LOWHILL TOWNSHIP

SUBDIVISION AND LAND DEVELOPMENT ORDINANCE

June 1971

As Amended

July 5, 1978
April 4, 1979
January 9, 1980
September 7, 1988
October 5, 1988
November 7, 1990
August 7, 1991
October 7, 1998

THE PREPARATION OF THIS ORDINANCE WAS FINANCED IN PART THROUGH AN URBAN PLANNING GRANT FROM THE U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT, UNDER PROVISION OF SECTION 701 OF THE HOUSING ACT OF 1954, AS AMENDED, ADMINISTERED BY THE BUREAU OF PLANNING, PENNSYLVANIA DEPARTMENT OF COMMUNITY AFFAIRS.

Prepared by

The Joint Planning Commission Lehigh-Northampton Counties

TABLE OF CONTENTS

SECTION I

GENERAL PROVISIONS

1.100 AUTHORITY AND TITLE

Lowhill Township pursuant to the Pennsylvania Municipalities Planning Code, Act 247 of 1968 hereby establishes this Ordinance which may be cited as the "Lowhill Township Subdivision and Land Development Ordinance".

1.200 All subdivision or land development of any lot, tract or parcel of land including new street, sanitary or storm sewer, water main or other improvement intended to be dedicated for public use or intended for the common use of occupants or tenants of buildings abutting thereon, shall comply with this Ordinance. A resubdivision shall be considered the same as a new subdivision herein.

This Ordinance shall also apply to previously approved subdivisions when the required improvements and other approved aspects of the subdivision in accordance with the terms of such approval have not been completed within three years of such approval.

This Ordinance shall also apply to the conveyance of agricultural conservation easements to the extent and as hereinafter set forth in this Ordinance.

1.300 All applications and plans for subdivision or land development in Lowhill Township shall be submitted to the Township Administrator for review and processing. The Township Planning Commission will then make a recommendation for action upon such application and plan to the Lowhill Township Board of Supervisors.

Prior to such review and approval of the proposed subdivision or land development plan by the Township, a copy of the plan shall be forwarded to the County Planning Commission for its review and report. The Township shall not approve such plan and application until the County report is received or until the expiration of forty-five (45) days from the date the application was forwarded to the County.

1.400 PURPOSE

This Ordinance has been adopted for the purpose of providing for the following:

a) Orderly future growth and development of the Township;

b) Protection and promotion of safety, health, welfare, convenience, economy and protection of the environment;

c) Reduction of foreseeable maintenance and improvement problems.

1.500 EFFECTIVE DATE

This Ordinance shall become effective five days from the date of its adoption by the Board of Township Supervisors.

SECTION II

DEFINITIONS

2.100 GENERAL

For the purpose of this Ordinance, words used in the present tense include the future tense; the term "shall" is always mandatory; other terms or words used herein shall be interpreted or defined as follows:

2.200 SPECIFIC TERMS

2.201 Administrator. The administrator designated by the Board of Supervisors to perform the administrative and/or supervisory duties required by the provisions of this Ordinance.

2.202 Alley. A permanent service way providing a secondary means of access to abutting lands.

2.203 Applicant. A landowner or developer, as hereinafter defined, who has filed an application for development including his heirs, successors and assigns.

2.203A Application for Development. Every application, whether sketch, preliminary or final, required to be filed and approved prior to the start of construction or development including but not limited to an application for a building permit, for the approval of a subdivision plat or plan or for the approval of a development plan.

2.203B Appointing Authority. The Board of Supervisors of Lowhill Township.

2.203C Authority. A body politic and corporate created pursuant to the Act of May 2, 1945 (P.L. 382, No. 164), known as the "Municipality Authorities Act of 1945".

2.204 Block. Property bounded on one side by a street, and other three sides by a street, railroad right-of-way, waterway, un-subdivided area or other definite barrier.

2.205 Board of Supervisors. The Board of Supervisors of Lowhill Township, Lehigh County, Pennsylvania.

2.206 Building Set-Back Line. A line which represents the minimum distance measured at right angles from the street right-of-way line abutting the property to any building or structure to be erected on the lot.

