STORM WATER MANAGEMENT ORDINANCE

ORDINANCE NO. 1996 - 1

SANDY TOWNSHIP, CLEARFIELD COUNTY, PENNSYLVANIA

R. EDWARD FERRARO, ESQ.
SANDY TOWNSHIP SOLICITOR
FERRARO & YOUNG
690 MAIN STREET
BROCKWAY, PENNSYLVANIA 15824

Adopted at a Public Meeting Held on

January 2, 19 96

This is a True and Correct Copy of the full text of the Ordinance enacted January 2, 1996.

Barbara D. Hopkins
Barbara D. Hopkins
Township Secretary

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SANDY LICK CREEK WATERSHED
ACT 167 STORM WATER MANAGEMENT ORDINANCE

ARTICLE I
GENERAL PROVISIONS

Section 101. Statement of Findings

The governing body of the Municipality finds that:

A. Inadequate management of accelerated storm water 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 storm water, undermines floodplain management and flood reduction efforts in upstream and downstream communities, reduces groundwater recharge, and threatens public health and safety.

B. A comprehensive program of storm water 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 Municipality and all the people of the Commonwealth, their resources, and the environment.

Section 102. Purpose

The purpose of the Ordinance is to promote health, safety, and welfare within the Sandy Lick Creek Watershed by minimizing the damages described in Section 101A. of this Ordinance through provisions designed to :

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

B. Utilize and preserve the existing natural drainage systems.

C. Encourage recharge of groundwater where appropriate and prevent degradation of groundwater quality.

D. Maintain existing flows and quality of streams and watercourses in the Municipality and the Commonwealth.

E. Preserve and restore the flood-carrying capacity of streams.

F. Provide proper maintenance of all permanent storm water management facilities that are constructed in the Municipality.

G. Provide performance standards and design criteria for watershed-wide storm water management and planning.

Section 103. Statutory Authority

The Municipality is empowered to regulate land use activities that affect runoff by the authority of the Act of October 4, 1978, P.L. 864 (Act 167), the "Storm Water Management Act", and other ordinances of the municipality, if any.

Section 104. Applicability

This Ordinance shall apply to those areas of the Municipality that are located within the Sandy Lick Creek Watershed, as delineated on Plate I Volume 1, of this ordinance.

This Ordinance shall only apply to permanent storm water management facilities constructed as part of any of the Regulated Activities listed in this Section. Storm water management and erosion and sedimentation control during construction activities are specifically not regulated by this Ordinance, but shall continue to be regulated under existing laws and ordinances.

This Ordinance contains only the storm water management performance standards and design criteria that are necessary or desirable from a watershed-wide perspective. Local storm water management design criteria (e.g. inlet spacing, inlet type, collection system details, outlet structure design, etc.) Shall continue to be regulated by the applicable Municipal Ordinances or at the municipal engineer's discretion.

The following activities are defined as "Regulated Activities" and shall be regulated by this Ordinance.

A. Land development
B. Subdivision
C. Construction of new or additional impervious or semi-pervious surfaces (driveways, parking lots, etc.).
D. Construction of new buildings or additions to existing buildings.
E. Diversion or piping of any natural or man-made stream channel.
F. Installation of storm water management facilities or appurtenances thereto

Section 105. Repealer

Any ordinance of the Municipality inconsistent with any of the provisions of this Ordinance is hereby repealed to the extent of the inconsistency only.

Section 106. Severability

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

Section 107. Compatibility With Other Ordinance Requirements

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.

ARTICLE II
DEFINITIONS

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

A. Words used in the present tense include the future tense; the singular number includes the plural, and the plural number includes the singular; words of masculine gender include feminine gender; and words of feminine gender include masculine gender.

B. The word "includes" or "including" shall not limit the term to the specific example but is intended to extend its meaning to all other instances of like kind and character.

C. The word "person" includes an individual, firm, association, organization, partnership, trust, company, corporation, or any other similar entity.

D. The words "shall" and "must" are mandatory; the words "may" and "should" are permissive.

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

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

Agricultural Activities - The work of producing crops and raising livestock including tillage, plowing, discing, harrowing, pasturing and installation of conservation measures. Construction of new buildings or impervious area is not considered an agricultural activity.

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

Applicant - A landowner or developer who has filed an application for approval to engage in any Regulated Activities as defined in Section 104 of this Ordinance.

Channel Erosion - The widening, deepening, and headword cutting of small channels and waterways, due to erosion caused by moderate to large floods.

Cistern - An underground reservoir or tank for storing rainwater.

Conservation District - The Jefferson County and/or Clearfield County Conservation District.

Culvert - A structure with appurtenant works which carried a stream under or through an embankment or fill.

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

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

Designee - The agent of the Jefferson County and/or Clearfield County Planning Commission and/or agent of the governing body involved with the administration, review or enforcement of any provisions of this ordinance by contract or memorandum of understanding.

Detention Basin - An impoundment structure designed to manage storm water runoff by temporarily storing the runoff and releasing it at an predetermined rate.

Developer - A person, partnership, association, corporation, or other entity, or any responsible person therein or agent thereof, that undertakes any Regulated Activity of this Ordinance.

Development Site - The specific tract of land for which a Regulated Activity is proposed.

Down slope Property Line - That portion of the property line of the lot, tract, or parcels of land being developed located such that all overland or pipe flow from the site would be directed towards it.

Drainage Conveyance Facility - A storm Water Management Facility designed to transmit storm water runoff and shall include streams, channels, swals, pipes, conduits, culverts, storm sewers, etc.

Drainage Easement - A right granted by a landowner to a grantee, allowing the use of private land for storm water management purposes.

Drainage Permit - A permit issued by the Township governing body after the drainage plan has been approved. Said permit is issued prior to or with the final Township approval.

Drainage Plan - The documentation of the storm water management system, if any, to be used for a given development site, the contents of which are established in Section 403.

Earth Disturbance - Any activity including, but not limited to, construction, mining, timber harvesting and grubbing which alters, disturbs, and exposes the existing land surface.

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

Erosion and Sediment Pollution Control Plan - A plan which is designed to minimize accelerated erosion and sedimentation.

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

Flood - A general but temporary condition of partial or complete inundation of normally dry land areas from the overflow 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. Also included are areas that comprise Group 13 Soils, as listed in Appendix A of the Pennsylvania Department of Environmental Resources (PADER) Technical Manual for Sewage Enforcement Officers (as amended or replaced from time to time by PADER).

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

Forest Management/Timber Operations - Planning and activities necessary for the management of forest land. These include timber inventory and preparation of forest management plans, silvicultural treatment, cutting budgets, logging road design and construction, timber harvesting, site preparation and reforestation.

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

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

Grassed Waterway - A natural or construction waterway, usually broad and shallow, covered with erosion-resistant grasses, used to conduct surface water from cropland.

Groundwater Recharge - Replenishment of existing natural underground water supplies.

Impervious Surface - A surface that prevents the percolation of water into the ground.

Impoundment - A retention or detention basin designed to retain storm water runoff and release it at a controlled rate.

Infiltration Structures - A structure designed to direct runoff into the ground (e.g. French drains, seepage pits, seepage trench).

Inlet - A surface connection to a closed drain. A structure at the diversion end of a conduit. The upstream end of any structure through high water may flow.

Land Development - (I) the improvement of one lot or two or more contiguous lots, tracts, or parcels of land for any purpose involving (a) a group of two or more buildings, or (b) the division or allocation of land or space between or amount two or more existing or prospective occupants by means of, or for the purpose of streets, common areas, leaseholds, condominiums, building groups, or other features; (iii) development in accordance with Section 503(1.1) of the PA Municipalities Planning Code.

Land Disturbance - Any activity involving grading, tilling, digging, or filling of ground or stripping of vegetation or any other activity that causes an alteration to the natural condition of the land.

Main Stem (Main Channel) - Any stream segment or other runoff conveyance facility used as a reach in the Sandy Lick Creek hydrologic mode.

Manning Equation in (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.

Memorandum of Understanding - An agreement between Sandy Township and the Jefferson of Clearfield County Conservation District to provide for cooperation between the Jefferson or Clearfield County Conservation District and the Sandy Township Supervisors, Jefferson or Clearfield County, to include within its ordinances, and to jointly promote conservation of natural resources within Sandy Townships on lands both public and private, for the purposes of preventing accelerated soil erosion and sedimentation of streams, reducing storm water damage, and promoting the health, safety and general welfare of the residents of Sandy Township.

Municipality - The Township of Sandy

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

NRCS - National Resource Conservation Service (previously SCS).

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

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.

Parking Lot Storage - Involves the use of impervious parking areas as temporary impoundments with controlled release rates during rainstorms.

Peak Discharge - The maximum rate of storm water runoff from a specific storm event.

Penn State Runoff Model (calibrated) - The computer-based hydrologic modeling technique adapted to the Sandy Lick Creek watershed for the Act 167 Plan. The model has been "calibrated" to reflect actual recorded flow values by adjoining key model input parameters.

Pipe - A culvert, closed conduit, or similar structure (including appurtenances) that conveys storm water.

Plan - The storm water management and erosion and sediment pollution control plans and narratives.

Plan Administrator - The entity set up specifically to review Act 167 Drainage Plans, inspect storm water management structures, and otherwise enforce all regulations as outlined in the "Sandy Lick Creek Watershed Act 167 Storm Water Management Ordinance". The plan administrator for Sandy Township is herein defined as the Board of Supervisors, or its designee, by resolution.

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

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

Regulated Activities - Actions or proposed actions that have an impact on storm water runoff and that are specified in Section 104 of this Ordinance.

Retention Basin - An impoundment in which storm water is stored and not released during the storm event. Stored water may be released from the basin at some time after the end of the storm.

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

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

Rooftop Detention - Temporary ponding and gradual release of storm water falling directly onto flat roof surfaces by incorporating controlled-flow roof drains into buildings designs.

Runoff - Any part of precipitation that flows over the land surface.

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

Sediment Pollution - The placement, discharge or any other introduction of sediment into the waters of the Commonwealth occurring from the failure to design, construct, implement or maintain control measures and control facilities in accordance with the requirements of the Ordinance.

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

Seepage Pit/Seepage Trench - An area of excavated earth filled with loose stone or similar course material, into which surface water is directed for infiltration into the ground.

Sheet Flow - Runoff which flows over the ground surface as a thin, even layer, not concentrated in a channel.

Soil-Cover Complex Method - A method of runoff computation developed by the NRCS that is based on relating soil type and land use/cover to a runoff parameter called Curve Number (CN).

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

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

Storage Indication Method - A reservoir routing procedure based on solution of the continuity equation (inflow minus outflow equals the change in storage) with outflow defined as a function of storage volume and depth.

Storm Frequency - The number of times that a given storm "event" occurs or is exceeded on the average in a stated period of years. See "Return Period".

Storm Sewer - A system of pipes and/or open channels that convey intercepted runoff and storm water from other sources, but excludes domestic sewage and industrial wastes.

Storm Water - The total amount of precipitation reaching the ground surface.

Storm Water Management Facility - Any structure, natural or man-made, that, due to its condition, design, or construction, conveys, stores, or otherwise affects storm water runoff. Typical storm water management facilities include, but are not limited to, detention and retention basins, open channels, storm sewers, pipes, and infiltration structures.

Storm Water Management Plan - The plan for managing storm water runoff in the Sandy Lick Creek Watershed adopted by Jefferson or Clearfield Counties as required by the Act of October 4, 1978, P.L. 864 (Act 167), and known as the "Sandy Lick Creek Watershed Action 167 Storm Water Management Plan.

Storm Water Management Site Plan - The plan prepared by the Developer or his representative indicating how storm water runoff will be managed at the particular site of interest according to this Ordinance.

