in, and the infiltration requirement can be determined from, Figure 11A.

[3] The recharge volume (Rev) required would therefore be computed as:

$Rev = I * \% \text{ impervious area}$ [Equation 11.2]

Where: I = infiltration requirements (in.)

(b) Annual recharge. Water budget approach:

[1] It has been determined that infiltrating 0.6 inch of runoff from the impervious areas will aid in maintaining the hydrologic regime of the watershed. If the goals of §11A(2) cannot be achieved, then 0.6 inch of rainfall shall be infiltrated from all impervious areas, up to an existing site condition curve number of 77. Above a curve number of 77, Equation 11.1 or the curve in Figure 11A shall be used to determine the infiltration requirement.

[2] The recharge volume (Rev) required would therefore be computed as:

$Rev = 0.6 \text{ or } I, \text{ whichever is less, times the percent impervious area } (* \% \text{ impervious area}).$

B. Soils. A detailed soils evaluation of the project site shall be required to determine the suitability of recharge facilities. The evaluation shall be performed by a qualified design professional, and, at a minimum, 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 watershed to determine general areas of suitability for infiltration practices.
- (2) Provide site-specific infiltration test results (at the level of the proposed infiltration surface) in accord with the BMP Manual and/or ASTM Guide No. D5126 to determine the appropriate hydraulic conductivity rate.
- (3) Design the infiltration structure for the required storm volume based on field-determined capacity with the appropriate safety factors applied (as noted in the Pennsylvania Stormwater Best Management Practices Manual) 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 Township that the soils are conducive to infiltrate on the lots identified with site-specific testing identified in §11B(2) above.

C. Stormwater hotspots.

(1) A stormwater hotspot is defined as a land use activity that generates higher concentrations of hydrocarbons, trace metals or toxicants than are found in typical stormwater runoff, based on monitoring studies.

(a) Designated hotspots include, but are not limited to:

- [1] Salvage yards and recycling facilities
- [2] Fleet storage areas (bus, truck, etc.)
- [3] Public works storage areas
- [4] Facilities that generate or store hazardous materials
- [5] Commercial gasoline and fuel oil sales
- [6] Vehicle service stations, repair facilities and body repair and painting facilities
- [7] Dry-cleaning and dyeing establishments and laundries that use cleaning solvents

(b) 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 cannot be allowed to infiltrate into groundwater where it may contaminate water supplies.

(c) Therefore, the Rev requirement is NOT applied to development sites that fit into the hotspot category (and the entire WQv must still be treated). Second, a greater level of stormwater treatment may be needed at hotspot sites to prevent pollutant wash off after construction. EPA's NPDES stormwater program requires some industrial sites to prepare and implement a stormwater pollution prevention plan.

(1) Extreme caution shall be exercised where salt or chloride 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/recharge facility and perform a hydrogeologic justification study, if necessary. The infiltration requirement in high quality/exceptional value waters shall be subject to the Department's Chapter 93 Antidegradation Regulations. The Township may require the installation of an impermeable liner in detention basins where the possibility of groundwater contamination exists. A detailed hydrogeologic investigation may be required by the Township.

(2) The Township shall require the applicant to provide safeguards against groundwater contamination for uses which may cause groundwater contamination should there be a mishap or spill.

D. Extreme caution shall be exercised where infiltration is proposed in source water protection areas or that may affect a wellhead or surface water intake.

E. Recharge/infiltration facilities shall be used in conjunction with other innovative or traditional BMPs, stormwater control facilities, and nonstructural stormwater management alternatives.

§12. Stormwater management districts.

A. Watersheds. Ross Township lies within the Aquashicola/Buckwha/Pohopoco Watershed except for a small portion in the Brodhead/McMichael Watershed. (See the following Ross Township Watershed Boundaries Map.)

<p>Table 12A(1) Water Quantity Requirements for the Aquashicola/Buckwah/Pohopoco</p>

Watershed	
Proposed Conditions	(reduce to) Existing Conditions
2-year	1-year
5-year	5-year
10-year	10-year
25-year	25-year
50-year	50-year
100-year	100-year

Table 12A(2) Water Quantity Requirements for the Brodhead/McMichael Watershed	
Proposed Conditions	(reduce to) Existing Conditions
District B-1	
2-year	1-year
5-year	2-year
10-year	5-year
25-year	10-year
50-year	25-year
100-year	100-year
District B-2	
2-year	1-year
5-year	2-year
25-year	10-year
50-year	25-year
100-year	100-year



- B. General. Proposed condition rates of runoff from any regulated activity shall not exceed the peak release rates of runoff prior to development for the design storms specified in §12A.
- C. Brodhead/ McMichael Watershed District boundaries. The boundaries of the Stormwater Management Districts, as indicated on maps approved and adopted on June 11, 1991, by Monroe County as part of the Brodhead Creek Watershed Act 167 Watershed Plan, and incorporated herein by reference, are shown on a map that is available for observation at the Township office. The exact location of the stormwater management district boundaries as they apply to a given development site shall be determined by mapping the boundaries using the two-foot topographic contours (or most accurate data required) provided as part of the stormwater management site plan.
- D. Sites located in more than one district. For a proposed development site located within two or more stormwater management districts, the peak discharge rate from any subarea shall be the existing conditions peak discharge for that subarea as indicated in §12 (Stormwater management districts). The calculated peak discharges shall apply regardless of whether the grading plan changes the drainage area by subarea. An exception to the above may be granted by the Township if discharges from multiple subareas recombine in proximity to the site. In this case, peak discharge in any direction may be a one-hundred-percent release rate, provided that the overall site discharge meets the weighted average release rate.
- E. 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.
- F. 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 management district criteria. In other words, unimpacted areas bypassing the stormwater management facilities would not be subject to the management district criteria.
- G. "No harm" option. For any proposed development site not located in a provisional direct discharge district (District C), 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 this ordinance. The "no harm" option is used when an applicant can prove that the proposed hydrographs can match existing 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" compliant with §12H to determine if adequate hydraulic capacity exists. The applicant shall submit to the Township 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 Township.
 - (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 Brodhead/McMichael Watershed. These flow values can be obtained from the original Act 167 watershed stormwater management plan

adopted on June 11, 1991, by Monroe County and entitled the "Brodhead Creek Watershed Act 167 Watershed Stormwater Management Plan," which flow values are incorporated herein by reference.

- (5) Applicant-proposed conditions 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 compliant with §12H.
 - (6) A financial distress shall not constitute grounds for the Township to approve the use of the "no-harm" option.
 - (7) Downstream capacity improvements may be provided as necessary to achieve the "no harm" option.
 - (8) Any "no harm" justifications shall be submitted by the applicant as part of the stormwater management site plan submission per Article IV.
- H. Downstream hydraulic capacity analysis. Any downstream hydraulic capacity analysis conducted in accord with this ordinance shall use the following criteria for determining adequacy for accepting increased peak flow rates:
- (1) Existing natural or man-made channels or swales must be able to convey the increased runoff associated with a two-year and a fifty-year return period event within their banks at velocities compliant 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, as amended and included herein by reference.
 - (2) Culverts, bridges, storm sewers or any other facilities which must pass or convey flows from the tributary area must be designed in accord with DEP Chapter 105 regulations (if applicable) and, at minimum, pass the increased fifty-year return period runoff.
- I. Hardship option. The Stormwater Management Plan and its standards and criteria are designed to maintain existing conditions peak flows and volumes throughout the Township as it becomes developed. There may be certain instances, however, where the standards and criteria established are too restrictive for an Applicant. The existing drainage network in some areas may be capable of safely transporting slight increases in flows without causing a problem or increasing flows elsewhere. If an Applicant cannot meet the stormwater standards due to lot conditions or if conformance would become a hardship to an Applicant, the hardship option may be applied. A financial distress shall not constitute grounds for the Township to approve the use of the hardship option. The Applicant must plead the case to the Board of Supervisors with the final determination made by the Board. Any Applicant pleading the "hardship option" assumes all liabilities that may arise due to exercising this option.

§13. Calculation methodology.

- A. Stormwater runoff from all development sites with a drainage area of greater than 200 acres shall be calculated using a generally accepted calculation technique that is based on the NRCS Soil Cover Complex Method. Table 13 - Acceptable Computation Methodologies for Stormwater Management Plans 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 the proposed site. The Township may allow the use of the Rational Method to estimate peak discharges from drainage areas that contain less than 200 acres.

Table 13 Acceptable Computation Methodologies for Stormwater Management Plans		
Method	Source	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	Applicable where use of full hydrology computer model is desirable or necessary
PSRM	Penn State University	Applicable where use of full hydrology computer model is desirable or necessary; simpler than TR-20 or HEC-1
Other methods	Varies	Other computation methodologies approved by the Township and/or Township Engineer for activities which do not require an NPDES Permit

- B. All calculations compliant with this ordinance using the Soil Cover Complex Method shall use the appropriate design rainfall depths for the various return period storms according to NOAA Atlas 14. If a hydrologic computer model such as PSRM or HEC-1 is used for stormwater runoff calculations, then the duration of rainfall shall be 24hours.
- 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, as listed in Table A-4 in Appendix A.
- D. All calculations using the Rational Method shall use rainfall intensities compliant with appropriate times-of-concentration for overland flow and return periods from the applicable design storm curves from Pennsylvania Department of Transportation Design Rainfall Curves (1986). 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 A-1 in Appendix A.
- F. Runoff coefficients (c) for both existing and proposed conditions for use in the Rational Method shall be obtained from Table A-4 in Appendix A.
- G. The designer shall consider that the runoff from proposed sites graded to the subsoil will not have the same runoff conditions as the site under existing conditions, even after top soiling or seeding. The designer shall increase his proposed condition *CN* to better reflect proposed soil conditions.
- H. 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 compliant with Table A-2 in Appendix A.
- I. Outlet structures for stormwater management facilities shall be designed to meet the performance standards of this ordinance using any generally accepted hydraulic analysis technique or method.
- J. The design of any stormwater detention facilities intended to meet the performance standards of this ordinance shall be verified by routing the design storm hydrograph through these facilities using the Storage Indication Method. For drainage areas greater than 200 acres in size, the design storm hydrograph shall be computed using a calculation method that produces a full hydrograph. The Township may approve the use of

any generally accepted full hydrograph approximation technique that shall use a total runoff volume that is compliant with the volume from a method that produces a full hydrograph.

- K. Existing conditions runoff calculations must consider natural or man-made features or structures that may limit existing runoff including such features as existing culverts that may restrict flow and natural or manmade depressions.

§14. Additional requirements.