2.207 Planning Agency. The Lowhill Township Planning Commission.

2.208 Common Open Space. A parcel or parcels of land or an area of water, or a combination of land and water within a development site and designed and intended for the use or enjoyment of residents of a development, not including streets, off-street parking areas and areas set aside for public facilities.

2.209 Comprehensive Plan. The complete plan, or any part of its plan, for the development of Lowhill Township, prepared by the Commission and adopted in accordance with the Pennsylvania Municipalities Planning Code.

2.210 County. Lehigh County, Pennsylvania.

2.211 Crosswalk or Walkway. A strip of land including a right-of-way dedicated to public use in order to facilitate pedestrian access through or into a block.

2.212 Cul-de-sac. A minor street having one end open to traffic and being permanently terminated by a vehicular turnaround.

2.213 Developer. Any landowner, agent or such landowner or tenant with the permission of such landowner, who makes or causes to be made a subdivision of land or a land development.

2.213A Development Plan. The provisions for development, including a planned residential development, a plat of subdivision, all covenants relating to use, location and bulk of buildings and other structures, intensity of use or density of development, public streets, ways and parking facilities, common open space and public facilities. The phrase "provisions of the development plan" when used in this Act shall mean the written and graphic materials referred to in this definition.

2.214 Dwelling Unit. One or more rooms with provision for cooking, living, sanitary, and sleeping facilities arranged for the use of one family.

a) Dwelling Unit, Single-Family. A detached building, designed for or occupied exclusively by one family, except for a mobile home as defined below.

b) Dwelling Unit, Two-Family. A detached or semi-detached building where not more than two individual family or dwelling units are entirely separated by vertical walls and/or horizontal floors.

c) Reserved.

d) Dwelling Unit, Multi-Family. A building containing two or more dwelling units per building and being designed for occupancy of families living independently of each other.

2.215 Engineer. The Township Engineer designated by the Board of Supervisors to perform all supervisory duties required of a registered engineer by the provisions of this Ordinance.

2.216 Easement. A grant by the property owner of the use of a strip of land by the public, a corporation, or persons, for specified purposes.

2.216.1 Improved Street. A street which meets the minimum design requirements for a local access road (50/200 average daily traffic) or an existing State or Township paved, non-gravel road.

2.217 Land Development. Any of the following activities:

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

i) A group of two 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

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

2) A subdivision of land.

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

2.217A Landowner. The legal or beneficial owner or owners of land including the holder of an option or contract to purchase (whether or not such option or contract is subject to any condition), a lessee if he is authorized under the lease to exercise the rights of the landowner, or other person having a proprietary interest in land.

2.218 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.

a) Flag Type Lots. Lots which are designed with a corridor leading from the main portion of the lot to a public road.

2.219 Lot Line, Front. The street right-of-way line at the front of a lot. On a corner lot the owner may specify the front lot line on the plan.

2.220 Lot, Width of. The distance between the side lot line measured along the building setback line.

2.220A Mediation. A voluntary negotiating process in which parties in a dispute mutually select a neutral mediator to assist them in jointly exploring and settling their differences, culminating in a written agreement which the parties themselves create and consider acceptable.

2.221 Mobile Home Park. A parcel or contiguous parcels of land which has been so designated and improved that it contains two or more mobile home lots for the placement thereon of mobile homes.

a) Mobile Home Lot. A parcel of land in a mobile home park, improved with the necessary utility connections and other appurtenances necessary for the erections thereon of a single mobile home.

b) Mobile Home. A transportable, single family dwelling intended for permanent occupancy, contained in one unit, or in two or more units designed to be joined into one integral unit capable of again being separated for repeated towing, which arrives at a site complete and ready for occupancy except for minor and incidental unpacking and assembly operations, and constructed so that it may be used without a permanent foundation.

2.222 Official Map. A map adopted by ordinance pursuant to Article IV of the Pennsylvania Municipalities Planning Code.

2.223 Performance Guarantee. Any security which may be accepted by the Township in lieu of a requirement that certain improvements be made by the subdivider before the plan is approved, including corporate bonds, escrow agreements and other similar collateral or surety agreements.