Stream Enclosure - A bridge, culvert or other structure in excess of 100 feet in length upstream to downstream which encloses a regulated water of this Commonwealth.

Subarea - The smallest drainage unit of a watershed for which storm water management criteria have been established in the Storm Water Management Plan.

Subdivision - The Division or re-division 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, or lease, transfer of ownership, or building or lot development: Provided, however, that the subdivision by lease of land for agricultural purposes into parcels of more than ten acres, not involving any new street or easement of access or any residential dwellings, shall be exempt.

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

Timber Operations - See Forest Management.

Time of Concentration (Tc) - The time of 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.

Watercourse - A stream of water; river; brook; creek; or a channel or ditch for water, whether natural or manmade.

Watercourse - A stream of water; river; brook; creek; or a channel or ditch for water, whether natural or manmade.

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

Wetland - Those areas that are inundated or saturated by surface or ground water 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, ferns, and similar areas.

ARTICLE III
STORM WATER MANAGEMENT

Section 301. General Requirements

A. Storm water drainage systems shall be provided in order to permit unimpeded flow along natural watercourses, except as modified by storm water management facilities or open channel consistent with this Ordinance.

B. The existing points of concentrated drainage that discharge onto adjacent property shall not be relocated and shall be subject to any applicable discharge criteria specified in this Ordinance.

C. 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.

If diffused flow is proposed to be concentrated and discharged onto adjacent property, the Developer must document that adequate downstream conveyance facilities exist to safely transport the concentrated discharge, or otherwise prove that no erosion, sedimentation, flooding or other harm will result form the concentrated discharge.

D. Where a Development Site is traversed by watercourses other than permanent streams, a drainage easement shall be provided conforming substantially to the line of such watercourses. The terms of the easement shall prohibit excavation, the placing of fill or structures, and any alterations that may affect adversely the flow of storm water within any portion of the easement. Also, maintenance and mowing of vegetation within the easement shall be required.

E. Any storm water 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 (PADOT).

F. The Pennsylvania DER, Chapter 105, Rules and Regulations, apply to the construction, modifications, operation or maintenance of both existing and proposed dams, water obstructions and encroachments throughout the watershed, including work in wetlands. Inquiries on dam safety permit requirements or other concerns shall be addressed to DER's Bureau of Dams, Waterways and Wetlands, Harrisburg, PA.

G. When it can be shown that, due to topographic conditions, natural drainage ways on the site cannot adequately provide for drainage, open channels may be constructed conforming substantially to the line and grade of such natural drainage ways. Work within natural drainage ways shall be subject to approval by PADER through the Joint Permit Application process, or, where deemed appropriate by PADER, through the General Permit process.

Section 302. Storm Water Management Performance Standards

A. General

The following general standards shall be applied to all development within the Sandy Lick Creek Watershed to promote flow attenuation, erosion and sediment control and flood control.

1. All site development in the Sandy Lick Creek Watershed which do not fall under the exemption criteria shown in Ordinance Appendix A shall submit a drainage plan consistent with the Sandy Lick Creek Watershed Storm Water Management Plan to the municipality for review.

   This criteria shall apply to the total proposed development even if development is to take place in stages. Impervious cover shall include, but not be limited to, any roof, parking or driveway areas and any new streets and sidewalks. Any areas designed to initially be gravel or crushed stone shall be assumed to be impervious for the purposes of comparison to the waiver criteria.

2. Runoff from impervious area must be drained to pervious areas of the property.

3. Roof drains must not be connected to streets, sanitary or storm sewers or roadside ditches.

4. Runoff from a site should not be concentrated or increased runoff discharged onto adjacent property without the written consent of the adjacent landowners.

B. Detention/Infiltration Standards

1. Post-development rates of runoff from any regulated activity shall not exceed the peak rates of runoff prior to development for the design storms specified on Plate I, Volume I and Section V.B.1., volume II. ← (ATTACHED) ← MAP OF DETENTION DISTRICTS

2. Minimization of impervious surfaces and infiltration of runoff through seepage beds, infiltration trenches, etc. are encouraged, where soil conditions permit, to reduce the size or eliminate the need for detention facilities.

Section 303. Design Criteria for Storm Water Management Facilities

A. Any storm water facility located on State highway rights-of-way shall be subject to approval by the Pennsylvania Department of Transportation.

B. Any storm water management facility (i.e. 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 the 100 year post-development conditions. The height of embankment must be set as to provide minimum 1.0 foot of freeboard above the maximum pool elevation computed when the facility functions for the 100 year post-development inflow. However, criteria for design and construction of storm water management facilities are not the same criteria that are used in the permitting of dams under the DER Dam Safety Program. Depending upon the physical characteristics of a dam, a dam permit may be required and the design will have to meet the provisions of Chapter 105 of the Dam Safety and Encroachments Act. Depending on the physical characteristics of a dam, the design could require that anywhere from a 50-year to a PMF storm event be considered.

C. Any drainage conveyance facility and/or channel that doesn't fall under Chapter 105 Regulations, must be able to convey, without damage to the drainage structure or roadway, runoff from the 25-year design storm. Conveyance facilities to or exiting from storm water management facilities (i.e. detention basins) shall be designed to convey the design flow to or from that structure. Roadway crossings located within designated floodplain areas must be able to convey runoff from a 100-year design storm. Any facility located within a PADOT right-of-way must meet PADOT minimum design standards and permit submission requirements.

D. Storm sewers must be able to convey post-development runoff from a 25-year design storm without surcharging inlets.

E. Capacity Improvements - If the Developer could prove that it would be feasible to provide capacity improvement to relieve the capacity deficiency in the existing drainage network, the adequate capacity improvements could be provided by the Developer in lieu of storm water management facilities on the development site. Any capacity improvements would be designed based on development of all areas tributary to the improvements and the capacity criteria specified in this Ordinance. The type and amount of development that the Developer must consider shall be either based on current zoning or established by the municipality, whichever results in a greater amount of imperviousness. It shall be assumed that all new development upstream of a proposed capacity improvement would implement applicable storm water management techniques, consistent with this Ordinance.

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

Section 304. Calculation Methodology

Storm water runoff from all development sites shall be calculated using either the rational method or a soil-cover-complex methodology.

A. Any storm water runoff calculations involving drainage areas greater than 20 acres, including on and off-site area, shall use generally accepted calculation technique that is based on the NRCS soil cover complex method. Table VIII-1 summarized acceptable computation methods. It is assumed that all methods will be selected by the design professional based on the individual limitations and suitability of each method for a particular site.

   The Plan Administrator may approve the use of the Rational Method to estimate peak discharges from drainage areas that contain less than 20 acres.

B. All calculations consistent with this Ordinance using the soil cover complex method shall use the appropriate design rainfall depths for the various return period storms presented in Table B-1 in Appendix B of this Ordinance. If a hydrologic computer model such as PSRM or HEC-1 is used for storm water runoff calculations, then the duration of rainfall shall be 24 hours. The NRCS 'S' curve is shown in Figure B-1, Appendix B of this Ordinance shall be used for the rainfall distribution.

C. For the purposes of predevelopment flow rate determination, undeveloped land shall be considered as "meadow" conditions, unless the natural ground cover generates a lower curve number or Rational 'C' value (i.e. forest).

D. All calculations using the Rational Method shall use rainfall intensities consistent with appropriate times of concentration for overland flow and return periods from the Design Storm Curves from PA Department of Transportation Design Rainfall Curves (1986) (Figure B-2). Times of concentration for overland flow shall be calculated using the methodology presented in Chapter 3 of Urban Hydrology for Small Watersheds, NRCS, TR-55 (as amended or replaced from time to time by NRCS). Times of concentration for channel and pipe flow shall be computed using Manning's equation.

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

TABLE VIII-1

ACCEPTABLE COMPUTATION METHODOLOGIES FOR STORM WATER MANAGEMENT PLANS

METHOD	METHOD DEVELOPED BY	APPLICABILITY
TR-20 (Or commercial 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	US Army Corps of Engineers	Applicable where use of hydrologic computer model is desirable or Necessary.
PSRM	Penn State University	Applicable where use of A hydrologic computer Model is desirable or Necessary; simpler Than TR-20 or HEC-1.
Rational Method (Or commercial computer package based on Rational Method)	Emil Kuichling (1889)	For sites less than 200 Acres, or as approved by The plan Administrator And Municipal Engineer.
Other Methods	Varies	Other computation Methodologies approved By the Plan Administrator And Municipal Engineer.

F. Runoff coefficients © for both existing and proposed conditions for use in the Rational method shall be obtained from Table B-3 in Appendix B of this Ordinance.

G. Where uniform flow is anticipated, the Manning equation shall be used for hydraulic computations, and to determined the capacity of open channels, pipes, and storm sewers. Values for Manning's roughness coefficient (n) shall be consistent with Table B-4 in Appendix B of the Ordinance.

H. The design of any storm water detention facilities intended to meet the performed standards of this Ordinance shall be verified by routing the design storm hydro graph through these facilities using the Storage-Indication Method. For drainage areas greater than 20 acres in size, the design storm hydro graph shall be computed using a calculation method that produces a full hydro graph. The municipality may approve the use of any generally accepted full hydro graph approximation technique shall use a total runoff volume that is consistent with the volume from a method that produces a full hydro graph.

I. Outlet structures for storm water management facilities shall be designed to meet the performance standards of this Ordinance using any generally accepted hydraulic analysis technique or method.

Section 305. Use of Performance Standards and Criteria

The methodology for determining required storm water controls for a regulated activity is shown in Figure VIII-1 and outlined below.

A. Compute:

1. Pre-development hydro graph at the site discharge point for the required design storm.

2. Post-development hydro graph at the site discharge point incorporating any "non-detention" techniques such as pervious areas, swales, infiltration trenches, etc.

Note: Hydro graphs may be obtained from NRCS methods such as TR-55, or from use of the "modified" rational formulas.

B. Compare:

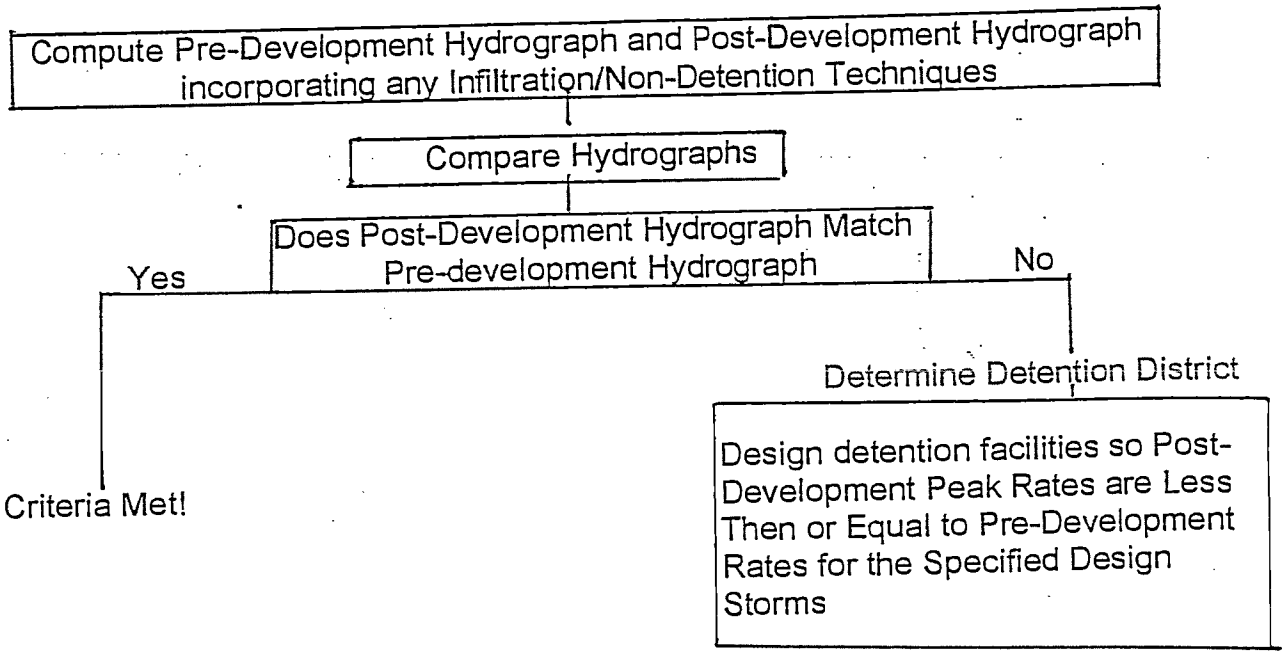
Post-development Hydro graphs with pre-development Hydro graphs. If the peak rate of runoff and the shape of the Hydro graphs are nearly identical, storm water management has been achieved. Detention will not be required. If not, proceed to Item C.