- A. Any stormwater management facility (i.e., BMP, detention basin) designed to store runoff and requiring a berm or earthen embankment required or regulated by this ordinance shall be designed to provide an emergency spillway to handle flow up to and including the one hundred-year proposed conditions. The height of embankment must provide a minimum 1.0 foot of freeboard above the maximum pool elevation computed when the facility functions for the one hundred-year proposed conditions inflow. Should any stormwater management facility require a dam safety permit under PA DEP Chapter 105, the facility shall be designed in accord with Chapter 105 and meet the regulations of Chapter 105 concerning dam safety which may be required to pass storms larger than the one-hundred-year event.
- B. Any facilities that constitute water obstructions (e.g., culverts, bridges, outfalls, or stream enclosures), and any work involving wetlands governed by PA DEP Chapter 105 regulations (as amended or replaced from time to time by PA DEP), shall be designed in accord with Chapter 105 and will require a permit from PA DEP.
- C. Any other stormwater conveyance facility and/or channel that does not fall under Chapter 105 regulations must be able to convey, without damage to the stormwater structure or roadway, runoff from the 25-year design storm in rural areas and the fifty-year design storm in suburban areas while passing the 100-year design storm (with no erosion damage) for culverts and bridges. Any facility that constitutes a dam as defined in PA DEP Chapter 105 regulations may require a permit under dam safety regulations. 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 one-hundred-year design storm. Any facility located within a PennDOT right-of-way must meet PennDOT minimum design standards and permit submission requirements.
- D. Storm sewers must be able to convey proposed conditions runoff from a 50-year design storm without surcharging inlets, where appropriate and as supplemented by §14C.
- E. Adequate erosion protection shall be provided along all open channels, and at all points of discharge.
- F. The design and construction of all stormwater management facilities shall comply with the requirements of Appendix B and shall incorporate sound engineering principles and practices. The Township reserves the right to disapprove any design that would result in the construction of or continuation of a stormwater problem area.

§15. Erosion and sediment control requirements.

- A. Any earth disturbance shall be conducted in conformance with Pennsylvania Title 25, Chapter 102, Erosion and Sediment Control.
- B. Additional erosion and sediment control design standards and criteria that must be or 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.

§16. Consumptive use tracking report.

All regulated activities shall submit a "Consumptive Use Tracking Report" (CUTR), which shall be developed in accord with the forms available at the Township and submitted as follows:

- A. Residential development and/or redevelopment. The CUTR shall be submitted to the Township during the preliminary plan approval process or building permit approval process, whichever occurs first, and the Monroe County Conservation District along with the erosion and sedimentation control plan.
- B. Commercial/industrial development and/or redevelopment. The CUTR shall be submitted to the Township during the preliminary plan approval process or building permit approval process, whichever occurs first. The CUTR shall also be submitted to the Monroe County Conservation District along with the erosion and sedimentation control plan.

ARTICLE IV
Stormwater Management Site Plans

§17. General requirements.

For any of the activities regulated by this ordinance, the preliminary or final approval of subdivision and/or land development plans, the issuance of any building or occupancy permit, or the commencement of any earth disturbance may not proceed until the applicant or his/her agent has received written approval of a stormwater management site plan from the Township, an adequate erosion and sediment control plan review by the Conservation District and an NPDES permit from the DEP, if required.

§18. Exemptions; NPDES permit supersedes.

- A. Exemptions. The following land use activities are exempt from the stormwater management site plan submission requirements of this ordinance:
 - (1) Use of land for gardening for home consumption.
 - (2) Agriculture when operated in accord 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 (E&S) Control Guidelines for Forestry" and are operating under an approved E&S plan and must comply with stream buffer requirements in §10 (Water quality and stream-bank erosion) and floodplain management requirements.
 - (4) Any regulated activity that has less than 5,000 square feet of impervious surface subject to the additional exemption criteria set forth in §18B is exempt from the plan submittal provisions of this ordinance. These criteria shall apply to the total development even if development is to take place in phases.
 - (a) McMichael's and Brodhead. The date of the original McMichael's and Brodhead Creeks Stormwater Management Act 167 Plan adoption by Monroe County December 6, 2006) 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 December 6, 2006, shall not be considered in cumulative impervious area calculations for exemption

purposes.

(b) Aquashicola/Buckwah/Pohopoco. December 6, 2006 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 December 6, 2006 shall not be considered in cumulative impervious area calculations for exemption purposes.

(5) The combination of existing lots of record and the realignment of lot lines of existing lots of record which do not increase the number of lots.

B. Additional exemption criteria include:

(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 ordinance; however, stormwater management site plans will not have to be submitted to the Township.

(2) Special requirements. This exemption shall not relieve the applicant from meeting the special requirements for watersheds draining to exceptional value (EV) waters and source water protection areas (SWPA): requirements for nonstructural project design sequencing (§9 - Nonstructural project design sequencing to minimize stormwater impacts), water quality and stream-bank erosion (§10 - Water quality and stream-bank erosion), and groundwater recharge (§11 - Groundwater recharge, infiltration and bioretention).

(3) Drainage problems. If a drainage problem is documented or known to exist downstream of, or expected from, the proposed activity, then the Township may require a stormwater management site plan submittal.

C. NPDES permit requirements supersede. For regulated activities which require a PA DEP NPDES Stormwater Permit, the PA DEP requirements shall supersede those in §9 (Nonstructural project design sequencing to minimize stormwater impacts), §10A-H, §11 (Groundwater recharge, infiltration and bioretention) and §13 (Calculation methodology).

§19. Stormwater management site plan contents.

The stormwater management site plan shall consist of a general description of the project, including sequencing items described in §10 (Water quality and stream-bank erosion), calculations, maps, plans and a consumptive use tracking report. 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 stormwater management site plan materials shall be submitted to the Township in a format that is clear, concise, legible, neat, and well organized, in the opinion of the Township; otherwise, the stormwater management site plan shall not be accepted for review and shall be returned to the applicant. The following items shall be included in the stormwater management site plan:

A. General.

(1) General description of the project including those areas described in §9 (Nonstructural project design sequencing to minimize stormwater impacts).

(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.
 - (4) An Erosion and sediment control plan, including all reviews and letters of adequacy obtained by the Conservation District.
 - (5) A general description of nonpoint source pollution controls.
 - (6) A consumptive use tracking report.
- B. Maps. Map(s) of the project area shall be submitted on 24-inch by 36-inch sheets and/or shall be prepared in a form that meets the requirements for recording at the offices of the Recorder of Deeds of Monroe County. If the Subdivision and Land Development Ordinance 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 and final contours at intervals of two feet. In areas of steep slopes (greater than 15 percent), five-foot 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 flood hazard boundaries, buffers, existing drainage courses, areas of natural vegetation to be preserved, and the total extent of the upstream area draining through the site. The upstream area draining through the site can be located on a portion of a USGS topographic map if more detailed topographic information is not available.
 - (5) The locations of all existing and proposed utilities, sanitary sewers, and waterlines within 50 feet of property lines.
 - (6) The location(s) of public water supply wells and surface water intakes as well as their source water protection areas.
 - (7) Soil names and boundaries; along with any limitations associated with the soil type and the proposed resolution of the listed limitations.
 - (8) Limits of earth disturbance, including the type and amount of impervious area that would be added.
 - (9) Proposed structures, roads, paved areas, and buildings. The proposed buildings would also include proposed residential structures in a subdivision.
 - (10) The name of the development, the name and address of the applicant 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 equals no more than 50 feet; for tracts of 200 acres or more, the scale shall be one inch equals no more than 100 feet.
 - (13) A North arrow.
 - (14) The total tract boundary and size with accurate distances to hundreds of a foot and bearings to the nearest second.
 - (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 15-foot-wide access easement to and 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 covenant on the plan indicating the location and responsibility for maintenance of stormwater management facilities that would be located off site. All off-site facilities shall meet the performance standards and design criteria specified in this ordinance.
- (22) A statement, signed by the applicant, acknowledging that any revision to the approved stormwater management site plan must be approved by the Township and that a revised E&S plan must be submitted to the Conservation District for a determination of adequacy.
- (23) The following signature block for the design engineer:

"I, (Design Engineer), on this date (date of signature), hereby certify that the Stormwater Management Site Plan meets all design standards and criteria of the Ross Township Stormwater Management Ordinance. The word 'certify' is an expression of professional opinion by the undersigned and does not constitute a guarantee or warranty."

C. Supplemental information.

- (1) A written description of the following information shall be submitted.
 - (a) The overall stormwater management concept for the project designed in accord with §9 (Nonstructural project design sequencing to minimize stormwater impacts).
 - (b) Stormwater runoff computations as specified in this ordinance.
 - (c) Stormwater management techniques to be applied both during and after development.
 - (d) Expected project time schedule.
 - (e) Development stages (project phases) if so proposed.
 - (f) An operation and maintenance plan in accord with §28 (Maintenance responsibilities).
- (2) An erosion and sediment control plan (i.e., plans, narrative, calculations and any required applications.)
- (3) Completed consumptive use tracking report as specified in §16 (Consumptive use tracking report).
- (4) The effect of the project (in terms of runoff volumes and peak flows) on adjacent properties and on any existing Township stormwater collection system that may receive runoff from the project site.
- (5) 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 groundwater recharge methods such as seepage pits, beds or trenches are used, the locations of existing and proposed septic tank infiltration areas and wells must be shown on the plan.
- (3) All calculations, assumptions, and criteria used in the design of the stormwater management facilities must be shown.

§20. Plan submission.

The Township shall require receipt of a complete plan as specified in this ordinance. For any activities that require an NPDES Permit for Stormwater Discharges from Construction Activities, or a PA DEP Joint Permit Application, or a PennDOT Highway Occupancy Permit, or any other permit under applicable state or federal regulations, or are regulated under Chapter 105 (Dam Safety and Waterway Management) or Chapter 106 (Floodplain Management) of PA DEP's Rules and Regulations, 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 Township SALDO review process.

- A. For those regulated activities which require subdivision and land development approval, the stormwater management site plan and ERSAM shall be submitted by the applicant as part of the preliminary plan submission.
- B. For those regulated activities that do not require subdivision and land development approval (See §17 - General requirements.), the stormwater management site plan and ERSAM shall be submitted 30 days prior to permit issuance or commencement of earth disturbance.
- C. Six copies of the stormwater management site plan and ERSAM shall be submitted and distributed as follows:
 - (1) Two copies to the Township accompanied by the requisite Township review fee (§25 - Stormwater management site plan review and observation fee).
 - (2) Two copies to the Conservation District.
 - (3) One copy to the Township Engineer.
 - (4) One copy to the County Planning Commission.
- D. Any submissions found incomplete shall not be accepted for review and shall be returned to the applicant with a notification in writing of the specific deficiencies.