2.224 Plan or Plat. A map or chart indicating the subdivision or resubdivision of land which in its various stages or preparation can include the following:

a) Sketch Plan. An informal plan, indicating salient existing features of a tract and its surroundings and the general layout of the proposed subdivision to be used as a basis for consideration by the Township.

b) Preliminary Plan. A tentative plan, in lesser detail than a final plan, showing approximate proposed streets and lot layout and such other information as required by this Ordinance.

c) Final Plan. A complete and exact plan, with professional engineers' or surveyors' seal affixed and prepared for official recording as required by this Ordinance to define property rights and proposed streets and other improvements.

2.225 Planned Residential Development. An area of land, controlled by a landowner, to be developed as a single entity for a number of dwelling units, or combination of residential and nonresidential uses, the development plan for which does not correspond in lot size, bulk, type of dwelling, or use, density, or intensity, lot coverage and required open space to the regulations established in any one district created, from time to time, under the provisions of a municipal zoning ordinance.

2.226 Public Grounds. Includes:

1) Parks, playgrounds, trails, parts and other recreational areas and other public areas;

2) Sites for schools, sewage treatment, refuse disposal and other publicly owned or operated facilities; and

3) Publicly owned or operated scenic and historic sites.

2.226A Public Hearing. A formal meeting held pursuant to public notice by the governing body or planning agency, intended to inform and obtain public comment, prior to taking action in accordance with this Act.

2.226B Public Meeting. A forum held pursuant to notice under the Act of July 3, 1986 (P.L. 388, No. 84), known as the "Sunshine Act".

2.227 Public Notice. Notice published once each week for two successive weeks in a newspaper of general circulation in the municipality. Such notice shall state the time and place of the hearing and the particular nature of the matter to be considered at the hearing. The first publication

shall not be more than thirty (30) days and the second publication shall not be less than seven (7) days from the date of the hearing.

2.228 Reverse Frontage Lots. Lots which front on one public street and back on another with vehicular access solely from one street.

2.229 Sewer Connection. The connection consisting of all pipes, fittings and appurtenances from the drain outlet of a house or mobile home to the inlet of the corresponding sewer pipe of the sewerage system.

2.230 Sewage Disposal System, Centralized. A public and/or private utility system designed to collect, centrally treat, and dispose of sewage from customers in compliance with Pennsylvania Department of Health regulations or regulations of the Township, whichever may be more stringent. In addition, said system shall be so organized as to come within the jurisdiction of the proper State agency or department.

2.231 Street. A strip of land, including the entire right-of-way intended for use as a means of vehicular and pedestrian circulation. Classes of streets according to use, function and width shall be so designated in the Comprehensive Plan or if not so designated shall conform with the following:

a) Arterial Street. "Arterial Streets" are those serving or anticipated to serve in excess of 5,000 vehicles per day.

b) Collector Street. "Collector Streets" are those which intercept minor streets, provide access to abutting properties and/or serve or are anticipated to serve between 500 and 5,000 vehicles daily.

c) Local Street. "Local Streets" are those used primarily to provide access to abutting property and serve or are anticipated to serve up to 500 vehicles daily.

1) Public or Publicly Dedicated Street. A street or roadway claimed and maintained by the Commonwealth or, in the case of the Township, a street or roadway for which the Township receives liquid fuels tax funds and which has been formally dedicated and accepted by the Township as a public street or, which has become a public street in accordance with the provisions of the Second Class Township Code.

2) Private Street. Any road or thoroughfare which is not a public, or publicly dedicated street.

2.232 Structure. Any man-made object having an ascertainable stationary location on or in land or water, whether or not affixed to the land.

2.233 Subdivider. The owner, or authorized agent of the owner, including but not limited to an individual, partnership or corporation that undertakes a subdivision or land development or any of the activities covered by this Ordinance, particularly the preparation of a subdivision plan showing the layout of the land and the public improvements involved therein. The term "developer" even though the personnel involved in successive stages of the project may vary.