C. Design:

Detention/retention facilities, in conjunction with any non-detention techniques, such that post-development peak rates from the site will not exceed pre-development levels for the required design storms.

FIGURE VIII-1

STORM WATER CONTROL DETERMINATION FLOW CHART



ARTICLE IV
DRAINAGE PLAN REQUIREMENTS

Section 401. General Requirements

For any of the activities regulated by this Ordinance, the final approval of subdivision and/or land development plans, the issuance of any building or occupancy permit, or the commencement of any land disturbance activity may not proceed until the Property Owner or Developer or his/her agent has received written approval of a Drainage Plan from the Plan Administrator.

Section 402. Exemptions.

A. Any Regulated Activity that meets the exception criteria in the Ordinance Appendix A is exempt from the Drainage Plan preparation provisions of this Ordinance. This criteria shall apply to the total development even if development is to take place in phases. The date of the Official County Plan adoption shall be the starting point from which to consider tracts as "parent tracts" in which future subdivisions and respective impervious are computations shall be cumulatively considered. Exemption shall not relieve the applicant from providing adequate storm water management to meet the purpose of this Ordinance.

B. Land disturbance associated with existing one and two family dwellings, subject to conditions described in A. of this Section.

C. Use of land for gardening for home consumption.

D. Agriculture when operated in accordance with a conservation plan or erosion and sedimentation control plan found adequate by the Conservation District. The agricultural activities such as growing crops, rotating crops, filling of soil and grazing animals and other such activities are specifically exempt from complying with the requirements of this Ordinance.

E. Forest Management operations which are following the Department of Environmental Resources' management practices contained in its publication "Soil Erosion and Sedimentation Control Guidelines for Forestry" and are operating under an erosion and sedimentation control plan.

No exemption shall be provided for Regulated Activities as defined in Section 104.E and 104.F of this Ordinance.

Section 403. Drainage Plan Contents

The Drainage Plan shall consist of all applicable calculations, maps, and plans. A note on the maps shall refer to the associated computations and erosions and sedimentation control plan by title and date. The cover sheet of the computations and erosion and sedimentation control plan shall refer to the associated maps by title and date. All drainage Plan materials shall be submitted to the Plan Administrator in a format that is clear, concise, legible, neat, and well organized; otherwise, the Drainage Plan shall be disapproved and returned to the Applicant.

The following items shall be included in the Drainage Plan:

A. General

1. General description of project.

2. General description of permanent storm water management techniques, including construction specifications of the materials to be used for storm water management facilities.

3. Complete hydrologic, hydraulic, and structural computations for all storm water management facilities.

B. Map(s) of the project area shall be submitted on 24-inch x 36 inch sheets and shall be prepared in a form that meets the requirements for recording the offices of the Recorder of Deeds of Clearfield County. The contents of the map(s) shall include, but not be limited to:

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

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

3. Existing streams, lakes, ponds, or other bodies of water within the project area.

4. Other physical features including flood hazard boundaries, sinkholes, streams, existing drainage courses, areas of natural vegetation to be preserved, and the total extent of the upstream area draining through the site.

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

6. An overlay showing soil names and boundaries

7. Proposed changes to the land surface and vegetative cover, including the type and amount of impervious area that would be added.

8. Proposed structure, roads, paved areas, and buildings.

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

10. The name of the development, the name and address of the owner of the property, and the name of the individual or firm preparing the plan.

11. The date of submission.

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

13. A North arrow.

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

15. Existing and proposed land use(s).

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

17. Horizontal and vertical profiles of all open channels, including hydraulic capacity.

18. Overland drainage paths.

19. A fifteen foot wide access easement around all storm water management facilities that would provide ingress from and egress to a public right-of-way.

20. A note on the plan indicating the location and responsibility for maintenance of storm water management facilities that would be located off-site. All off-site facilities shall meet the performance standards and design criteria specified in this Ordinance.

21. A construction detail of any improvements made to sinkholes and the location of all notes to be posted, as specified in this Ordinance.

22. A statement, signed by the landowner, acknowledging the storm water management system to be a permanent fixture that can be altered or removed only after approval of a revised plan by the Plan Administrator.

23. The following signature block for the Plan Administrator:

"I (Plan Administrator), on this date (date of signature), have reviewed and hereby certify that the Drainage Plan meets all design standards and criteria of the Sandy Lick Creek Watershed Act 167 Storm Water Management Ordinance."

24. The location of all erosion and sedimentation control facilities.

C. Supplemental Information

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

   a. The overall storm water management concept for the project.
   b. Storm water runoff computations as specified in this Ordinance.
   c. Storm water management techniques to be applied both during and after development.
   d. Expected project time schedule.

2. A soil erosion and sedimentation control plan, including all reviews and approvals, as required by PADER.

3. A geologic assessment of the effects of runoff on sinkholes as specified in this Ordinance.

4. The effect of the project (in terms of runoff volumes and peak flows) on adjacent properties and on any existing municipal storm water collection system that may receive runoff from the project site.

5. A Declaration of Adequacy and Highway Occupancy Permit from the PADOT District Office when utilization of a PADOT storm drainage system is proposed.

D. Storm Water Management Facilities

1. All storm water management facilities must be located on a map and described in detail.

2. When groundwater recharge methods such as seepage pits, beds or trenches are used, the location of existing and proposed septic tank infiltration areas and wells must be shown.

3. All calculations, assumptions, and criteria used in the design of the storm water management facilities must be shown.

Section 404. Plan Submission

For all activities regulated by this Ordinance, the steps below shall be followed for submission. For any activities that require a PADER Joint Permit Application and regulated under Chapter 105 (Dam Safety and Waterway Management) or Chapter 106 (Floodplain Management) of PADER's Rules and Regulations, require a PADOT Highway Occupancy Permit, or require any other permit under applicable state or federal regulations, the permit(s) shall be part of the plan.

1. The Drainage Plan shall be submitted by the Developer as part of the Preliminary Plan submission for the Regulated Activity.

2. Four (4) copies of the Drainage Plan shall be submitted to the municipality with the requisite fees.

Section 405. Drainage Plan Review

A. The Plan Administrator shall review the Drainage Plan for consistency with the adopted Sandy Lick Creek Watershed Act 167 Storm Water Management Plan. The Plan Administrator shall require receipt of a complete plan, as specified in this Ordinance.

B. The Municipal Engineer shall review the Drainage Plan for any submission or land development against the municipal subdivision and land development ordinance provisions not superseded by this Ordinance.

C. Should the Drainage Plan be determined to be consistent with the Storm Water Management Plan, the Plan Administrator will forward an approval letter to the Developer.

Should the Drainage Plan be determined to be inconsistent with the Storm Water Management Plan, the Plan Administrator will forward a disapproval letter to the Developer citing the reason(s) for the disapproval. Any disapproved Drainage Plans may be revised by the Developer and resubmitted consistent with this Ordinance.

D. For Regulated Activities requiring a PADER Joint Permit Application, the Plan Administrator shall notify PADER whether the Drainage Plan is consistent with the Storm Water Management Plan and forward a copy of the review letter to the Developer. PADER may consider the Plan Administrator's review comments in determining whether to issue a permit.

E. The Municipality shall not approve any subdivision or land development for Regulated Activities specified in Sections 104.A and 104.B of this Ordinance if the Drainage Plan has been found to be inconsistent with the Storm Water Management Plan, as determined by the Plan Administrator, or without considering the comments of the Municipal Engineer. All required permits from PADER must be obtained prior to approval.

F. The Municipal Building Permit Office shall not issue a building permit for any Regulated Activity specified in Section 104 of this Ordinance if the Drainage Plan has been found to be inconsistent with the Storm Water Management Plan, as determined by the Plan Administrator, or without considering the comments of the Municipal Engineer. All required permits from PADER must be obtained prior to issuance of a building permit.

G. The Developer shall be responsible for completing an "As-Built Survey" of all storm water management facilities included in the approved Drainage Plan. The As-Built Survey and an explanation of any discrepancies with the design plans shall be submitted to the Plan Administrator for final approval. In no case shall the Plan Administrator approve the As-Build Survey until the Plan Administrator receives a copy of an approved Declaration of Adequacy, Highway Occupancy Permit from the PADOT District Office, and any applicable permits from PADER.

H. The Plan Administrator's approval of a Drainage Plan shall be valid for a period not to exceed one (1) year. This one-year time period shall commence on the date that the Plan Administrator signs the approved Drainage Plan. If storm water management facilities included in the approved Drainage plan have not been constructed, or if an As-Built Survey of these facilities has not been approved within this one-year time period, then the Plan Administrator may considered the Drainage plan disapproved and may recommend that the Municipality revoke any and all permits. Drainage Plans that are considered disapproved by the Plan Administrator shall be resubmitted in accordance with Section 407 of this Ordinance.

Section 406. Modification of Plans

A modification to a submitted Drainage Plan for a development site that involves a change in storm water management facilities or techniques, or that involves the relocation or re-design of storm water management facilities, or that is necessary because soil or other conditions are not stated on the Drainage Plan (as determined by the Plan Administrator or the Municipal Engineer), shall require a resubmission of the modified Drainage Plan consistent with Section 404 of this Ordinance and be subject to review as specified in Section 405 of this Ordinance.

A modification to an already approved or disapproved Drainage Plan shall be submitted to the Plan Administrator, accompanied by the applicable Plan Administrator Review Fee. A modification to a Drainage Plan for which a formal action has not been taken by the Plan Administrator shall be submitted to the Plan Administrator, accompanied by the applicable Plan Administrator Review Fee.

Section 407. Resubmission of Disapproved Drainage Plans

A disapproved Drainage Plan may be resubmitted, with the revisions addressing the Plan Administrator's concerns documented in writing, to the Plan Administrator in accordance with Section 404 of this Ordinance and be subject to review as specified in Section 405 of this Ordinance. The applicable Plan Administrator Review Fee must accompany a resubmission of a disapproved Drainage Plan.

ARTICLE V
INSPECTIONS

Section 501. Schedule of Inspections

A. The Plan Administrator or his assignee shall inspect all phases of the installation of the permanent storm water management facilities.

B. During any stage of the work, if the Plan Administrator determines that the permanent storm water management facilities are not being installed in accordance with the approved Storm Water Management Plan, the Municipality shall revoke any existing permits until a revised Drainage Plan is submitted and approved, as specified in this Ordinance.

ARTICLE VI
FEES AND EXPENSES

Section 601. General

The fees required by this Ordinance are the Municipal Review Fee and any other fees established by resolution. The Municipal Review fee shall be established by the Municipality to defray review costs incurred by the Municipality and the Municipal Engineer. All fees shall be paid by the Applicant.

Section 602. Plan Administrator Drainage Plan Review Fee

The Plan Administrator shall establish a Review Fee Schedule based on the size of the Regulated Activity and based on the Plan Administrator's costs for reviewing Drainage Plans. The Plan Administrator shall periodically update the Review Fee Schedule to ensure that review costs are adequately reimbursed.