§21. Stormwater management site plan review.

- A. Township Engineer review. The Township Engineer shall review the stormwater management site plan for compliance with any applicable Act 167 Stormwater Management Plan, the provisions of this ordinance and any applicable provisions of the Township Subdivision and Land Development Ordinance.
- B. County Conservation District review.
 - (1) The E&S plan shall be reviewed by the County Conservation District and found adequate to meet the requirements of PA DEP's Chapter 102 regulations prior to Township approval of the stormwater management site plan.
 - (2) The Conservation District shall also review the consumptive use tracking report for compliance with §16

(Consumptive use tracking report). The Conservation District will track consumptive use. The Conservation District will notify the Township when the threshold for consumptive use within a watershed has been met because subsequent stormwater management site plan approvals will affect base flow, water quality and aquatic habitats. Where thresholds for consumptive use have not yet been established, tracking reports must still be submitted to the Conservation District for use when future studies have established consumptive use thresholds.

- C. Compliance determination. For regulated activities requiring approval under the Township Subdivision and Land Development Ordinance, the review of the plan shall follow the time requirements of that ordinance and the applicable provisions of the Pennsylvania Municipalities Planning Code. For activities not regulated by the Subdivision and Land Development Ordinance the Township Engineer shall notify the Township in writing within 30 calendar days of receipt of a complete application whether the plan complies with this ordinance.
- (1) Compliant. Should the stormwater management site plan be determined to comply, the Township Engineer shall forward a letter of compliance to the Township Secretary who shall then notify the applicant.
- (2) Noncompliant.
- (a) Should the stormwater management site plan be determined to be noncompliant, the Township Engineer shall forward a letter to the Township Secretary with a copy to the applicant citing the reason(s) and specific ordinance sections for the noncompliance. Noncompliance may be due to inadequate information to make a reasonable judgment as to compliance.
- (b) Any plan found to be noncompliant with this ordinance may be revised and resubmitted triggering a new review process and time period as required by this §21C.
- D. Zoning/building permit. For regulated activities specified in §4 (Applicability; regulated activities) which require a zoning and/or building permit, the Zoning Officer/Code Enforcement Officer shall be included in the notices required by §21C.
- E. Reserved.
- F. Township approval. The Township shall not grant unconditional approval or grant preliminary approval to any subdivision or land development for regulated activities if the stormwater management site plan has been found to be noncompliant with this ordinance, as determined by the Township Engineer. All required permits from PA DEP must be obtained prior to any unconditional preliminary approval of any subdivision or land development.
- G. Township permits. No Township permits shall be issued for any regulated activity if the stormwater management site plan has been found to be noncompliant with this ordinance. All required permits from PA DEP must be obtained prior to issuance of a building permit.
- H. As-built plans. The applicant shall be responsible for completing as-built plans for all stormwater management facilities included in the approved stormwater management site plan. The as-built plans and an explanation of any discrepancies with the design plans shall be submitted to the Township Engineer for final approval prior to the issuance of any occupancy permits. In no case shall the Township approve the as-built plans until the Township receives a copy of an approved declaration of adequacy and/or highway occupancy permit from the PennDOT District Office (if required), NPDES Permit, consumptive use tracking report, and any other applicable permits or approvals from PA DEP or the Conservation District. The above permits and approvals

must be based on the as-built plans. This means that if there are changes during construction, the as-built plans must be submitted to the PA DEP and the Conservation District for an updated approval if this was not done previously.

- I. Plan validity. The Township's approval of a stormwater management site plan shall be valid for a period not to exceed five years commencing on the date that the Township signs the approved plan. If stormwater management facilities included in the approved stormwater management site plan have not been constructed, or if constructed, as-built plans of these facilities have not been submitted for approval, within this five-year period, then the Township may consider the stormwater management site plan disapproved and may revoke any and all permits. Stormwater management site plans that are considered disapproved by the Township must be resubmitted in accord with §23 (Inspections and schedule).

§22. Modification of plans.

- A. Under review. A modification to a stormwater management site plan under review by the Township for a development site that involves a change in stormwater management facilities or techniques, or that involves the relocation or redesign of stormwater management facilities, or that is necessary because soil or other conditions are not as stated on the stormwater management site plan as determined by the Township Engineer, shall require a resubmission of the modified stormwater management site plan compliant with §20 (Plan submission) and be subject to review as specified in §21 (Stormwater management site plan review).
- B. Approved or disapproved. A modification to an already approved or disapproved stormwater management site plan shall be submitted to the Township, accompanied by the applicable Township review and observation fee. A modification to a stormwater management site plan for which a formal action has not been taken by the Township shall be submitted to the Township, accompanied by the applicable Township review and observation fee.

§23. Resubmission of disapproved stormwater management site plans.

A disapproved stormwater management site plan may be resubmitted, with the revisions addressing the Township Engineer's concerns documented in writing and addressed to the Township Secretary in accord with §20 and distributed accordingly and be subject to review as specified in §21 (Stormwater management site plan review). The applicable Township review and observation fee must accompany a resubmission of a disapproved stormwater management site plan.

ARTICLE V Inspections

§24. Inspections and schedule.

- A. Inspections.
 - (1) The Applicant's Design Professional shall make inspections during construction according to the submitted and approved inspection schedule. At the completion of the project, and as a prerequisite for the release of the performance guarantee, the Applicant shall provide a certification from a Design Professional verifying that the inspections have been made and that the construction has been completed according to the approved plans and specifications and any approved revisions.
 - (2) The Township Engineer or his Township designee may inspect all phases of the installation of the permanent stormwater management facilities as deemed appropriate by the Township Engineer.
 - (3) Incorrect installation. During any stage of the work, if the Township determines that the permanent stormwater management facilities are not being installed in accord with the approved stormwater

management site plan, the Township shall revoke any existing permits or other approvals and issue a cease and desist order until a revised stormwater management site plan is submitted and approved.

- (4) Correction. Any portion of the work which does not comply with the approved plan shall be corrected by the permittee within the time period specified by the Township. No work may proceed on any subsequent phase of the stormwater management site plan, the subdivision or land development or building construction until the required corrections have been made.
- (5) Final observation. A final observation of all stormwater management facilities shall be conducted by the Township Engineer or his Township designee to confirm compliance with the approved stormwater management site plan prior to the issuance of any occupancy permit(s).

B. Schedule.

- (1) The Applicant shall submit a proposed schedule of inspections to be made by the Applicant's Design Professional for review and approval by the Township.
- (2) The Township or its designee shall observe the installation of the permanent stormwater management facilities as deemed appropriate by the Township.
- (3) During any stage of the work, if the Township or its designee determines that the facilities are not being installed in accord with the approved plan, the Township shall revoke any existing permits or other approvals and issue a cease and desist order until a revised plan is submitted and approved in accord with this ordinance.

ARTICLE VI
Fees and Expenses

§25. Stormwater management site plan review and observation fee.

- A. Township fees. Fees shall be charged by the Township to defray costs incurred by the Township. All estimated fees shall be paid by the applicant at the time of stormwater management site plan submission and any additional fees actually incurred shall be paid within 14 days of the issuance of an invoice for the same by the Township.
- B. Fee schedule. A fee schedule shall be established by resolution of the Board of Supervisors based on the size of the regulated activity and based on the Township's costs of administering this ordinance (§26 – Expenses covered by fees) and reviewing stormwater management site plans and conducting observations (§24 – Inspections and schedule). The Township will periodically update the fee schedule, by resolution, to ensure that administrative and review costs are adequately reimbursed.

§26. Expenses covered by fees.

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

- A. Managerial costs.
- B. The review of the stormwater management site plan by the Township and the Township Engineer.
- C. A preconstruction site observation.
- D. The observation of stormwater management facilities and drainage improvements during construction.

- E. The final observation upon completion of the stormwater management facilities and drainage improvements presented in the stormwater management site plan. This shall include a review of the as-built plans required by §211.
- F. Any additional work required to enforce any permit provisions regulated by this ordinance, correct violations, and assure proper completion of stipulated remedial actions.
- G. Other professional fees.

ARTICLE VII
Construction and Maintenance Responsibilities

§27. Performance guarantee.

- A. For subdivisions and land developments, the applicant shall provide a performance guarantee to the Township for the timely installation and proper construction of all stormwater management controls as required by the approved stormwater management site plan in the amount and method of payment provided for in the Subdivision and Land Development Ordinance as determined by the Board of Supervisors..
- B. For other regulated activities, the Township will require a performance guarantee from the applicant in an amount equal to 110 percent of the full construction cost of the stormwater management controls as required by the approved plan estimated as of 90 days following the date scheduled for the completion of the construction. The form of the guarantee and method of payment shall be determined by the Board of Supervisors.
- 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 a Pennsylvania-licensed professional engineer, verifying that all required stormwater management facilities have been constructed according to the plans and specifications and approved revisions thereto as follows:

"I (Design Engineer), on this date (date of signature) hereby certify that the stormwater management facilities have all been installed in accord with the approved Stormwater Management Site Plan for (name of project) and in compliance with the design standards and requirements of the Ordinance."
 - (2) Provide a set of as-built plans with a certification from the contractor on the as-built plans that states:

"I, (insert signer's name), state that I am the (insert position) of (insert name of contractor) on this date (date of signature), hereby certify (1) that I am duly authorized to make this certification of behalf of (insert name of contractor), and (2) that all stormwater management facilities have been constructed according to the approved plans and specifications and approved revisions thereto."

The signer shall either be the owner, partner, officer of the corporation, managing member of the limited liability company, or person in control of any other legal entity, duly authorized by the contractor to sign the certification.
- D. After the Township receives the certifications and as-built plans, a final observation shall be conducted by the Township Engineer or his Township designee to verify compliance with the approved stormwater management site plan and approved revisions thereto.

§28. Maintenance responsibilities.