Section 603. Expenses Covered by Fees

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

A. The review of the Drainage Plan by the Plan Administrator and the Municipal Engineer.

B. The site inspection.

C. The inspection of storm water management facilities and drainage improvements during construction.

D. The final inspection upon completion of the storm water management facilities and drainage improvements presented in the Drainage Plan.

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

ARTICLE VII
MAINTENANCE RESPONSIBILITIES

Section 701. Maintenance Responsibilities

A. The storm water management plan for the development site shall contain an operation and maintenance plan prepared by the developer and approved by the municipal engineer. The operation and maintenance plan shall outline required routine maintenance actions and schedules necessary to insure proper operation of the facility(ies).

B. The storm water management plan for the development site shall establish responsibilities for the continuing operating and maintenance of all proposed storm water control facilities, consistent with the following principals:

1. If a development consists of structures or lots which are to be noncommercial and separately owned and in which streets, sewers and other public improvements are to be dedicated to the municipality, storm water control facilities should also be dedicated to and maintained by the municipality.

2. If a development site is to be commercial or maintained in a single ownership or if sewers and other public improvements are to be privately owned and maintained, then the ownership and maintenance of storm water control facilities should be the responsibility of the owner or private management entity.

C. The governing body, upon recommendation of the municipal engineer, shall make the final determination on the continuing maintenance responsibilities prior to final approval of the storm water management plan. The governing body reserves the right to accept the ownership and operating responsibility for any or all of the storm water management controls.

Section 702. Maintenance Agreement for Privately Owned Storm Water Facilities

A. Prior to final approval of the site's storm water management plan, the property owner shall sign and record a maintenance agreement covering all storm water control facilities which are to be privately owned. The agreement shall stipulate that:

1. The owner shall maintain all facilities in accordance with the approved maintenance schedule and shall keep all facilities in a safe and attractive manner. (Note: Municipality may consider a 5-10 year period to turn over ownership/maintenance to the Municipality.)

2. The owner shall convey to the municipality easements and/or rights-of-way to assure access for periodic inspections by the municipality and maintenance, if required.

3. The owner shall keep in file with the municipality the name, address and telephone number of the person or company responsible for maintenance activities; in the event of a change, new information will be submitted to the municipality within ten (10) days of the change.

4. If the owner fails to maintain the storm water control facilities following due notice by the municipality to correct the problem(s), the municipality may perform the necessary maintenance work or corrective work and the owner shall reimburse the municipality for all costs.

B. Other items may be included in the agreement where determined necessary to guarantee the satisfactory maintenance of all facilities. The maintenance agreement shall be subject to the review and approval of the municipal solicitor and governing body.

ARTICLE VIII
ENFORCEMENT AND PENALTIES

Section 801. Right-of-Entry

Upon presentation of proper credentials, duly authorized representatives of the municipality may enter at reasonable times upon any property within the municipality to investigate or ascertain the condition of the subject property in regard to any aspect regulated by this Ordinance.

Section 802. Notification

In the event that a person fails to comply with the requirements of this Ordinance, or fails to conform to the requirements of any permit issued hereunder, the municipality shall provide written notification of the violation. Such notification shall set forth the nature of the violation(s) and establish a time limit, usually 16 days, for correction of these 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 municipality from pursuing any and all other remedies. It shall be responsibility of the owner of the real property on which any regulated activity is proposed to occur, is occurring, or has occurred, to comply with the terms and conditions of this Ordinance.

Section 803. Public Nuisance

A. Any violation of any provision of this Ordinance is deemed a public nuisance.

B. Each day that a violation of any provision continues constitutes a separate violation.

Section 804. Penalties

A. Any person who or which has violated any provisions of this Ordinance, shall, upon a judicial determination thereof, be subject to civil judgment for each such violation of one thousand and 00/100 dollars ($1,000.00), plus costs of suit. Each day that a violation occurs shall constitute a separate offense. All fines shall be paid to the Township of Sandy for its general purposes.

B. 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.

Section 805. Appeals

A. Any persons aggrieved by any action of the municipality's designee or representative may appeal to (the municipality's governing body) within thirty (30) days of that action.

B. Any person aggrieved by any decision of (the municipality's governing body) may appeal to the (County Court of Common Pleas) within thirty (30) days of that decision.

ARTICLE IX
MISCELLANEOUS

Section 901. References in this ordinance to PADER are hereby revised so as to refer to the Pennsylvania Department of Environmental Protection.

ORDAINED, ADOPTED AND ENACTED this 2 day of January, 1996, to be effective immediately five (5) days after adoption.

ATTEST:

Barbara D. Hopkins

George L. Evans

Leslie Read

Ray Anderson

Edward Watson, Jr.

ORDINANCE APPENDIX A
EXEMPTION CRITERIA AND SAMPLES

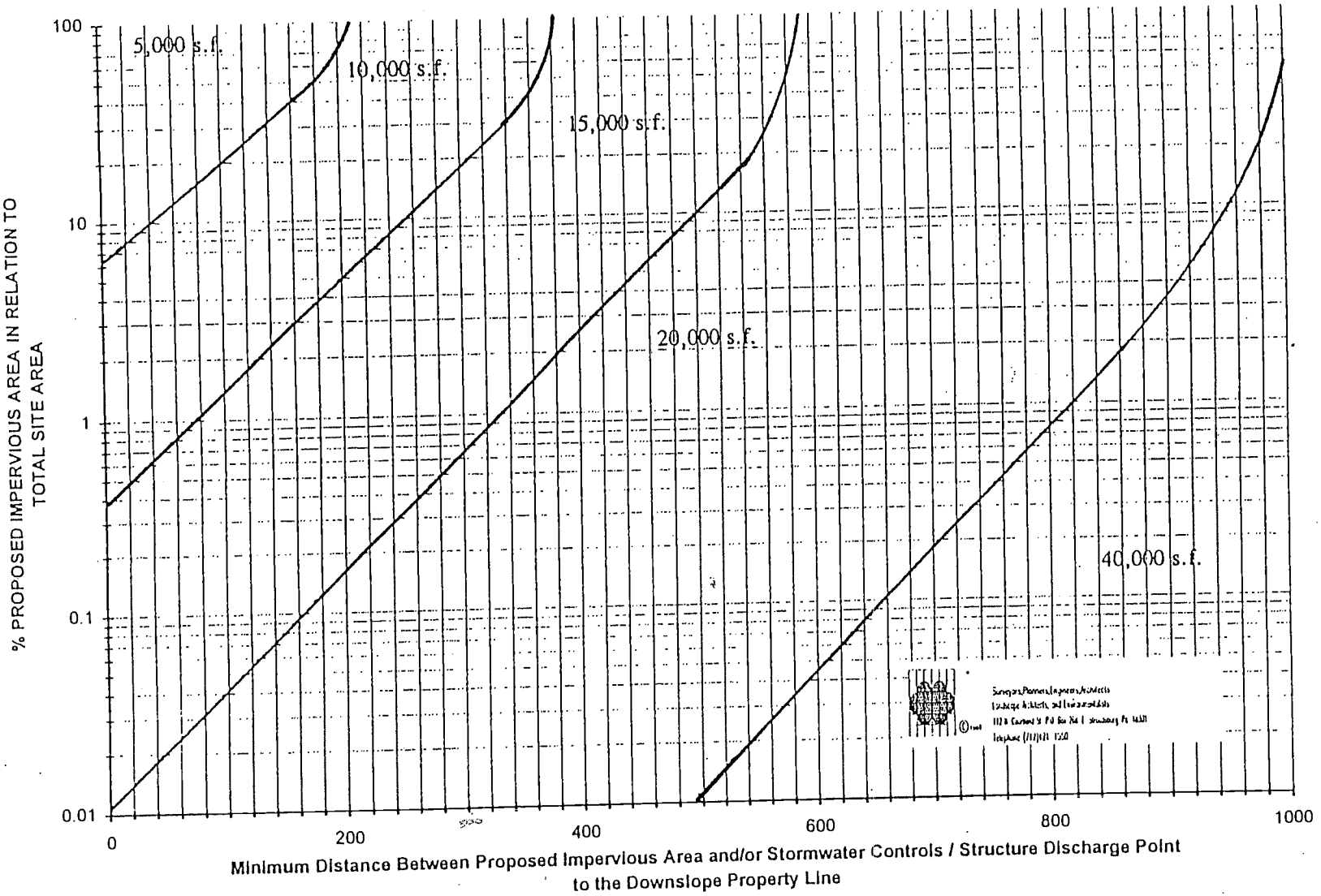


Figure A-1

Example 1.

20,000 square feet (sf) lot -- 9,000 sf proposed impervious area is 200 feet from the downslope property line.

9,000 sf/20,000 sf = 45% impervious area

From Figure A-2 exemption is 10,000 sf

9,000 sf < 10,000 sf therefore exempt from the ordinance

Example 2.

50 acre parcel -- 30,000 sf proposed impervious area is 900 feet from the downslope property line

30,000 sf/(50 ac. x 43.560 sf/ac) = 1.37% impervious area

From Figure A-2 exemption is 40,000 sf

30,000 sf < 40,000 sf therefore exempt from the ordinance

Example 3.

5 acre lot -- 2 acres proposed to be impervious area 100 feet from the downslope property line.

2 ac/5 ac. = 40% impervious area

From Figure A-2 exemption is 5,000 sf

2 acres (87,120 sf) > 5,000 sf therefore comply with the ordinance or reduce impervious area to 5,000 sf

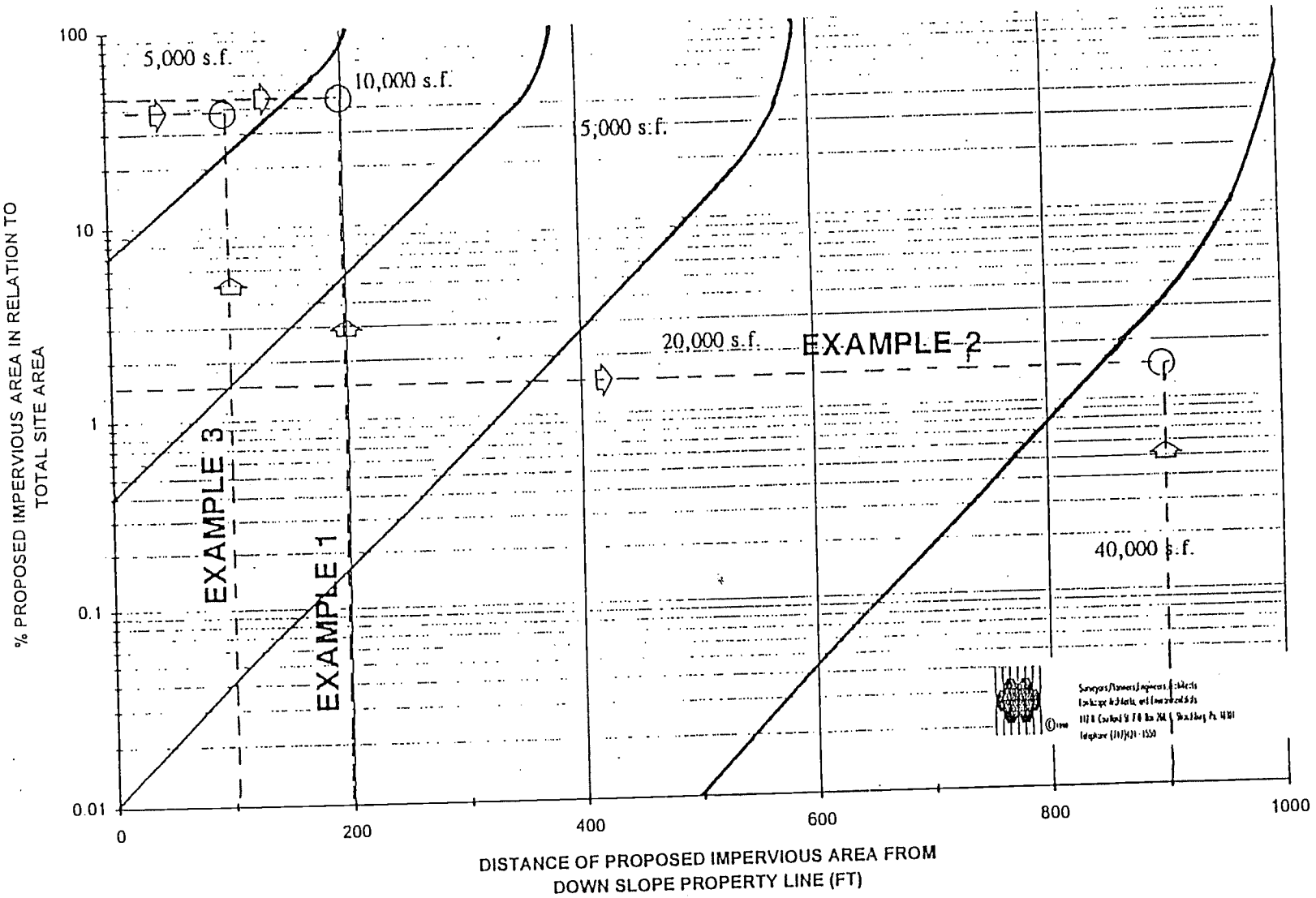


Figure A-2

ACT 167 STORMWATER MANAGEMENT
EXEMPTION CRITERIA

Total Parcel Size	Minimum Distance * (feet)	Impervious Areas Exempt from Ordinance
< 1 acre	0	5000 sq. ft.
1 - 2 acres	100	10,000 sq. ft.
2 - 5 acres	250	15,000 sq. ft.
> 5 acres	500	20,000 sq. ft.

* The minimum distance between the proposed impervious area and/or stormwater controls / structure discharge point to the downslope property line.

ORDINANCE APPENDIX B

DESIGN CRITERIA

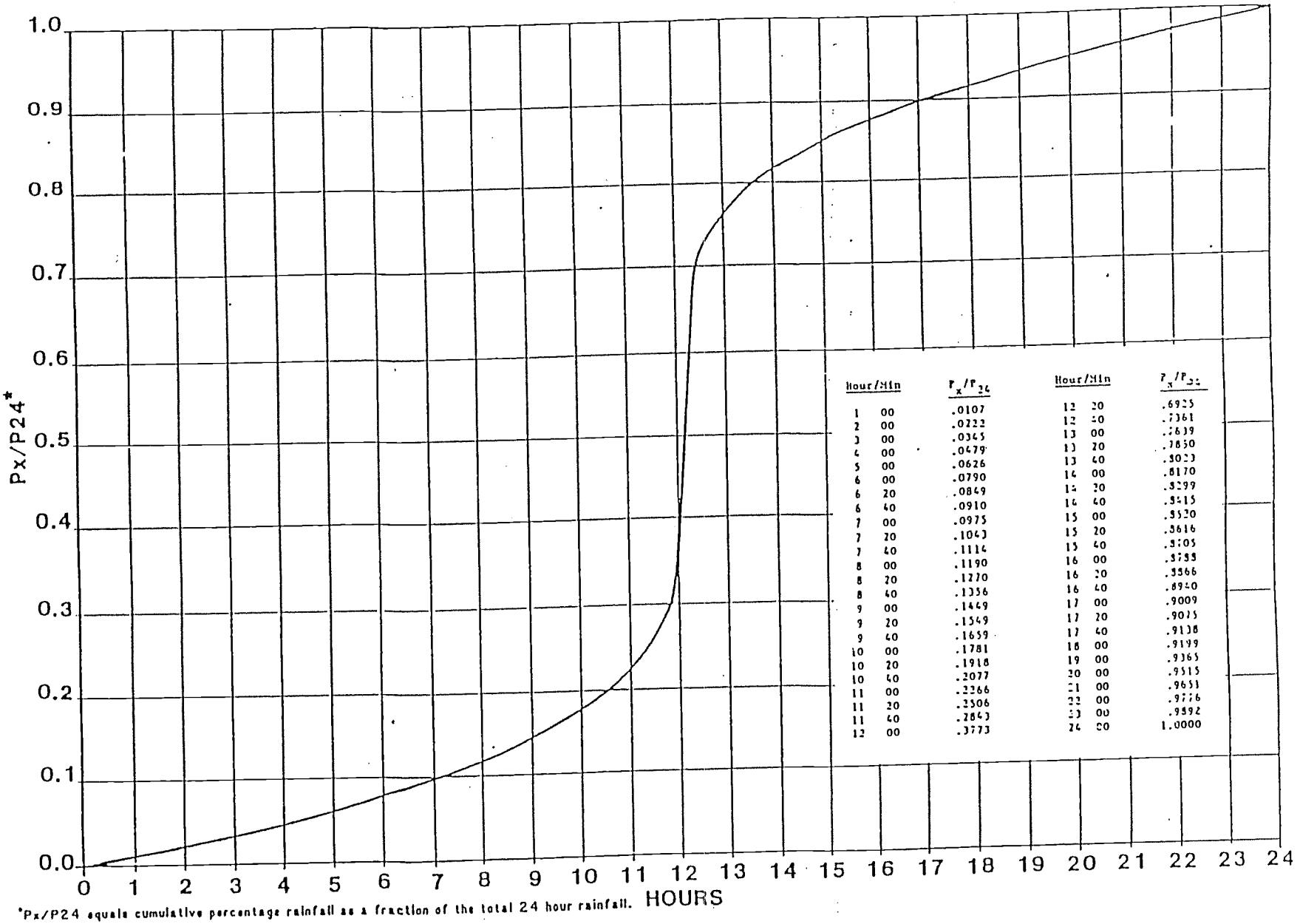
TABLE B-1
DESIGN STORM RAINFALL AMOUNT (INCHES)

RETURN 1 PERIOD	DURATION			
	1	6	12	24
1	0.53	0.85	1.05	1.18
2	1.00	1.62	1.99	2.25
2.33	1.10	1.80	2.20	2.50
5	1.40	2.30	2.75	3.10
10	1.65	2.60	3.20	3.59
25	1.96	3.10	3.65	4.19
50	2.20	3.50	4.10	4.66
100	2.42	3.75	4.50	5.10

Source: "Rainfall Duration Frequency Tables for Pennsylvania" PA-DER, February, 1983.

FIGURE B-1.

SCS TYPE II RAINFALL DISTRIBUTION



Hour/Min	P_x/P_{24}	Hour/Min	P_x/P_{24}
1 00	.0107	12 20	.6925
2 00	.0222	12 40	.7361
3 00	.0345	13 00	.7639
4 00	.0479	13 20	.7850
5 00	.0626	13 40	.8023
6 00	.0790	14 00	.8170
6 20	.0849	14 20	.8299
6 40	.0910	14 40	.8415
7 00	.0975	15 00	.8520
7 20	.1043	15 20	.8616
7 40	.1114	15 40	.8705
8 00	.1190	16 00	.8788
8 20	.1270	16 20	.8866
8 40	.1356	16 40	.8940
9 00	.1449	17 00	.9009
9 20	.1549	17 20	.9075
9 40	.1659	17 40	.9138
10 00	.1781	18 00	.9199
10 20	.1918	19 00	.9365
10 40	.2077	20 00	.9515
11 00	.2266	21 00	.9651
11 20	.2506	22 00	.9776
11 40	.2843	23 00	.9892
12 00	.3773	24 00	1.0000

*Px/P24 equals cumulative percentage rainfall as a fraction of the total 24 hour rainfall.

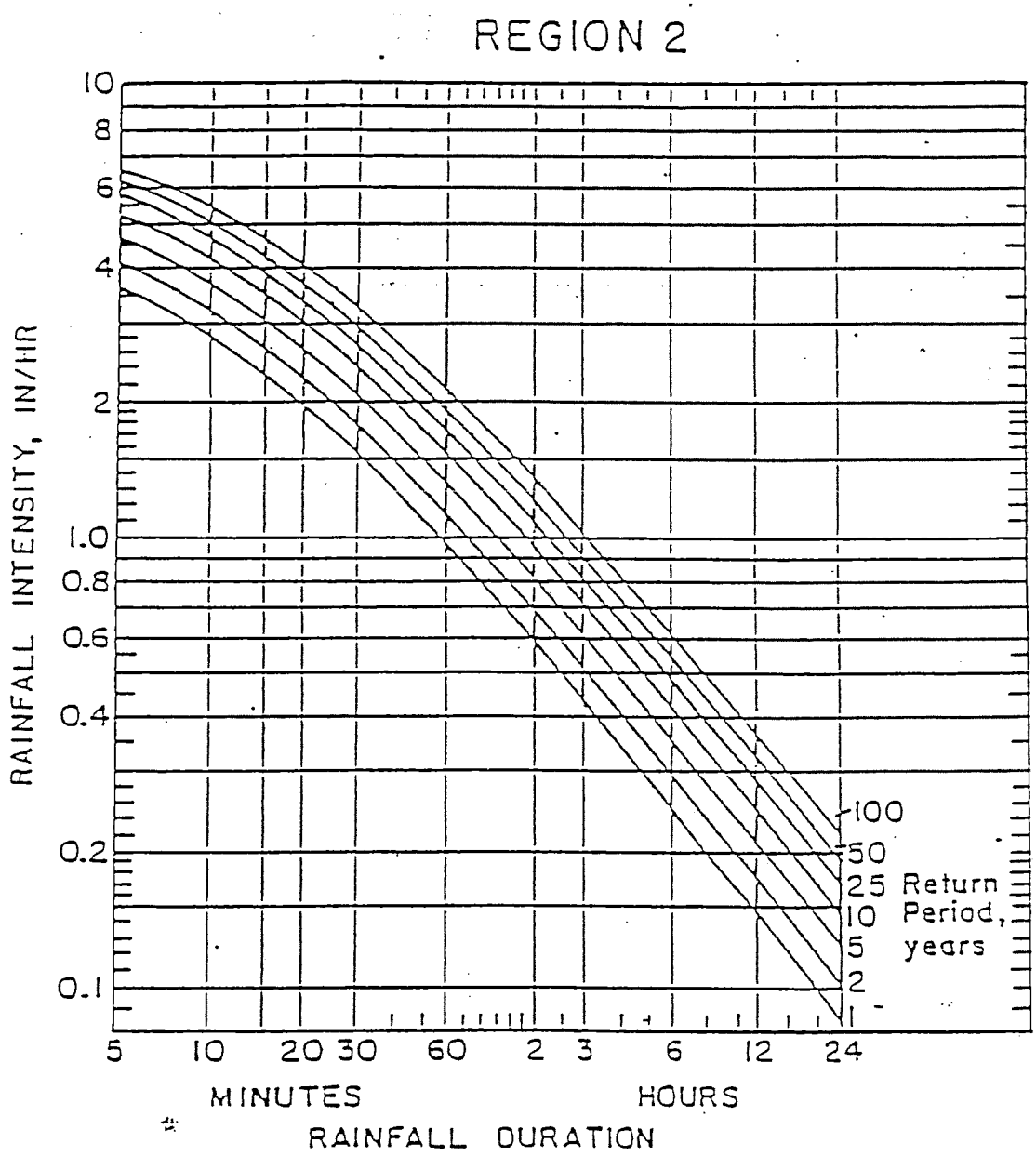


Figure B-2 Storm intensity-duration-frequency curves for Region 2.