- A. Operation and maintenance plan. The stormwater management site plan for the development site shall contain an operation and maintenance plan prepared by the applicant and approved by the Township. The operation and maintenance plan shall outline required routine maintenance actions and schedules necessary to insure proper operation of the stormwater management facilities. Stormwater management facilities shall be maintained in accord with the Stormwater Management Conveyance Facilities and BMP Inspection Checklist available from the Township.
- B. Operation and maintenance responsibilities. The stormwater management site plan for the development site shall establish responsibilities for the continuing operation and maintenance of all proposed stormwater management facilities, compliant with the following:
- (1) Both the owner and developer of the development site shall be responsible for maintenance of the stormwater management facilities, unless the Board of Supervisors shall otherwise agree.
 - (2) If a development site consists of structures or lots which are to be separately owned and in which streets, sewers or other public improvements are to be offered for dedication to the Township, stormwater control facilities may also be offered for dedication to the Township, however the Township is not obligated to accept ownership.
 - (3) If a development site is to be maintained in a single ownership or if streets, sewers or other public improvements are to be privately owned and maintained, then the ownership and maintenance of stormwater control facilities shall be the responsibility of the applicant, owner or private management entity, as approved by the Township.
 - (4) If, with the permission of the Board of Supervisors, the ownership of and/or maintenance responsibility for the stormwater management facilities is assigned/delegated to a homeowners' association, condominium unit owners' association, or similar entity (a "transferee"), such transferee shall enter into an agreement with the Township, which shall be in form and substance acceptable to the Township, acknowledging its duties and the Township's rights, and agreeing to perform all maintenance responsibilities, contained in the stormwater maintenance agreement referenced in §29 (Maintenance agreement for privately owned facilities) entered into with respect to the property or project. If such transferee fails to properly maintain the stormwater management facilities, the Township shall have the same rights granted to municipalities under §705 of the Pennsylvania Municipalities Planning Code, Act of July 31, 1968, P.L. 805, No. 247, as amended, with reference to maintenance of common open space, to maintain the stormwater management facilities.
- C. Board of Supervisors determination. The Board of Supervisors, upon recommendation of the Township Engineer, shall make the final determination on the continuing maintenance responsibilities prior to approval of the stormwater management site plan. The Board of Supervisors reserves the right, but not the obligation or requirement, to accept the ownership and operating responsibility for any or all the stormwater management controls.

§29. Maintenance agreement for privately owned facilities.

- A. Maintenance agreement. Prior to approval of the site's stormwater management site plan, the applicant shall sign and record a maintenance agreement in form and substance satisfactory to the Board of Supervisors, covering all stormwater control facilities that are to be privately owned. Other items may be included in the maintenance agreement where determined necessary to guarantee the satisfactory maintenance of all facilities.

B. Municipal stormwater maintenance fund.

- (1) For stormwater basins which will be owned by a homeowners' association, condominium unit owners' association or similar entity, or by the owner of an individual lot which contains a basin to manage stormwater from other lots or properties, or for stormwater basins for which ownership will be transferred to the Township, a nonrefundable deposit to the Municipal Stormwater Maintenance Fund will be required to cover the cost of inspections and long-term maintenance. The amount of the deposit shall be determined as follows:
 - (a) The amount of the deposit to the fund shall be established by the fee schedule adopted by the Township.
 - (b) Based on the fee schedule, the amount of the deposit shall cover the estimated cost of biannual inspections for 10 years and the estimated cost of long-term major maintenance.
- (2) The long-term maintenance portion of the deposit shall be for the repair of major damage, such as serious wash-outs, failure of the berm or outlet(s), spillway restoration, settlement or subsidence damage, and similar major items in case the owner is unable to make such repairs as required by the Maintenance Agreement, and the damage poses a public hazard or nuisance. This deposit does not cover routine maintenance, including mowing, brush cutting, reseeding, fertilizing, repair of minor erosion, minor repair of the fence and gate, etc., which shall be the responsibility of the owner of the basin.
- (3) If a storage facility is proposed that also serves as a recreation facility (e.g., ball field, lake), the Township may reduce or waive the amount of the maintenance fund deposit based upon the value of the land for public recreation purpose.
- (4) If at some future time a storage facility (whether publicly or privately owned) is eliminated due to the installation of storm sewers or other storage facilities, the unused portion of the maintenance fund deposit will be applied to the cost of abandoning the facility and connecting to the storm sewer system or other facility. Any amount of the deposit remaining after the costs of abandonment are paid shall remain in the Municipal Stormwater Maintenance Fund.

ARTICLE VIII Enforcement and Penalties

§30. Right of entry.

Upon presentation of proper credentials, duly authorized representatives of the Township may enter at reasonable times upon any property within the Township to inspect the condition of the stormwater structures and facilities regarding any aspect regulated by this ordinance.

§31. Notification.

If a person fails to comply with the requirements of this ordinance or fails to conform to the requirements of any permit issued hereunder, the Township 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 such violation(s). Failure to comply within the time specified shall subject such person to the penalty provisions of this ordinance. All such penalties shall be deemed cumulative and shall not prevent the Township from pursuing any and all remedies, including but not limited to injunctive relief. It shall be the responsibility of the applicant 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 ordinance.

§32. Enforcement.

The Zoning Officer is hereby authorized and directed to enforce all provisions of this ordinance. All observations regarding compliance with the stormwater management site plan shall be the responsibility of the Township Engineer or other qualified persons designated by the Township.

- A. Design plans. A copy of the stormwater management site plan approved by the Township shall be on file at the site throughout the duration of the construction activity. Periodic observations may be made by the Township or designee during construction.
- B. Adherence to approved plan. It shall be unlawful for any person to undertake any regulated activity under §4 (Applicability; regulated activities) on any property except as provided for in the approved stormwater management site plan and pursuant to the requirements of this ordinance. It shall be unlawful to alter or remove any control structure required by the stormwater management site plan pursuant to this ordinance or to allow the property to remain in a condition which does not conform to the approved stormwater management site plan.
- C. Hearing. 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 applicant's responsibility.
- D. Suspension and revocation of permits.
- (1) Any permit issued by the Township may be suspended or revoked for:
 - (a) Noncompliance with or failure to implement any provision of the permit.
 - (b) A violation of any provision of this ordinance or any other applicable law, ordinance, rule or regulation relating to the project.
 - (c) The creation of any condition or the commission of any act during construction or development which constitutes or creates a hazard or nuisance, pollution or which endangers the life or property of others.
 - (2) A suspended permit shall be reinstated by the Board of Supervisors when:
 - (a) The Township Engineer or his Township designee has inspected and approved the corrections to the stormwater management and erosion and sediment pollution control measure(s), or the elimination of the hazard or nuisance; and/ or
 - (b) The Board of Supervisors is satisfied that the violation of the permit, ordinance, law, or rule and regulation has been corrected.
 - (3) A permit that has been revoked cannot be reinstated. The applicant may apply for a new permit under the procedures outlined in this ordinance.
- E. Occupancy permit. An occupancy permit shall not be issued unless the requirements of §27 (Performance guarantee) have been fully completed. An occupancy permit shall be required for each lot owner and/ or applicant for all regulated activities, subdivisions and land developments in the Township.

§33. Public nuisance.

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

§34. Violations and penalties.

- A. Enforcement action. This ordinance shall be enforced by action brought before a Magisterial District Judge in the same manner provided for the enforcement of summary offenses under the Pennsylvania Rules of Criminal Procedure. Any person, partnership, corporation or other entity who or which violates or permits a violation of the provisions of this ordinance shall, upon conviction in a summary proceeding, pay a fine of not more than \$1,000, plus the costs of prosecution, and, in default of the payment of the fine and costs of prosecution, shall be imprisoned for a period not exceeding 30 days. All fines, penalties, costs and reasonable attorney's fees collected for the violation of this ordinance shall be paid to Ross Township for its general use.
- B. Additional remedies. In addition, the Township may institute injunctive, mandamus or any other appropriate action or proceeding at law or in equity for the enforcement of this ordinance. Any court of competent jurisdiction shall have the right to issue restraining orders, temporary or permanent injunctions, mandamus or other appropriate forms of remedy or relief.

§35. Appeals.

- A. Appeals from any determination of the Zoning Officer or Township Engineer in the administration or enforcement of this ordinance insofar as the same relates to applications for land development under Article V of the Pennsylvania Municipalities Planning Code shall be to the Board of Supervisors.
- B. Appeals from any determination of the Zoning Officer or Township Engineer in the administration or enforcement of this ordinance insofar as the same relates only to development not involving an application for land development under the Pennsylvania Municipalities Planning Code shall be to the Ross Township Zoning Hearing Board.

**ARTICLE IX
Modifications**

§36. Modifications of requirements.

- A. Basis of modification. In order to permit the reasonable utilization of property, the Board of Supervisors may grant a modification of the requirements of one or more provisions of this ordinance if literal compliance will result in undue hardship or be unreasonable as it is applied to a particular property, or if the applicant establishes to the satisfaction of the Board of Supervisors that an alternative proposal will allow for equal or better results, provided that such modification will not be contrary to the public interest and fulfills the purpose and intent of this ordinance.
- B. Conditions. In granting any requested modification, the Board of Supervisors may impose such conditions as will, in its judgment, secure substantially the objectives of the standards and requirements of this ordinance.
- C. Requests. All requests for modification shall be made in writing, shall be signed by the applicant, shall accompany the submission of the stormwater management site plan, and shall include:

- (1) The specific provision of this ordinance with respect to which a modification is desired.
 - (2) The specific modification desired and the proposed alternative.
 - (3) The applicant's justification for the modification, including the full basis and facts of the alleged unreasonableness or undue hardship, and an explanation of how the requested modification is the minimum modification necessary to permit the reasonable utilization of the property but still achieves the purposes and objectives of this ordinance.
- D. Written record. The Board of Supervisors shall maintain a written record of the action taken on all requests for modification. Any modifications which are granted or approved shall be set forth on the approved stormwater management site plan and on the as-built plans.

ARTICLE X Miscellaneous Provisions

§37. Repealer.

All ordinances or parts of ordinances conflicting or inconsistent with any of the provisions of this ordinance are hereby repealed, but only insofar as the same are in direct conflict, or directly inconsistent, with this ordinance; provided, however that the repealed ordinances or resolutions or parts thereof shall remain effective for, and apply to, any applications submitted to and in process before the Township prior to the effective date of this ordinance.

§38. Severability.

If any sentence, clause, section or part of this ordinance is for any reason found to be unconstitutional, illegal or invalid, such unconstitutionality, illegality, or invalidity shall not affect or impair any of the remaining provisions, sentences, clauses, sections or parts of this ordinance. It is hereby declared as the intent of the Board of Supervisors that this ordinance would have been adopted had such unconstitutional, illegal or invalid sentence, clause, section or part thereof not been included herein.