TABLE B-2

RUNOFF CURVE NUMBERS (CN'S) TO BE UTILIZED FOR SANDY LICK CREEK
(AMC II - IA = .25)

LAND USE DESCRIPTION			HYDROLOGIC SOIL GROUP A	B	C	D
OPEN SPACE (LAWN, PARK, GOLF COURSES, CEMETARIES, PASTURE)			44	65	77	82
MEADOW, ORCHARDS			30**	58	71	78
NEWLY GRADED LAND, FALLOW, DISTURBED LAND WITH NO OR LITTLE VEGETATION COVER			77	86	91	94
FOREST			36**	60	73	79
COMMERCIAL	(85% IMPERVIOUS)		89	92	94	95
INDUSTRIAL	(72% IMPERVIOUS)		81	88	91	93
RESIDENTIAL						
AVERAGE LOT SIZE	% IMPERVIOUS					
1/8 ACRE OR LESS*	65		77	85	90	92
1/4-1/3 ACRE	34		59	74	82	87
1/2 - 1 ACRE	23		53	69	80	85
2-4 ACRES	12		46	66	78	82
FARMSTEAD			59	74	82	86
SMOOTH SURFACES (CONCRETE, ASPHALT, GRAVEL OR BARE COMPACTED SOIL)			98	98	98	98
WATER			98	98	98	98

*INCLUDES MULTI-FAMILY HOUSING UNLESS JUSTIFIED LOWER DENSITY CAN BE PROVIDED.

**CAUTION – CN'S UNDER 40 MAY PRODUCE ERRONIOUS MODELING RESULTS.

Exiting site conditions of bare earth or fallow shall be considered as meadow when choosing a C value

TABLE B-2 (CON'T)

- Runoff curve numbers for cultivated agricultural lands[1]

Cover Description			Curve numbers for hydrologic soil group			
Cover Type	Treatment[2]	Hydrologic condition[3]	A	B	C	D
Fallow	Bare Soil	--	77	86	91	94
	Crop residue cover (CR)	Poor	76	85	90	93
		Good	74	83	88	90
Row Crops	Straight Row (SR)	Poor	72	81	88	91
		Good	67	78	85	89
	SR + CR	Poor	71	80	87	90
		Good	64	75	82	85
	Contoured ©	Poor	70	79	84	88
		Good	65	75	82	86
	C + CR	Poor	69	78	83	87
		Good	64	74	81	85
	Contoured & Terraced (C&T)	Poor	66	74	80	82
		Good	62	71	78	81
	C&T + CR	Poor	65	73	79	81
		Good	61	70	77	80
Small grain	SR	Poor	65	76	84	88
		Good	63	75	83	87
	SR + CR	Poor	64	75	83	86
		Good	60	72	80	84
	C	Poor	63	74	82	85
		Good	61	73	81	84
	C + CR	Poor	62	73	81	84
		Good	60	72	80	83
	C&T	Poor	61	72	79	82
		Good	59	70	78	81
	C&T + CR	Poor	60	71	78	81
		Good	58	69	77	80
Close seeded or broadcast legumes or rotation meadow	SR	Poor	66	77	85	89
		Good	58	72	81	85
	C	Poor	64	75	83	85
		Good	55	69	78	83
	C&T	Poor	63	73	80	83
		Good	51	67	76	80

[1] Average runoff condition, and 1(a) = 0.2S

[2] Crop residue cover applies only if residue is on at least 5% of the surface throughout the year.

[3] Hydrologic condition is based on combination of factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas (b) amount of year round cover (c) amount of grass or close seeded legumes in rotations, (d) percent of residue cover on the land surface (good ≥ 20%), and (e) degree of surface roughness.

Poor: Factors impair infiltration and tend to increase runoff.

Good: Factors encourage average and better than average infiltration and tend to decrease runoff.

TABLE B-3

Runoff coefficients for the rational formula by hydrologic soil group and slope range (after Rawls et al., 1981).

	A			B			C			D		
Land Use	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]	0.13	0.16	0.11	0.15	0.21	0.14	0.19	0.26	0.18	0.23	0.31
	0.14[b]	0.18	0.22	0.16	0.21	0.28	0.20	0.25	0.34	0.24	0.29	0.41
Pasture	0.12	0.20	0.30	0.18	0.28	0.37	0.24	0.34	0.44	0.30	0.40	0.50
	0.15	0.25	0.37	0.23	0.34	0.45	0.30	0.42	0.52	0.37	0.50	0.62
Meadow	0.10	0.16	0.25	0.14	0.22	0.30	0.20	0.28	0.36	0.24	0.30	0.40
	0.14	0.22	0.30	0.20	0.28	0.37	0.26	0.34	0.44	0.30	0.40	0.50
Forest	0.05	0.08	0.11	0.08	0.11	0.14	0.10	0.13	0.16	0.12	0.16	0.20
	0.08	0.11	0.14	0.10	0.14	0.18	0.12	0.16	0.20	0.15	0.20	0.25
Residential	0.25	0.28	0.31	0.27	0.30	0.35	0.30	0.33	0.38	0.33	0.36	0.42
Lot size 1/8 acre	0.33	0.37	0.40	0.35	0.39	0.44	0.38	0.42	0.49	0.41	0.45	0.54
Lot size ¼ acre	0.22	0.26	0.29	0.24	0.29	0.33	0.27	0.31	0.36	0.30	0.34	0.40
	0.30	0.34	0.37	0.33	0.37	0.42	0.36	0.40	0.47	0.38	0.42	0.57
Lot size 1/3 acre	0.19	0.23	0.26	0.22	0.26	0.30	0.25	0.29	0.34	0.28	0.32	0.39
	0.28	0.32	0.35	0.30	0.35	0.39	0.33	0.38	0.45	0.36	0.40	0.50
Lot size ½ acre	0.16	0.20	0.24	0.19	0.23	0.28	0.22	0.27	0.32	0.26	0.30	0.37
	0.25	0.29	0.32	0.28	0.32	0.36	0.32	0.35	0.42	0.34	0.38	0.48
Lot size 1 acre	0.14	0.19	0.22	0.17	0.21	0.26	0.20	0.25	0.31	0.24	0.29	0.35
	0.22	0.26	0.29	0.24	0.28	0.34	0.28	0.32	0.40	0.31	0.35	0.46
Industrial	0.67	0.68	0.68	0.68	0.35	0.69	0.68	0.69	0.69	0.69	0.69	0.70
	0.85	0.85	0.86	0.85	0.53	0.86	0.86	0.86	0.87	0.86	0.86	0.88
Commercial	0.71	0.71	0.72	0.71	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
	0.88	0.88	0.89	0.89	0.89	0.89	0.89	0.89	0.90	0.89	0.89	0.90
Streets	0.70	0.71	0.72	0.71	0.72	0.74	0.72	0.73	0.76	0.73	0.75	0.78
	0.76	0.77	0.79	0.80	0.82	0.84	0.84	0.85	0.89	0.89	0.91	0.95
Open Space	0.05	0.10	0.14	0.08	0.13	0.19	0.12	0.17	0.24	0.16	0.21	0.28
	0.11	0.16	0.20	0.14	0.19	0.26	0.18	0.23	0.32	0.22	0.27	0.39
Parking	0.85	0.86	0.87	0.85	0.86	0.87	0.85	0.86	0.87	0.85	0.86	0.87
	0.95	0.96	0.97	0.95	0.96	0.97	0.95	0.96	0.97	0.95	0.96	0.97

[a] Runoff coefficients for storm recurrence intervals less than 25 years

[b] Runoff coefficients for storm recurrence intervals of 25 years or more

Existing site conditions of bare earth or fallow shall be considered as meadow when choosing a C value

TABLE B-4

-Manning roughness coefficients, n [1]

	Manning's n range [2]
I. Closed conduits:	
A. Concrete pipe	0.011–0.013
B. Corrugated-metal pipe or pipe-arch:	
1. 2⅔ by ½-in. corrugation (riveted pipe): [3]	
a. Plain or fully coated	0.024
b. Paved invert (range values are for 25 and 50 percent of circumference paved):	
(1) Flow full depth	0.021–0.018
(2) Flow 0.8 depth	0.021–0.016
(3) Flow 0.6 depth	0.019–0.013
2. 6 by 2-in. corrugation (field bolted)	0.03
C. Vitrified clay pipe	0.012–0.014
D. Cast-iron pipe, uncoated	0.013
E. Steel pipe	0.009–0.011
F. Brick	0.014–0.017
G. Monolithic concrete:	
1. Wood forms, rough	0.015–0.017
2. Wood forms, smooth	0.012–0.014
3. Steel forms	0.012–0.013
H. Cemented rubble masonry walls:	
1. Concrete floor and top	0.017–0.022
2. Natural floor	0.019–0.025
I. Laminated treated wood	0.015–0.017
J. Vitrified clay liner plates	0.015
II. Open channels, lined [4] (straight alinement): [5]	
A. Concrete, with surfaces as indicated:	
1. Formed, no finish	0.013–0.017
2. Trowel finish	0.012–0.014
3. Float finish	0.013–0.015
4. Float finish, some gravel on bottom	0.015–0.017
5. Gunite, good section	0.016–0.019
6. Gunite, wavy section	0.018–0.022
B. Concrete, bottom float finished, sides as indicated:	
1. Dressed stone in mortar	0.015–0.017
2. Random stone in mortar	0.017–0.020
3. Cement rubble masonry	0.020–0.025
4. Cement rubble masonry, plastered	0.016–0.020
5. Dry rubble (riprap)	0.020–0.030
C. Gravel bottom, sides as indicated:	
1. Formed concrete	0.017–0.020
2. Random stone in mortar	0.020–0.023
3. Dry rubble (riprap)	0.023–0.033
D. Brick	0.014–0.017
E. Asphalt:	
1. Smooth	0.013
2. Rough	0.016
F. Wood, planed, clean	0.011–0.013
G. Concrete-lined excavated rock:	
1. Good section	0.017–0.020
2. Irregular section	0.022–0.027
III. Open channels, excavated [4] (straight alinement, [5] natural lining):	
A. Earth, uniform section:	
1. Clean, recently completed	0.016–0.018
2. Clean, after weathering	0.018–0.020
3. With short grass, few weeds	0.022–0.027
4. In gravelly soil, uniform section, clean	0.022–0.025
B. Earth, fairly uniform section:	
1. No vegetation	0.022–0.025
2. Grass, some weeds	0.025–0.030
3. Dense weeds or aquatic plants in deep channels	0.030–0.035
4. Sides clean, gravel bottom	0.025–0.030
5. Sides clean, cobble bottom	0.030–0.040
C. Dragline excavated or dredged:	
1. No vegetation	0.028–0.033
2. Light brush on banks	0.035–0.050
D. Rock:	
1. Based on design section	0.035
2. Based on actual mean section:	
a. Smooth and uniform	0.035–0.040
b. Jagged and irregular	0.040–0.045
E. Channels not maintained, weeds and brush uncut:	
1. Dense weeds, high as flow depth	0.08–0.12
2. Clean bottom, brush on sides	0.05–0.08
3. Clean bottom, brush on sides, highest stage of flow	0.07–0.11
4. Dense brush, high stage	0.10–0.14
IV. Highway channels and swales with maintained vegetation [6] [7] (values shown are for velocities of 2 and 6 f.p.s.):	
A. Depth of flow up to 0.7 foot:	
1. Bermudagrass, Kentucky bluegrass, buffalograss:	
a. Mowed to 2 inches	0.07–0.045
b. Length 4–6 inches	0.09–0.05
2. Good stand, any grass:	
a. Length about 12 inches	0.18–0.09
b. Length about 24 inches	0.30–0.15
3. Fair stand, any grass:	
a. Length about 12 inches	0.14–0.08
b. Length about 24 inches	0.25–0.13
B. Depth of flow 0.7–1.5 feet:	
1. Bermudagrass, Kentucky bluegrass, buffalograss:	
a. Mowed to 2 inches	0.05–0.035
b. Length 4 to 6 inches	0.06–0.04
2. Good stand, any grass:	
a. Length about 12 inches	0.12–0.07
b. Length about 24 inches	0.20–0.10
3. Fair stand, any grass:	
a. Length about 12 inches	0.10–0.06
b. Length about 24 inches	0.17–0.09
V. Street and expressway gutters:	
A. Concrete gutter, troweled finish	0.012
B. Asphalt pavement:	
1. Smooth texture	0.013
2. Rough texture	0.016
C. Concrete gutter with asphalt pavement:	
1. Smooth	0.013
2. Rough	0.015
D. Concrete pavement:	
1. Float finish	0.014
2. Broom finish	0.016
E. For gutters with small slope, where sediment may accumulate, increase above values of n by	*0.002*
VI. Natural stream channels: [8]	
A. Minor streams [9] (surface width at flood stage less than 100 ft.):	
1. Fairly regular section:	
a. Some grass and weeds, little or no brush	0.030–0.035
b. Dense growth of weeds, depth of flow materially greater than weed height	0.035–0.05
c. Some weeds, light brush on banks	0.035–0.05
d. Some weeds, heavy brush on banks	0.05–0.07
e. Some weeds, dense willows on banks	0.06–0.08
f. For trees within channel, with branches submerged at high stage, increase all above values by	*0.01–0.02*
2. Irregular sections, with pools, slight channel meander; increase values given in 1a–e about	*0.01–0.02*
3. Mountain streams, no vegetation in channel, banks usually steep, trees and brush along banks submerged at high stage:	
a. Bottom of gravel, cobbles, and few boulders	0.04–0.05
b. Bottom of cobbles, with large boulders	0.05–0.07
B. Flood plains (adjacent to natural streams):	
1. Pasture, no brush:	
a. Short grass	0.030–0.035
b. High grass	0.035–0.05
2. Cultivated areas:	
a. No crop	0.03–0.04
b. Mature row crops	0.035–0.045
c. Mature field crops	0.04–0.05
3. Heavy weeds, scattered brush	0.05–0.07
4. Light brush and trees: [10]	
a. Winter	0.05–0.06
b. Summer	0.06–0.08
5. Medium to dense brush: [10]	
a. Winter	0.07–0.11
b. Summer	0.10–0.16
6. Dense willows, summer, not bent over by current	0.15–0.20
7. Cleared land with tree stumps, 100–150 per acre:	
a. No sprouts	0.04–0.05
b. With heavy growth of sprouts	0.06–0.08
8. Heavy stand of timber, a few down trees, little undergrowth:	
a. Flood depth below branches	0.10–0.12
b. Flood depth reaches branches	0.12–0.16
C. Major streams (surface width at flood stage more than 100 ft.): Roughness coefficient is usually less than for minor streams of similar description on account of less effective resistance offered by irregular banks or vegetation on banks. Values of n may be somewhat reduced. Follow recommendation in publication cited [8] if possible. The value of n for larger streams of most regular section, with no boulders or brush, may be in the range of	0.028–0.033

ORDINANCE APPENDIX C
SAMPLE DRAINAGE PERMIT APPLICATION

ORDINANCE APPENDIX C

SAMPLE – DRAINAGE PLAN APPLICATION

(TO BE ATTACHED TO THE "LAND SUBDIVISION PLAN OR DEVELOPMENT PLAN REVIEW APPLICATION" OR "MINOR LAND SUBDIVISION PLAN REVIEW APPLICATION)

APPLICATION IS HEREBY MADE FOR REVIEW OF THE STORM WATER MANAGEMENT AND EROSION AND SEDIMENTATION CONTROL PLAN AND RELATED DATA AS SUBMITTED HEREWITH IN ACCORDANCE WITH THE _____ TOWNSHIP STORM WATER MANAGEMENT AND EARTH DISTURBANCE ORDINANCE.

_____FINAL PLAN _____PRELIMINARY PLAN _____SKETCH PLAN

DATE OF SUBMISSION:_____

1. NAME OF SUBDIVISION OR DEVELOPMENT_____
   _____

2. NAME OF APPLICANT_____PHONE _._____
   _____
   (IF CORPORATION, LIST THE CORPORATIONS NAME AND THE NAMES OF TWO OFFICERS OF THE CORPORATION)
   ADDRESS_____
   _____ZIP_____

   APPLICANTS INTEREST IN SUBDIVISION OR DEVELOPMENT_____
   (IF OTHER THAN PROPERTY OWNER GIVE OWNERS NAME AND ADDRESS)

3. NAME OF PROPERTY OWNER_____PHONE_____
   ADDRESS_____
   _____ZIP_____

4. NAME OF ENGINEER OR SURVEYOR_____PHONE_____
   ADDRESS_____
   _____ZIP_____

5. TYPE OF SUBDIVISION OR DEVELOPMENT PROPOSED:

_____SINGLE-FAMILY LOTS	_____TOWNHOUSES	_____COMMERCIAL (MULTI-LOT)
_____TWO-FAMILY LOTS	_____GARDEN APT.	_____COMMERCIAL (ONE-LOT)
_____MULTI-FAMILY LOTS	_____MOBILE HOME PARK	_____INDUSTRIAL (MULTI-LOT)
_____CLUSTER TYPE LOTS	_____CAMPGROUND	_____INDUSTRIAL (ONE-LOT)
_____PLANNED RESIDENTIAL DEVELOPMENT	_____OTHER (_____)	

6. LINEAL FEET OF NEW ROAD PROPOSED_____L.F.

7. AREA OF PROPOSED AND EXISTING IMPERVIOUS AREA ON ENTIRE TRACT.

   A. EXISTING (TO REMAIN) _____S.F.

   B. PROPOSEED _____S.F.

8. STORM WATER

A. DOES THE PEAK RATE OF RUNOFF PROPOSED CONDITIONS EEXCEED THAT FLOW WHICH OCCURRED FOR REDEVELOPMENT CONDITIONS FOR THE DESIGNATED DESIGN STOM? _____

_____

_____

B. DESIGN STORM UTILIZED (ON-SITE CONVEYANCE SYSTEMS) (24 HR.)
(CHECK ONE)

____NO. OF SUBAREA _____
____WATERSHED NAME _____
____OTHER
EXPLAIN:_____

_____

C. IS THE PROPOSED RUNOFF REDUCED TO THE ALLOWABLE RELEASE RATE FOR THE SUBAREA IN WHICH THE SITE IS LOCATED FOR THE 2.33- AND THE 50-YEAR DESIGN STORM? _____

_____

_____

D. NUMBER OF SUBAREA FROM PLATE 1, VOLUME 1 TECHNICAL MANUAL OF THE CREEK WATERSHED STORM WATER MANAGEMENT PLAN. _____

_____

E. TYPE OF PROPOSED RUNOFF CONTROL _____

F. DOES THE PROPOSED STORM WATER CONTROL CRITERIA MEET THE REQUIREMENTS AND GUIDELINES OF THE STORM WATER ORDINANCES?_____
IF NOT, WHAT VARIANCES/WAIVERS ARE REQUESTED?_____

_____

REASONS WHY _____

_____

G. DOES THE PLAN MEET THE REQUIREMENTS OF ARTICLE III OF THE STORM WATER ORDINANCES?_____
IF NOT, WHAT VARIANCES/WAIVERS ARE REQUESTED?_____

_____

REASONS WHY _____

_____

H. WAS TR-55, JUNE 1986 UTILIZED IN DETERMINING THE TIME OF CONCENTRATION? _____

_____

I. IS A HYDRAULIC ROUTING THROUGH THE STORM WATER CONTROL STRUCTURE SUBMITTED?

_____

J. IS A CONSTRUCTION SCHEDULE OR STAGING ATTACHED?_____

K. IS A RECOMMENDED MAINTENANCE PROGRAM ATTACHED?_____

L. WHO WILL HAVE ULTIMATE MAINTENCNCE RESPONSIBILITY OF THE STORM WATER CONTROL FACILITIES?_____

9. EROSION AND SEDIMENT POLUTION CONTROL (E & S)

A. HAS THE STORM WATER MANAGEMENT AND E & S PLAN, SUPPORTING DOCUMENTATION AND NARRATIVE BEEN SUBMITTED TO THE _____COUNTY CONSERVATION DISTRICT?_____

_____

B. TOTAL AREA OF EARTH DISTURBANCE _____S.F.

10. WETLANDS

A. HAVE THE WETLANDS BEEN DELINEATED BY SOMEONE TRAINED IN WETLAND DELINEATION?

_____

B. HAVE THE WETLAND LINES BEEN VERIFIED BY STATE OR FEDERAL PERMITTING AUTHORITY?

_____

C. HAVE THE WETLAND LINES BEEN SURVEYED?_____

D. TOTAL ACREAGE OF WETLAND WITHIN THE PORPERTY._____

E. TOTAL ACREAGE OF WETLAND DISTURBED._____

F. SUPPORTING DOCUEMTNATION._____

11. FILING

A. HAS THE REQUIRED FEE BEEN SUBMITTED?_____
AMOUNT_____

B. HAS THE PROPOSED SCHEDULE OF CONSTRUCTION INSPECTION TO BE PRERFORMED BY THE APPLICANT'S ENGINEER BEEN SUBMITTED?_____

C. NAME OF INDIVIDUAL WHOM WILL BE MAKING THE INSPECTIONS._____

_____

D. GENERAL COMMENTS ABOUT STORM WATER MANAGEMENT AT DEVELOPMENT._____

_____

_____

_____

CERTIFICATE OF OWNERSHIP AND ACKNOWLEDGEMENT OF APPLICATION:
COMMONWEALTH OF PENNSYLVANIA COUNTY OF

On this the _____day of _____, 20____, before me, the undersigned officer, personally appeared _____who being duly sworn, according to law, desposes and says that _____owners of the property described in this application and that the application was made with_____ knowledge and/or direction and does hereby agree with the said application and to the submission of the same.

_____ _____
Property Owner Property Owner

My Commission Expires _____, 20____ _____
Notary Public or Officer

THE UNDERSIGNED HEREBY CERTIFIES THAT TO THE BEST OF HIS KNOWLEDGE AND BELIEF THE INFORMATION AND STATEMENTS GIVEN ABOVE ARE TRUE AND CORRECT.