Appendix A
Stormwater Management Design Criteria

Table A-1
Runoff Curve Numbers

Table A-2
Manning Roughness Coefficients

Table A-3
Nonstandard Stormwater Management Stormwater Credits

**Table A-1
Runoff Curve Numbers (From NRCS (SCS) TR-55)**

Land Use Description	Hydrologic Condition	Hydrologic Soil Group			
		A	B	C	D
Open space					
Grass cover < 50%	Poor	68	79	86	89
Grass cover 50% to 75%	Fair	49	69	79	84
Grass cover > 75%	Good	39	61	74	80
Meadow		30	58	71	78
Agricultural					
Pasture, grassland, or range - Continuous forage for grazing	Poor	68	79	86	89
Pasture, grassland, or range - Continuous forage for grazing.	Fair	49	69	79	84
Pasture, grassland, or range - Continuous forage for grazing	Good	39	61	74	80
Brush-brush-weed-grass mixture with brush the major element	Poor	48	67	77	83
Brush-brush-weed-grass mixture with brush the major element	Fair	35	56	70	77
Brush-brush-weed-grass mixture with brush the major element	Good	30	48	65	73
Fallow					
Bare soil	—	77	86	91	94
Crop residue cover (CR)	Poor	76	85	90	93
	Good	74	83	88	90
Woods - grass combination (orchard or tree farm)					
	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods					
	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30	55	70	77
Commercial	(85% Impervious)	89	92	94	95
Industrial	(72% Impervious)	81	88	91	93
Institutional	(50% Impervious)	71	82	88	90
Residential districts by average lot size:	% Impervious				
1/8 acre or less (town houses*)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	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 Multifamily 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.

TABLE A-2

**Roughness Coefficients (Manning’s “n”) for Overland Flow
(United States 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.

**Table A-3
Nonstandard Stormwater Management
Stormwater Credits for Computing Proposed Conditions Hydrograph**

The developer may, subject to approval of the Municipal Engineer, use the stormwater credits described in the following table in computing proposed conditions hydrograph

Nonstructural Stormwater Measure	Description
Natural area conservation	Conservation of natural areas such as forest, wetlands, or other sensitive areas in a protected easement, thereby retaining their existing hydrologic and water quality characteristics.
Disconnection of rooftop runoff	Rooftop runoff is disconnected and then directed over a pervious area where it may either infiltrate into the soil or filter over it. This is typically obtained by grading the site to promote overland flow or by providing bioretention on single-family residential lots.
Disconnection of nonrooftop runoff	Disconnect surface impervious cover by directing it to pervious areas where it is either infiltrated or filtered through the soil.
Buffers	Buffers effectively treat stormwater runoff. Effective treatment constitutes capturing runoff from pervious and impervious areas adjacent to the buffer and treating the runoff through overland flow across a grass or forested area.
Grass channel (open section roads)	Open grass channels are used to reduce the volume of runoff and pollutants during smaller storms.
Environmentally sensitive rural development	Environmental site design techniques are applied to low-density or rural residential development.

**Table A-4
Runoff Coefficients for the Rational Formula
By Hydrologic Soil Group and Overland Slope (%)**

See Next Page

Land Use	A			B			C			D		
	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+
	Cultivated Land	0.08 ^a 0.14 ^b	0.13 0.18	0.16 0.22	0.11 0.16	0.15 0.21	0.21 0.28	0.14 0.20	0.19 0.25	0.26 0.34	0.18 0.24	0.23 0.29
Pasture	0.12 0.15	0.20 0.25	0.30 0.37	0.18 0.23	0.28 0.34	0.37 0.45	0.24 0.30	0.34 0.42	0.44 0.52	0.30 0.37	0.40 0.50	0.50 0.62
Meadow	0.10 0.14	0.16 0.22	0.25 0.30	0.14 0.20	0.22 0.28	0.30 0.37	0.20 0.26	0.28 0.35	0.36 0.44	0.24 0.30	0.30 0.40	0.40 0.50
Forest	0.05 0.08	0.08 0.11	0.11 0.14	0.08 0.10	0.11 0.14	0.14 0.18	0.10 0.12	0.13 0.16	0.16 0.20	0.12 0.15	0.16 0.20	0.20 0.25
Residential Lot Size 1/8 Acre	0.25 0.33	0.28 0.37	0.31 0.40	0.27 0.35	0.30 0.39	0.35 0.44	0.30 0.38	0.33 0.42	0.38 0.49	0.33 0.41	0.36 0.45	0.42 0.54
Lot Size 1/4 Acre	0.22 0.30	0.26 0.34	0.29 0.37	0.24 0.33	0.29 0.37	0.33 0.42	0.27 0.36	0.31 0.40	0.36 0.47	0.30 0.38	0.34 0.42	0.40 0.52
Lot Size 1/3 Acre	0.19 0.28	0.23 0.32	0.26 0.35	0.22 0.30	0.26 0.35	0.30 0.39	0.25 0.33	0.29 0.38	0.34 0.45	0.28 0.36	0.32 0.40	0.39 0.50
Lot Size 1/2 Acre	0.16 0.25	0.20 0.29	0.24 0.32	0.19 0.28	0.23 0.32	0.28 0.36	0.22 0.31	0.27 0.35	0.32 0.42	0.26 0.34	0.30 0.38	0.37 0.48
Lot Size 1 Acre	0.14 0.22	0.19 0.26	0.22 0.29	0.17 0.24	0.21 0.28	0.26 0.34	0.20 0.28	0.25 0.32	0.31 0.40	0.24 0.31	0.29 0.35	0.35 0.46
Industrial	0.67 0.85	0.60 0.85	0.60 0.86	0.60 0.85	0.68 0.86	0.69 0.86	0.68 0.86	0.69 0.86	0.69 0.87	0.69 0.86	0.69 0.86	0.70 0.88
Commercial	0.71 0.88	0.71 0.88	0.72 0.89	0.71 0.89	0.72 0.89	0.72 0.89	0.72 0.89	0.72 0.89	0.72 0.89	0.72 0.89	0.72 0.89	0.72 0.90
Streets	0.70 0.76	0.71 0.77	0.72 0.79	0.71 0.80	0.72 0.82	0.74 0.84	0.72 0.84	0.73 0.85	0.76 0.89	0.73 0.89	0.75 0.91	0.78 0.95
Open Space	0.05 0.11	0.10 0.16	0.14 0.20	0.08 0.14	0.13 0.19	0.19 0.26	0.12 0.18	0.17 0.23	0.24 0.32	0.16 0.22	0.21 0.27	0.20 0.39
Parking	0.85 0.95	0.86 0.96	0.87 0.97	0.85 0.95	0.86 0.96	0.87 0.97	0.85 0.95	0.86 0.96	0.87 0.97	0.85 0.95	0.86 0.96	0.87 0.97

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

Source: Rawls, W.J., S.L. Wong and R.H. McCuen, 1981. "Comparison of Urban Flood Frequency Procedures." Preliminary Draft, U.S. Department of Agriculture, Soil Conservation Service, Beltsville, MD.

Appendix B Stormwater Facility Design and Construction Standards

B.1 INTRODUCTION

- A. This Appendix B sets forth the general standards for the design and construction of various stormwater management and drainage facilities to be constructed within Ross Township.
- B. This Appendix B shall apply to any activity for which a stormwater management site plan is required by Article III of this ordinance.

B.2 REFERENCES AND STANDARDS - All facilities shall be designed to conform to the standards and requirements of the following references, as applicable:

- A. Pennsylvania Department of Environmental Protection, Title 25, Chapter 102 - Erosion and Sedimentation Control, as amended.
- B. Pennsylvania Department of Environmental Protection, Title 25, Chapter 105 - Water Obstructions and Encroachments, as amended.
- C. *Pennsylvania Erosion and Sediment Pollution Control Program Manual*, Technical Guidance Number 363-2134-008, dated March 2012, as amended.
- D. Pennsylvania Department of Environmental Protection - *Stormwater BMP Manual*, latest edition.
- E. Pennsylvania Department of Transportation, Publication 408 - *Specifications*, latest edition.
- F. Pennsylvania Department of Transportation, Publication 72M - *Standards for Roadway Construction, Series RC-1M to RC-100M*, latest edition.
- G. Ross Township Subdivision and Land Development Ordinance, as amended, Article 10 - *Design Standards and Required Improvements*.
- H. U.S. Department of Agriculture, Natural Resources Conservation Service, Conservation Engineering Division, *Urban Hydrology for Small Watersheds, TR-55*, Technical Release 55, June 1986, as amended.
- I. U.S. Department of Transportation, Federal Highway Administration, *Design of Roadside Drainage Channels*, FHWA Publication Number EPD-86-102, latest edition.
- J. U.S. Department of Transportation, Federal Highway Administration, *Hydraulic Design of Highway Culverts*, FHWA Publication Number HDS-5, latest edition.
- K. *Open-Channel Hydraulics*, by Ven T. Chow, published by McGraw-Hill, Inc., 1959.

B.3 GENERAL DESIGN CRITERIA

- A. The design flow for the design of any stormwater management/drainage facility shall be based on the methodology used in addressing §13 (Calculation methodology).
- B. The discharge from any stormwater/drainage facility to an adjacent property or road shall not be increased in rate nor altered in character unless a downstream hydraulic capacity analysis performed in accord with §12H demonstrates that the downslope/downstream receiving facilities have adequate capacity.
- C. Velocity Control Measures. Stormwater velocity control measures shall be used as needed to comply with the standards of the latest officially published version of the State Department of Environmental Protection *Erosion and Sediment Pollution Control Program Manual*. Such measures shall also be designed to address long-term maintenance concerns.
- D. Stormwater runoff from any subdivision or land development (including during construction and earthmoving) shall not occur at a peak rate (measured in cubic feet per second) that is greater after development than that permitted by this Ordinance.
- E. Runoff shall be controlled from a site using appropriate means of detention of stormwater on the site and/or other approved types of stormwater management, within the requirements of this ordinance.
- F. Runoff that is detained shall be held and released at a predetermined controlled rate by appropriately installed devices. The release shall be in the same manner as the natural or pre-development means of discharge from a site (such as point discharge or sheet flow).
- G. Stormwater runoff shall not be increased or redirected in such a way that it results in hazards to persons or property or interferes with the normal movement of vehicles.
- H. All stormwater management methods shall comply with standards of the Monroe County Conservation District.
- I. All lots shall be laid out and graded to prevent cross lot drainage, to provide positive drainage away from proposed building locations and any primary or alternate septic system locations. Stormwater shall also be not be redirected towards buildings or on-lot septic systems off the site.
- J. All stormwater management plans shall consider and provide for existing flow from upstream areas within the entire watershed.
- K. The existing points of natural drainage discharge onto adjacent property shall not be altered to increase flows nor shall the concentration of water runoff be increased because of development without the written approval of all affected landowners.
- L. No stormwater runoff or watercourse shall be diverted in a way that overloads existing drainage systems, or creates flooding or the need for additional drainage structures on other private properties or public lands, without Township approval of provisions to be made by the developer for properly handling such conditions, including water runoff impoundments, if necessary.
 1. An analysis shall be conducted of the ability of critical downslope facilities to handle the runoff.

2. The Township may require an analysis of the accuracy of the estimate of the pre-development stormwater runoff.
- M. Any diverted or affected subsurface water flows shall be properly dissipated or controlled to prevent velocities or concentrations that could harm a street or cause erosion within the right-of-way. Appropriate methods of control may include but are not limited to perforated pipe or other methods to slow the discharge of the water.
 - N. Sequence of Construction. No substantial grading shall occur, and no building permits shall be issued for any building unless any detention basin, siltation basin or improved major swale approved to handle the resulting runoff is in place. Any detention basin shall be seeded and stabilized and have an installed outlet structure prior to the construction of any streets or buildings within that drainage basin.
 - O. Phasing. The phasing of a development shall ensure that all stormwater facilities needed to manage runoff from a phase are in place and functioning adequately prior to and after the construction of buildings in that phase. This shall, for example, include the extension of the main outfall line. This may require the use of temporary structures, which shall be shown on submitted plans. If the development occurs in phases, the entire system shall be shown as part of the preliminary plan submission.
 - P. Streets shall be designed to provide for the discharge of stormwater from their rights-of-way. Street rights-of-way shall not be used for the conveyance of stormwater that does not originate within that street or within an adjacent street.
 - Q. The stormwater management plan shall show that a 100-year, 24-hour storm can be safely conveyed without jeopardizing any principal building on or adjacent to of the site.
 - R. Within the 100-year floodplain, any stormwater management structures and systems shall be designed to handle a 100-year storm. A 24-hour Type II storm shall be used if using the soil complex method.
 - S. Where crop farming or disturbed earth exists on the site prior to development, such areas shall be considered as meadow in good condition for the pre-development calculations.
 - T. All stormwater plans and reports shall be prepared in accord with applicable State professional certification laws and regulations, including those governing professional engineers, surveyors and registered landscape architects.
 - U. If any of the following unusual or special technical circumstances is present, in order to preserve and safeguard the public health and safety, all related stormwater management and sedimentation and erosion control calculations, designs, analyses and plans shall be prepared by a registered professional engineer:
 1. A retention basin, or a detention basin in which a permanent pool of water will be maintained.
 2. A retention basin, detention basin or any impoundment which is designed to pond water greater than three feet in depth, either permanently or temporarily, as a result of runoff from a storm with a likelihood of occurrence once in 50 years, or less.
 3. Any stormwater management facility which has a contributing drainage area of 25 acres or more.
 4. A retention basin, detention basin or any impoundment which is designed to cause ponding of water to a

depth in excess of three (3) feet upslope of and within 50 feet of any road (measured to the right-of-way line), property line, existing sewage disposal system or an existing or proposed dwelling.

5. Any stormwater and/or erosion and sedimentation control facility within the 100-year floodplain.
6. Any stormwater facility which involves an excavation to a depth of 12 feet or more.
7. Any stormwater facilities within an individual property which involve infiltration of runoff from an area of 2 or more acres.
8. Any stormwater facility which involves a bridge, or which involves a culvert with a waterway opening in excess of 12 square feet.
9. Any stormwater facility which results in a discharge onto an adjacent property at a point where no defined stormwater channel or water course presently exists.
10. Any stormwater facility which will discharge to a culvert under a public road.
11. Any stormwater and/or erosion and sedimentation control facility which requires an encroachment permit under 25 PA Code IDS, Dam Safety and Waterway Management, except for a General Permit authorized under Subchapter L.
12. Any stormwater impoundment facility which involves a structure other than an earthen embankment.
13. Any stormwater management facility which involves pumping or any other non-passive process.
14. Any stormwater management facility which is designed to operate in series with another stormwater management facility.
15. Any other situation or circumstance which is deemed by the Board of Supervisors to be an unusual or special circumstance which may impact the public health or safety.

B.4 STRUCTURES

- A. All structures shall be standard PennDOT structures as contained in Pennsylvania Department of Transportation, Publication 72M - *Standards for Roadway Construction, Series RC-1M to RC-100M*, latest edition, and specified in Pennsylvania Department of Transportation, Publication 408 - *Specifications*, latest edition, unless a detail has been provided of an alternative structure which is signed and sealed by a professional engineer registered in Pennsylvania.
- B. All inlet boxes, junction boxes, manholes and other confined spaces shall conform to current OSHA standards for confined spaces.
- C. Inlets. All inlets shall be pre-cast concrete and shall conform to Pennsylvania Department of Transportation, Publication 72M - *Standards for Roadway Construction, Series RC-1M to RC-100M*, latest edition, and RC-46M - *Inlet Boxes*, as amended, unless an alternative structure has been approved based on the submission of a certified detail as provided in Paragraph A, above, and shall conform to the following:
 1. Installation. The installation of all inlets shall conform the PennDOT Publication 72M and PennDOT

Publication 408.

2. All pipes must enter inlets completely through one of the sides. No corner entry of pipes is permitted. The crowns of the pipes shall be aligned within inlets with multiple pipes.
 3. Grates. All inlet tops, grates and frames shall conform to PennDOT Publication 72M, RC-45M - *Inlet Tops, Grates and Frames*, as amended.
 4. Grate Capacity. Inlet grate capacity shall be based on the manufacturer's design data, with the amount of ponding limited to accepted engineering practice for the location of the inlet. Within streets, the gutter spread based on the 25-year storm shall be no greater than one-half the travel lane, with a maximum depth of 2 inches at the inlet. Within street intersections, ponding shall not exceed 1½ inches based on the 25-year storm.
 5. Grate Elevation. Inlet tops shall be depressed 2 inches below the adjacent grade. Inlets placed in lawn areas shall have their tops installed level. Inlets placed in streets and shoulders shall have their tops installed at the street or shoulder grade.
 6. All inlets placed within paved areas shall have heavy duty bicycle safe grates consistent with PennDOT Publication 72M.
 7. Risers for adjusting inlet grates within paved areas shall be cast-in-place concrete or precast concrete.
- E. Storm Manholes. All storm manholes shall be precast concrete, and shall conform to PennDOT Publication 72M, RC-39M - *Stormwater Manholes*, and shall conform to the following:
1. Installation. The installation of all storm manholes shall conform to PennDOT Publication 72M and PennDOT Publication 408. All manholes shall be placed level and plumb.
 2. Drop Manholes. Drops within manholes shall normally not exceed one foot. For special circumstances, such as to avoid other utilities or to reduce the slope of pipes, larger drops will be evaluated on an individual basis.
 3. Manhole Covers. All storm manhole tops, grates and frames shall conform to PennDOT Publication 72M, RC-39M - *Stormwater Manholes*, as amended.
- E. Junction Boxes. All junction boxes shall be cast-in-place concrete or pre-cast concrete and shall conform to Pennsylvania Department of Transportation, Publication 72M - *Standards for Roadway Construction, Series RC-1M to RC-100M*, latest edition, and RC-46M - *Inlet Boxes*, as amended, unless an alternative structure has been approved based on the submission of a certified detail as provided in Paragraph A, above. All junction box tops, grates and frames shall conform to PennDOT Publication 72M, RC-45M - *Inlet Tops, Grates and Frames*, as amended.

B.5 PIPES

- A. Pipe Materials. Pipes shall be reinforced concrete, ductile iron, corrugated steel or aluminum, or thermoplastic, conforming to PennDOT Publication 408, Section 601 - *Pipe Culverts*, or other pipe materials conforming to PennDOT Publication 408. However, only reinforced concrete pipe or corrugated polyethylene pipe with a smooth liner shall be used under roads and other paved areas.

- B. Plastic Pipes. Plastic pipes shall have a smooth inner liner.
- C. Pipe Alignment. The alignment of pipes between drainage structures shall be straight. If a change of horizontal or vertical alignment is necessary, a manhole, inlet or junction box shall be used. Bends and/or curves in pipes are prohibited.
- D. Minimum Slope. All storm sewer pipes and culverts shall have a minimum slope of 0.5 percent.
- E. Maximum Run. The maximum run of storm sewer pipe between manholes or inlets shall be 400 feet for 36 inches or smaller pipes, and 500 feet for pipes larger than 36 inches.
- F. Fittings. Tee joints, elbows and wyes are prohibited, except for use with small diameter pipes within roof drain collection systems and special designs such as underground infiltration systems.
- G. End Treatment. The open end of all pipes shall be fitted with prefabricated concrete headwalls, endwalls or flared end sections. Plastic pipes may also be fitted with plastic flared end sections of the same material as the pipe. End treatments shall conform to PennDOT Publication 72M, RC-31 - *Endwalls* or RC33M - *End Sections for Pipe Culverts*. Rip-rap and/or energy dissipaters shall be provided, if necessary, and shall meet the latest edition of the *Pennsylvania Erosion and Sediment Pollution Control Program Manual*.
- H. Pipe Grates. Where determined to be necessary for safety, childproof grates will be required at the ends of storm sewer pipes, culverts and stormwater facility outflow pipes.
- I. Minimum Cover. All pipes under paved areas shall be constructed so that the required cover to withstand AASHTO HS-25 loading is provided. An absolute minimum cover of one foot shall be maintained at any point along all pipes.
- J. Minimum Pipe Size. Except for roof drains and special system designs, the minimum pipe size for stormwater conveyance pipes is 15 inches, except where a larger minimum size is required by other ordinances or regulations.
- K. Utility Clearance. For all pipes placed within a utility corridor, the appropriate agency shall be contacted to determine the agency's requirements for horizontal and vertical clearance between the pipe and the utility.
- L. Anchors. Where storm sewers are placed on a grade exceeding 15 percent, properly spaced concrete anchors shall be required. The types, sizes, details and locations of the anchors shall be indicated on the plans.
- M. Backfill. Backfill of pipe trenches shall be performed in accord with PennDOT Publication 72M, RC-30M - *Subsurface Drains*. For pipe installation depths in excess of 10 feet from the ground surface to the pipe crown, the pipe manufacturer's cover charts or structural calculations shall be provided. A pipe backfill trench detail shall be provided on the plans.
- N. Culverts. Culverts shall be designed in accord with the procedures in the U.S. Department of Transportation, Federal Highway Administration, *Hydraulic Design of Highway Culverts*, FHWA Publication Number HDS-5, latest edition.
- O. Storm Sewer Outfall. Storm sewer outfalls shall be designed so that the outfall elevation is sufficiently above the receiving channel so that the storm sewer will continue to drain the area it is designed to serve during the

50-year storm flow in the receiving watercourse.