SIGNATURE OF APPLICANT_____

//

(INFORMATION BELOW THIS LINE TO BE COMPLETED BY TOWNSHIP)

_____ TOWNSHIP OFFICIAL SUBMISSION RECEIPT:

DATE COMPLETE APPLICATION RECEIVED_____ PLAN NUMBER_____

FEES_____ DATE FEES PAID _____ RECEIVED BY _____

OFFICIAL SUBMISSION RECEIPT DATE _____

RECEIVED BY _____

_____TOWNSHIP
DRAINAGE PLAN
PROPOSED SCHEDULE OF FEES

SUBDIVISION NAME _____ SUBDIVISION NO._____

OWNER_____DATE_____

ENGINEER_____

1. FILING FEE $_____

2. LAND USE
   2A. SUBDIVISIONS, CAMPGOUNDS, MOBILE HOME PARKS, AND MULTI-FAMILY DWELLINGS WHERE THE UNITS ARE LOCATED IN THE SAME LOCAL WATERSHED. $_____
   2B. MULTI-FAMILY DWELLING WHERE THE DESIGNATED OPEN SPACE IS LOCATED IN A DIFFERENT LOCAL WATERSHED FROM THE PROPOSED UNITS. $_____
   2C. COMMERCIAL INDUSTRIAL. $_____

3. RELATIVE AMOUNT OF EARTH DISTURBANCE
   3A. RESIDENTIAL
      ROAD < 500 L.F. $_____
      ROAD 500-2,640 L.F. $_____
      ROAD > 2,640 L.F. $_____
   3B. COMMERCIAL/INDUSTRIAL AND OTHER
      IMPERVIOUS AREA < 3,500 S.F. $_____
      IMPERVIOUS AREA 3,500-43,560 S.F. $_____
      IMPERVIOUS AREA > 43,560 S.F. $_____

4. RELATIVE SIZE OF PROJECT
   4A. TOTAL TRACT AREA
      <1 AC $_____
      1-5 AC $_____
      5-25 AC $_____
      25-100 AC $_____
      100-200 AC $_____
      > 200 AC $_____

5. STORM WATER CONTROL MEASURES
   5A. DETENTION BASINS & OTHER CONTROLS WHICH REQUIRE A REVIEW OF HYDRAULIC ROUTINGS. ($ PER CONTROL) $_____
   5B. OTHER CONTROL FACILITIES WHICH REQUIRE STORAGE VOLUME CALCULATIONS BUT NO HYDRAULIC ROUTINGS. ($ PER CONTROL) $_____

6. SITE INSPECTION ($ PER INSPECTION) $_____

TOTAL $_____

ALL SUBSEQUENT REVIEWS SHALL BE ¼ THE AMOUNT OF THE INITIAL REVIEW FEE UNLESS A NEW APPLICATION IS REQUIRED AS PER SECTION 505 OF THE STORM WATER ORDINANCE. A NEW FEE SHALL BE SUBMITTED WITH EACH REVISION IN ACCORDANCE WITH THIS SCHEDULE.

ORDINANCE APPENDIX D
SAMPLE OCCUPANCY PERMIT APPLICATION

SAMPLE

OCCUPANCY PERMIT APPLICATION

Date_____

Property owner:

Leasee (if applicable) _____

Address_____

Location _____

Type of use _____

Name of Business _____
(If applicable)

Owner/Operator _____
(If applicable)

The applicant attests that he/she has complied with all of the _____ Township Ordinances prior to occupancy of the structure indicated above.

The following ordinances have been complied with:

	YES	NO	N/A
Subdivision Ordinance	____	____	____
Land Development Ordinance	____	____	____
Zoning Development	____	____	____
Building Permit	____	____	____
Storm Water Management and Earth Disturbance Ordinance	____	____	____
Street and Road Occupancy Permit	____	____	____

Signature of Applicant

_____ _____
Date

Signature of Issuing Agent

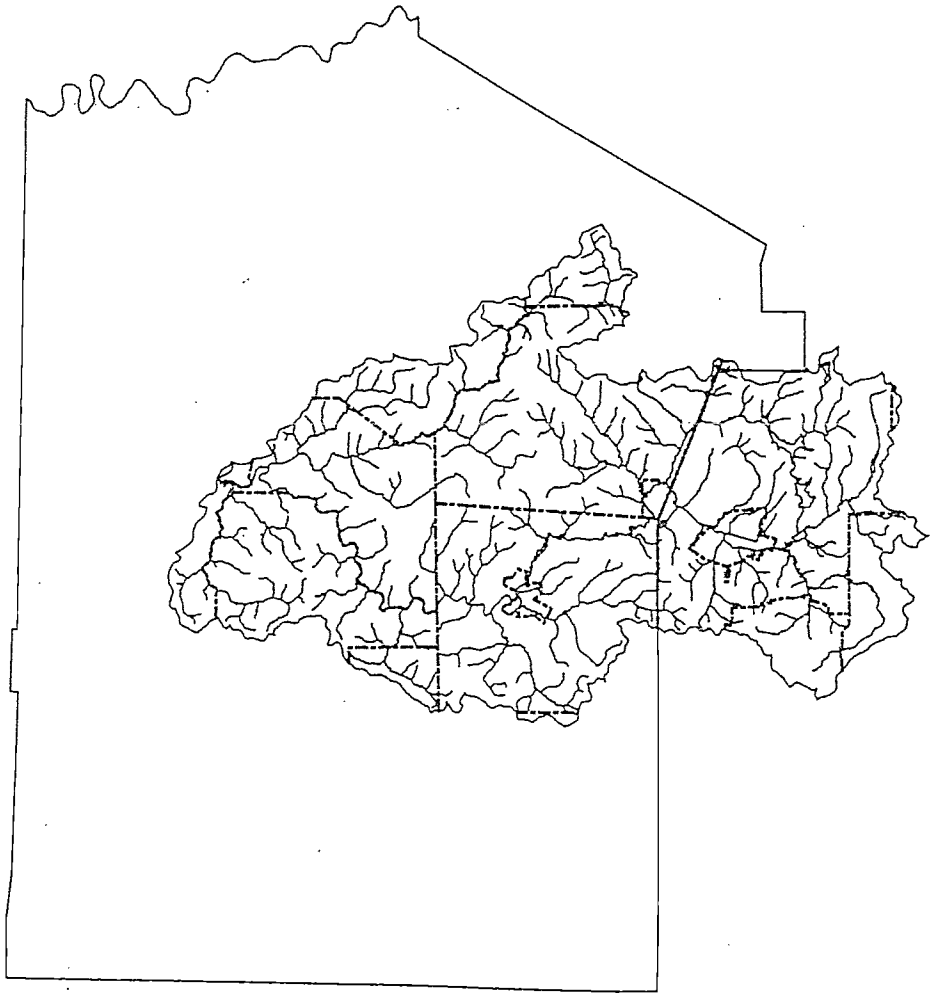
_____ _____
Date

Position: _____

ACT 167

WATERSHED STORM WATER MANAGEMENT PLAN

VOLUME II PLAN CONTENTS



JEFFERSON COUNTY, PENNSYLVANIA
FILE NO.. SWMP 259.33
PROJECT NO. 92020.12

JUNE, 1995

PREPARED FOR:

JEFFERSON COUNTY COMMISSIONERS
COUNTY COURTHOUSE
BROOKVILLE, PA 15825-9761

PREPARED BY:

JEFFERSON COUNTY
PLANNING COMMISSION
R.K.R. HESS ASSOCIATES

STANDARD	BENEFIT
Small Storm Detention Subwatersheds Those areas designated on Plate I and Volume I - Table 1 as small storm detention areas shall safely discharge runoff directly into an existing conveyance system with no detention or attenuation of greater than the 2-year storm.	Allows runoff to exit watershed system prior to peak.
Pervious Surfaces The use of pervious materials will be encouraged for parking surfaces and sidewalks.	Infiltration, groundwater recharge.
Structures Concentrate on locating facilities within areas conductive to recharge and design, accommodate recharge to meet release rate requirements.	Infiltration, groundwater recharge, stream baseflow.
Wetlands Network regulatory agencies involvement within wetland areas.	Infiltration, surface and groundwater recharge, stream baseflow, water quality, flow attenuation, detention.
Erosion and Sediment Pollution Control Network with Administrative and Regulatory agencies involvement with earth disturbance sites.	Infiltration, structure integrity, surface water quality, safe conveyance, stream, culvert, and channel capacity.
Steep Slopes Regulate activities in critical slope areas where management of storm water by structure is inappropriate.	Stream base flow, flow attenuation conveyance integrity, surface water quality.

Note: See Volume I and the Model Ordinance for more detailed standards and criteria.

1. Description of Performance Standard Districts

In performing the tasks for the Sandy Lick Creek Watershed Plan under Act 167, a major goal was to determine where in the watershed storm water detention was appropriate for new development and, just as importantly, where detention was not appropriate. It was also important to determine to what extent storm water detention would be required in individual subareas. Individual subareas would fall into one of three districts:

a. Small Storm Detention Districts: In these subareas, it was determined that it would be advantageous to not detain the runoff volume for the larger storms (greater than 2 year) but to allow it to exit the watershed before the peak reaches that particular subarea. It has been found that these areas still require control of the smaller (2-year storm post-development to 1-year pre-development rate) storms to maintain stream water quality. The objective is to detain the 2-year flow and release it at the 1-year predevelopment rate. At the same time the objective is to not attenuate the larger storms. This can be accomplished by configuration of the outlet structure to not control the larger storms, or by a bypass or channel to divert only the 2-year flood into the basin or divert flows in excess of the 2-year storm away from the basin.

b. Variable Storm Detention Districts: The post-development flow must be reduced to the pre-development flow for the design storms as follows:

Post-Development	Pre-Development
50	25
25	10
2	1

c. Standard Detention Districts: This post-development 50-year and 2-year peak rate of storm runoff must be controlled to the 50-year and 1-year pre-development peak respectively. Additionally, a routing or justification shall be performed to insure that the post-development 5-, 10-, and 25-year storms are within 10% of the pre-development 5-, 10-, and 25-year storms, respectively.

Development in those subareas designated on Plate I and Table 1 (Volume I), yet to be established as "small storm detention required" areas must convey the generated storm water runoff to a stream or watercourse in a safe manner. The conveyance must manage the quantity, velocity and direction of resulting storm water runoff in a manner which otherwise adequately protects health and property from possible injury pursuant to Act 167, does not overtax existing drainage facilities and does not cause erosion or sedimentation. Anyone who proposes no detention must show that the downstream natural or man-made channel or watercourse has the capacity within its banks to convey the 2-year design storm at velocities which are not erosive. Acceptable velocities shall be based upon criteria contained in the DER "Erosion and Sediment Pollution Control Program Manual". The 50-year design storm must also be safely conveyed by the stream and its overbanks without causing erosion or sedimentation, or creating any damage, safety or property hazard. The post-development flow greater than pre-development flow can only be released if it does not aggravate a significant obstruction or existing problem area or would overload existing storm sewer networks. If it would, proper storm water management, obstruction replacement or standard detention would be required. Additionally, any flow from the 50-year storm not carried by downstream

drainage facilities must be addressed and where necessary, additional controls installed to assure collection of this water by control facilities where required by the storm water design.

Proper analysis of channel capacity downstream of a development site for the purpose of discharging greater than predevelopment peak flow rates is essential for insuring that the goal of not creating any new problem areas or aggravating existing drainage problem areas is achieved. The analysis must include the assumption of complete build-out of the tributary areas to the channel being evaluated based upon the Future Land Use Map (Plate III, Volume II) or the latest zoning revision after plan adoption. Also, storm water control measures consistent with the Plan must be assumed in analyzing projected development tributary to the point of evaluation.

Culverts, bridges, stream enclosures or any other facilities proposed within the "Small Storm Detention Required" areas must pass flows for the 50-year design storm without causing a backwater which would act as a "detention basin" or meet more stringent DER criteria. Such facilities shall allow an unimpeded flow to be conveyed.

Stream channels, water courses or other conveyance facilities may be improved to meet the above requirements and alleviate existing capacity deficiencies as long as local, state, and federal requirements are met and permits obtained.

Any facilities that constitute stream enclosures or dams, as regulated by PADER Chapter 105 regulations (as amended or replaced from time to time by PADER), shall be designed in accordance with Chapter 105 and will require a permit from PADER. The definition of dam is defined in Chapter 105 regulations. Any roadway crossing including pipes, bridges, storm sewers or any other drainage conveyance facilities or any work involving wetlands as described in PADER Chapter 105 regulations shall be designed in accordance with Chapter 105 regulations and may require a permit from the Department. Any roadway crossing any facility located within a PADOT right-of-way must meet PADOT minimum design standards and permit submission requirements.

2. Sub-Regional (Combined Site) Storage

Traditionally, the approach to storm water management has been to control the runoff on an individual site basis. However, there is a growing commitment to finding cost-effective comprehensive control techniques which both preserve and protect the natural drainage system. In other words, two developers developing sites adjacent to each other could pool their capital resources to provide for a community storm water storage facility in the most hydrologic advantageous location.