B.6 OPEN CHANNEL CONVEYANCES

- A. Open channels within street rights-of-way shall not be used for the conveyance of stormwater that does not originate within that street or within an adjacent street.
- B. Swales. Swales shall be considered as any constructed channel designed to convey stormwater directly to a stormwater management facility, to surface waters or to overland flow.
1. Swale capacities and velocities shall be computed using Manning's equation with the "n" values set forth in this Ordinance, and procedures derived from *Open-Channel Hydraulics*, by Ven T. Chow, published by McGraw-Hill, Inc., 1959.
 2. Roadside channels and swales shall be designed in accord with the procedures in the U.S. Department of Transportation, Federal Highway Administration, *Design of Roadside Drainage Channels*, FHWA Publication Number EPD-86-102, latest edition.
 3. Vegetated swales shall generally have a minimum slope of 1 percent, unless otherwise approved by the Township based on specific site conditions. "V"-shaped or parabolic swales are preferred.
 4. Vegetated and rip-rap lined swales shall be designed to maximize infiltration and concentrate low flows to minimize siltation and meandering, unless geotechnical conditions are not conducive to infiltration.
 5. The side slope for swales shall not exceed 4:1 unless otherwise approved by the Township based on specific site conditions.
 6. Inlets placed within swales shall have a PennDOT Type "M" top unit, or other top specifically approved by the Township.
 7. Swale linings shall be designed in accord with the standards of the latest edition of the *Pennsylvania Erosion and Sediment Pollution Control Program Manual*.
- C. Level Spreaders. Level spreaders shall be designed to conform to the most recent guidance of the Monroe County Conservation District.
1. Level spreaders shall discharge at existing grade, onto undisturbed vegetation.
 2. Level spreaders shall be designed to discharge at a depth not exceeding 3.0 inches for the 50-year, 24-hour design storm.

B.7 METHODS OF DETENTION AND FLOW DELAY - The following methods of detention or flow delay devices may be used, as determined to be acceptable by the Township:

- A. Methods set forth in the latest edition of the *Stormwater BMP Manual*.
- B. Wet or dry ponds and detention basins.
- C. Roof storage and increased roof roughness.
- D. Infiltration trenches.

- E. Porous pavements, grassed channels and vegetated strips.
- F. Cisterns, underground reservoirs or covered ponds.
- G. Increased roughness of the development's surface area.
- H. Groundwater recharge.
- I. Routing stormwater flow over lawns in swales within stormwater easements.
- J. Detention storage within storm sewers.
- K. Parking lot detention where considered to be acceptable by the Township.
- L. Other methods that are specifically approved by the Township.

B.8 GROUNDWATER RECHARGE: BEST STORMWATER MANAGEMENT PRACTICES

- A. Unless the applicant proves such measures are not feasible considering soil and sub-surface conditions, the Board of Supervisors may require that a subdivision or land development include Best Management Practices ("BMPs") to promote groundwater recharge and to minimize pollutants in runoff. These measures shall be based upon the Manual entitled "*Best Management Practices for Developing Areas in Pennsylvania*" that is available through the County Conservation District or from other published standards acceptable to the Township.
- B. Infiltration BMPs intended to receive runoff from developed areas shall be selected based upon suitability of soils and site conditions and shall be constructed on soils that have the following characteristics:
 - 1. A minimum depth of 48 inches between the bottom of the facility and the seasonal high water table and/or bedrock (limiting zones).
 - 2. 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 professional designer.
- C. Infiltration BMPs receiving only roof runoff may be placed in soils having a minimum depth of 24 inches between the bottom of the facility and the limiting zone.
- D. The Township may require a soils evaluation of the project site to determine the suitability of recharge facilities. Such evaluation shall address soil permeability, depth to bedrock, susceptibility to sinkhole formation and sub-grade stability.
- E. 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 soils
 - 3. Proximity to building foundations and wellheads
 - 4. Slope and depth to bedrock
 - 5. Seasonal high water table
 - 6. Erodibility of soils, and
 - 7. Land availability and configuration of the topography
- F. Where such measures are required, the applicant shall submit construction details of the measures with the final plan submission.
- G. Best Management Practice measures to promote recharge shall include, but not be limited to, seepage beds, infiltration devices and/or porous pavement to promote groundwater recharge.

- H. Best Management Practice measures to protect water quality shall include, but not be limited to the following:
1. Water quality inlets to separate oils and grits from runoff.
 2. Regular cleaning of paved surfaces to pick up oils and grits from runoff.
 3. Stormwater or sediment basins designed to hold the "first flush" of runoff, such as holding the runoff from a one-year storm for 24 hours, to allow time for solids to be separated from runoff.
 4. Planting strips of thick vegetation between paved areas and creeks to filter out pollutants.
 5. Draining of areas with high spill hazards to a holding tank.
- I. Maintenance. Where such measures are required, the applicant shall show that adequate provisions will be put into place to ensure proper maintenance of the measures and to avoid groundwater contamination. Throughout the life of the use, the then-current owner of the lot shall be responsible for maintenance of the measures to make sure that they continue to serve their intended purposes.
- J. Infiltration. Areas intended for infiltration devices shall be protected from compaction, including prior to and during construction. Infiltration devices shall not receive runoff until areas flowing into the devices have been stabilized.

B.9 SUBSURFACE STORMWATER MANAGEMENT FACILITIES

- A. Subsurface Stormwater Management Facilities consist of all stormwater facilities which store, infiltrate, evaporate/transpire, renovate, or otherwise affect stormwater runoff, the top of which is not exposed to the natural environment, located below the finished ground elevation. Subsurface stormwater management facilities do not include conveyance facilities.
- B. Subsurface stormwater management facilities shall comply with the design and construction requirements and standards in the *Stormwater BMP Manual*, and the following requirements. In the case of any conflicts, the more conservative requirement shall apply:
1. Loading/Balancing. The facility shall be designed to provide a means of evenly balancing the flow across the surface of the facility used for infiltration.
 2. Observation/Access Ports.
 - a. For facilities with the bottom less than 5 feet below the average grade of the ground surface, clean-outs shall be considered acceptable observation ports.
 - b. For facilities with the bottom 5 feet, or more, below the average grade of the ground surface, manholes or other means acceptable to the Township shall be provide for access and monitoring of the facility.
 - c. An adequate number of access points shall be provided to flush or otherwise clean the system.
 3. Location.

- a. Infiltration systems greater than 3 feet in depth shall be located a minimum of 30 feet from basement walls.
 - b. Infiltration systems designed to manage runoff from commercial or industrial parking areas shall be a minimum of 100 feet from any water supply well, and 50 feet from any subsurface sewage disposal system.
4. Overflow. Subsurface stormwater management systems shall be designed and constructed to provide an overflow system with measures to provide non-erosive velocity and/or non-erosive lining to the receiving channel.

B.10 ABOVE-GROUND STORMWATER MANAGEMENT FACILITIES

- A. Above-Ground Stormwater Management Facilities consist of stormwater management facilities which store, infiltrate, evaporate/transpire, renovate, or otherwise affect stormwater runoff, the top of which is open to the natural environment, generally located above the finished ground elevation. Above-ground stormwater management facilities do not include conveyance facilities.
- B. All above-ground stormwater management facilities, including detention basins, retention basins, infiltration basins, rain gardens, etc. shall comply with the criteria in the following table of Above Ground Storage Facility Criteria:

ABOVE GROUND STORAGE FACILITY CRITERIA			
	Facility Depth		
	Less than 2 feet	2 feet to 6 feet	Greater than 6 feet
Top Width (Min)	4 feet	6 feet	8 feet
Interior Side Slope (Max)*	5:1	4:1	3:1
Exterior Side Slope (Max)	3:1	3:1	3:1
Impervious Core/Key Trench	Not Required	Required for Permanent Pool	Required
Anti-Seep (Pipe) Collar(s)	Not Required	Required	Required
Compaction Density	Not Required	Required	Required
Dewatering Device	Not Required	Required	Required
Outlet Pipe Size (Min)	6 inches	15 inches	18 inches
Pipe Material	SLHDPE, PVC, RCP **	SLHDPE, RCP **	RCP **
Anti-clogging Device	Not Required	Required	Required
Anti-vortex Design	Not Required	Required	Required

ABOVE GROUND STORAGE FACILITY CRITERIA			
	Facility Depth		
	Less than 2 feet	2 feet to 6 feet	Greater than 6 feet
Watertight Joints	Not Required	Required	Required
Spillway Freeboard (Min 100-yr.)	6 inches	1 foot	1 foot
Spillway Width (Min)	N/A	10 feet	20 feet
Spillway Channel Design	Not Required	Required	Required
Routing of 100 Year Storm	Required	Required	Required
<p>* Steeper slopes may be permitted by the Township if it is demonstrated that they will be stable, not be a hazard, and will be attractively maintained.</p> <p>** SLHDPE - Smooth-lined High Density Polyethylene; PVC - Polyvinyl Chloride; RCP - Reinforced Concrete Pipe.</p>			

C. Facility Depth.

1. For the purposes of this ordinance, the depth of the facility shall be measured from the top of the embankment or rim of the facility to the bottom of the basin or facility, measured at the lowest point adjacent to the embankment or side.
2. Facilities with a depth greater than 8 feet shall not be permitted in residential areas, unless specifically permitted by the Board of Supervisors.
3. Dams constructed on a natural or artificial watercourse where the contributory drainage area exceeds 100 acres, the greatest depth of water measured at the upstream toe of the dam at maximum water storage elevation exceeds 15 feet, or dams for which the impounding capacity at maximum storage elevation exceeds 50 acre-feet of water, require a permit from the PA DEP under Chapter 105.

D. Embankment Construction.

1. Embankment fill material shall be free of roots, stumps, wood, rubbish and organic material, large stones, frozen or other objectionable materials and shall meet the requirements of PennDOT Publication 408 - *Specifications*, Section 206 - Embankment.
2. Embankments shall be constructed in accord with the specifications and compaction requirements of PennDOT Publication 408 - *Specifications*, Section 206 - Embankment.
3. The top slope or toe of the embankment shall be located at least 5 feet from any property or street right-of-way line.
4. The maximum slope of an accessway for maintenance shall be 15 percent.
5. Impervious Core/Key Trench.

- a. An impervious core/key trench, where required, shall consist of a cutoff trench (below existing grade) and a core trench (above existing grade).
 - b. Materials used for the core/key trench shall conform to the United Soil Classification GC, SC, CH or CL and must contain at least 30 percent of material passing the No. 200 sieve.
 - c. The key trench shall be under the center of the top of the embankment, be parallel with the embankment, and shall have a minimum depth of 2 feet below existing grade, with a minimum width of 4 feet at the bottom, and side slopes of 1:1, or flatter.
 - d. The core shall be centered under the top of the embankment, be parallel with the embankment, and extend up to the 10-year water surface elevation or 6 inches below the emergency spillway elevation, whichever is lower.
 - e. The core shall have a minimum width of 4 feet at the top, and side slopes of 1:1, or flatter.
 - f. Compaction requirements for the core shall be the same as those for the embankment.
 - g. The core shall be constructed concurrently with the outer shell of the embankment.
 - h. The trench shall be dewatered during backfilling and compaction operations.
5. Breach Analysis. The Township may require a breach analysis done by a professional engineer registered in Pennsylvania, based on site-specific conditions and concern of threat for downslope property. When required, the breach analysis shall be conducted in accord with the National Resources Conservation Service (NRCS) methodology, the U.S. Army Corps of Engineers methodology (HEC-1) or other methodologies approved by the Township.

E. Internal Construction.

1. The minimum bottom slope of facilities not designed for infiltration shall be 1 percent toward the outlet. A flatter slope may be approved by the Township if a 1 percent channel is provided.
2. Dewatering Device. Where required, dewatering shall be provided using an underdrain, surface drain or other device approved by the Township. If the facility is to be used for infiltration, the dewatering device should have the capability of being disconnected and only be made operational when the basin is not dewatering within the required time frame, or during an emergency.
3. Infiltration Basins. Within basins designed for infiltration, existing native vegetation shall be preserved where feasible. For infiltration basins which require excavation, vegetation shall be provided and planted in accord with the *BMP Manual*.

F. Outlets

1. For facilities with a depth of 2 feet, or greater, an endwall, inlet box, riser box or similar structure shall be provided. Perforated risers, staggered orifices, weirs, grates and other outlet control devices may be permitted by the Township, provided no hazardous conditions will be created.
2. For facilities with a depth of less than 2 feet, an outlet structure is not required.

3. Outlet pipes shall meet the requirement for minimum size set forth in the above table.
 4. Anti-vortex and anti-clogging devices and grates shall be provided, where required.
 5. Where anti-seep collars are required, such collars shall be designed in accord with the *Pennsylvania Erosion and Sediment Pollution Control Program Manual*.
 6. Outlet channels shall be lined with rip-rap or other non-erosive material to comply with Chapter 102 requirements, as acceptable to the Monroe County Conservation District.
 7. The discharge from any stormwater/drainage facility to an adjacent property or road shall not be increased in rate nor altered in character unless a downstream hydraulic capacity analysis performed in accord with §12H demonstrates that the downslope/downstream receiving facilities have adequate capacity.
 8. All outflow structures shall be designed and equipped with a device that will permit regulation of the rate of outflow.
 9. Child-Proof Grates. Where considered to be necessary for safety, child-proof grates will be required at the ends of stormwater facility outflow pipes.
- G. Emergency Spillway. All basins shall be constructed with an emergency spillway sized for the 100-year, 24-hour storm flow, assuming a clogged outlet, with minimum width and freeboard as set forth in the above table.
1. The emergency spillway shall be designed to function independently from the primary outlet, i.e., the primary outlet structure shall control and pass all storms up to and including the 50-year storm, without discharge from the emergency spillway.
 2. The emergency spillway shall be designed to discharge the 100-year storm flow without erosional damage. The stabilization of the emergency spillway shall extend at least to the downslope toe of slope.
 3. The emergency spillway shall be lined with rip-rap or other non-erosive material to comply with Chapter 102 requirements, as acceptable to the Monroe County Conservation District.
 4. Freeboard shall be measured from the top of the water surface elevation to the top of the embankment or rim.
- H. Fencing. Surface stormwater facilities shall be required to be surrounded with a galvanized vinyl-clad chain link metal fence, with a minimum height of 4 feet, and suitable gates to permit access by maintenance vehicles, except as follows:
1. A stormwater detention basin with a design depth of less than 3 feet of water during a 10-year storm shall not be required to be fenced, if it is designed to dewater within 24 hours.
 2. When approved by the Township after an evaluation of the adjacent area, surface stormwater facilities with a permanent or semi-permanent pool of water shall not be required to be fenced, if they are designed as ponds for recreation, with side slopes of 10:1 or flatter.

I. Landscaping.

1. A surface basin with a depth of 2 feet, or greater, shall be screened from view of existing dwellings, a residential zoning district, or a public street, unless the basin will meet all of the following conditions:
 - a. It will have an average slope flatter than 4:1 on the inside berm of the basin.
 - b. Both the inside and outside of the basin will be planted in grass and intended to be mowed, or the basin will be designed to closely resemble a natural pond.
 - c. The basin will be designed so that it will not have to be surrounded by a primarily metal fence.
2. Any required screening shall meet the “buffer Yard” standards of the Township Zoning Ordinance, unless the Board of Supervisors approve an alternative landscaping arrangement that serves the same purposes.
3. Landscaping is not required along an area where natural vegetation will be maintained which will completely fulfill the screening purpose.
4. Thorny and prickly shrubs (that are also attractive) are encouraged to be used around surface basins to discourage entry by children.
5. Any areas of surface stormwater basins which are visible from streets and dwellings must be attractively maintained.

J. General Requirements.

1. The applicant may be required by the Township to demonstrate that the soil permeability is adequate and, if not, to properly amend the soil.
2. Stormwater facilities not having direct access to a public street shall be provided with a suitable access easement to a public street for the purpose of maintenance.
3. The design professional shall demonstrate that the operation of the stormwater facility will not significantly increase downstream peaking conditions.
4. Retention Basins. Retention basins may require aeration devices, depending on the quality of the influent, detention time and other factors.
5. Recreation. When reasonable, efforts should be made to allow suitable recreation use of portions of detention areas. This may include designing a detention basin so that only a portion would hold water after a minor storm, and have flatter side slopes, and the remainder would be well-drained during all but the most serious storms. These areas may be acceptable to at the discretion of the Township as part of any Township requirement to provide recreation land.

B.11 CALCULATIONS AND PLANS - In accord with, and in addition to, the requirements of this ordinance, the following information shall be provided in the stormwater plan submission:

- A. Such information as is necessary to determine compliance with this Ordinance, including, but not limited to,

pre- and post-development runoff calculations, soils and infiltration testing, existing and proposed contours, drainage area maps, typical cross-sections and details, conveyance calculations, etc.

- B. All stormwater plans and reports shall be prepared in accord with applicable State professional certification laws and regulations, including those governing professional engineers, surveyors and registered landscape architects.

B.12 STORMWATER EASEMENTS

- A. Where a subdivision or development is traversed by a watercourse, drainage way, channel or stream that the Township determines is subject to significant stormwater flows, there shall be provided a drainage easement established as follows:
1. Along the 100-year floodway, where that is defined;
 2. Where a 100-year floodplain, but not a 100 year floodway, is defined, the width shall be a minimum of 50 feet from the top bank of the of the waterway, or including the entire 100-year floodplain, whichever is less;
 3. Where a 100-year floodplain is not defined, the width shall be a minimum of 25 feet on each side of the centerline of the waterway;
 4. The easement shall provide the Township with the right to use or improve the drainage easement, at the Township's discretion.
- B. The drainage easements required above are intended to preserve the unimpeded flow of natural drainage and to provide for future possible widening, deepening, relocating, improving or protecting of such drainage facilities.
- C. It shall be the responsibility of the applicant to obtain all stormwater easements on, over or through other properties that are needed to carry out the proposed stormwater management plan.
- D. Areas where stormwater easements have or will be granted shall not be obstructed during or after construction.
- E. See also the easement requirements in §1008.I and §1011 of the Subdivision and Land Development Ordinance, including provisions regarding maintenance and obstructions.

B.13 SURFACE WATERS

- A. All natural streams, channels, swales, drainage systems and/or areas of concentration of surface water shall be maintained in their existing condition unless alteration is approved by the Township. The applicant shall be responsible to obtain all necessary DEP permits (see Chapter 105 of Title 25 of the State regulations).
- B. Stream Alignments. Any change to the alignment of a watercourse, or any blocking, impeding or redirecting of a watercourse shall only occur with written approval of DEP and the Board of Supervisors.

B.14 OWNERSHIP AND MAINTENANCE OF STORMWATER FACILITIES - A procedure for the ownership and

maintenance responsibilities of all temporary and permanent stormwater facilities and erosion and sedimentation control facilities that is satisfactory to the Board of Supervisors shall be established prior to Final Plan approval and shall be stated as a legal requirement on the Final Plan, including:

- A. Description of temporary and permanent maintenance requirements.
- B. Identification of the responsible individual, corporation, association or other entity for ownership and maintenance of both temporary and permanent stormwater management and erosion and sedimentation control facilities.
- C. Establishment of suitable easements for access to all facilities for maintenance.
- D. The Township may, at the discretion of the Board of Supervisors, decide not to accept an offer by the applicant for Township ownership of stormwater facilities.
 - 1. At its discretion, the Township may require that stormwater facilities be dedicated to the Township for maintenance. If the Township accepts maintenance responsibilities, it may require the developer to fund an account to pay for on-going maintenance.
 - 2. The Township may require that maintenance responsibilities be handled through a property owners association with all owners legally obligated to fund their share of the costs.
 - 3. If stormwater facilities that require proper maintenance are to be privately owned, legal mechanisms shall be established prior to property conveyance to require the owner and his/her successor and assigns to properly maintain the facilities in a safe, functional and attractive manner in accord with the approved maintenance schedule.
- E. Stormwater facilities shall be designed to require minimal maintenance.
- F. All storm drainage facilities shall be properly maintained by the party designated as responsible on the final subdivision plan, unless the Board of Supervisors agree to accept a change in the party responsible or the party owning the facility.
- G. Should a facility not be maintained in proper working order, the Board of Supervisors may, after due notice to the responsible party, arrange for the needed maintenance to be accomplished with all such expenses charged to the responsible party. These expenses shall be collectible as municipal claims are now collected by law.
- H. The Plan shall state that the appropriate Township Officials and Code Enforcement Staff have been given the right to enter private property to inspect storm drainage facilities, after making reasonable efforts to contact the property owner prior to any such inspection, or as otherwise provided under State law.

ENACTED AND ORDAINED into an Ordinance by the Board of Supervisors of Ross Township, Monroe County, Pennsylvania, this 7th Day of JUNE 2021 to be effective five (5) days following enactment.



Tina Drake, Chairman

David Shay, Vice-Chairman



James Zahoroiko, Supervisor

ATTEST:



Danielle Romano, Secretary/Treasurer