2.234 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 ten acres, not involving any new street or easement of access of any residential dwelling, shall be exempted.

2.235 Subdivision and Land Development, Minor. Any division or development of a parcel of land into not more than three lots each lot being at least one acre in area and provided that no new street or easement for access is to be required. The enumerating of lots shall include as a lot that portion of the original tract or parcel remaining after other lots have been subdivided therefrom and shall be assigned a lot number.

2.235A Substantially Completed. Where, in the judgment of the municipal engineer, at least ninety (90) percent (based on the cost of the required improvements for which financial security was posted pursuant to Section 509 of the Pennsylvania Municipalities Planning Code) of those improvements required as a condition for final approval have been completed in accordance with the approved plan, so that the project will be able to be used, occupied or operated for its intended use.

2.236 Township. Lowhill Township, Lehigh County, Pennsylvania.

2.237 Township Supervisors. The Board of Supervisors of Lowhill Township, Lehigh County, Pennsylvania.

2.238 Travel Trailer. A vehicle, less than 35 feet in length, used for temporary living or sleeping purposes which stands on wheels.

2.239 Water Connection. The connection consisting of all pipes, fittings and appurtenances from the water pipe to the water inlet pipe of the distribution system within the dwelling or nonresidential unit.

2.240 Water Supply System, Central. A public and/or private utility system designed to transmit water from a common source to customers, in compliance with Pennsylvania Department of Environmental Resources regulations or regulations of the Township, whichever may be more stringent. In addition, said system shall be so organized as to come within the jurisdiction of the proper State agency or department.

2.241 Water Survey. An inventory of the source, quantity, yield and use of groundwater and surface-water resources within a municipality.

SECTION II-A

ADVISORY REPORT FOR CONVEYANCE OF AGRICULTURAL CONSERVATION EASEMENTS

2A.100 PURPOSE

The purpose of the Advisory Report is to enlighten, educate and inform the landowner in advance of any conveyance of an agricultural conservation easement covering an area less than the perimeter of the landowner's tract(s), of the possible effects of such a conveyance and the potential for being unable to develop the remainder of the tract by reason of existing federal, state and/or municipal laws, regulations and ordinances.

2A.101 APPLICATION OF THE ARTICLE

Whenever a landowner proposes to convey an agricultural conservation easement covering an area less than the perimeter of the landowner's tract(s), the landowner shall obtain an Advisory Report from the Township pursuant to this Section and such Advisory Report shall be submitted to the Lehigh County Conservation Easement Administrator.

2A.102 ADVISORY REPORT PROCEDURE

a) Submission. The submission shall consist of the maps prepared for use by the County of Lehigh in its Conservation Easement Program or, in the event of the unavailability of said maps, then, the landowner shall comply with the requirements for a sketch plan pursuant to the provisions of this Ordinance. Specifically, the landowner's submission shall designate the entire proposed Agricultural Conservation Easement Area as well as that portion of such additional area which will be reserved from the grant of the Agricultural Conservation Easement by the landowner.

b) Advisory Report Requirements. Within sixty (60) days from the date the Administrator accepts the landowner's plan for review, the Planning Commission shall prepare and submit to the Board of Supervisors an Advisory Report which shall comment on the following:

1) The present suitability of the reserved land for development.

2) The requirement that the land will have to be suitable for the location of an on-lot sewage disposal system or other appropriate means of treating sewage generated from the lot under regulations as shall apply at the time the area is proposed to be developed.

3) The existence of certain other provisions in the Township Ordinances dealing with floodplains, high water tables, steep slopes and the like which may have limiting effects on the ability to develop the land.

4) The existence of external requirements such as the necessity to obtain a highway occupancy permit from either the Pennsylvania Department of Transportation or the municipality to obtain access to the subject area.

5) The existence of zoning ordinances and state procedures which are subject to alteration and change which may or may not render the area suitable for the landowner's intended purpose in the future.

6) The fact that the Advisory Report does not constitute subdivision approval under the provisions of this Ordinance.

7) Any other relevant municipal comments which pertain to the matter before the Township.

c) Review by Board of Supervisors. If the Board of Supervisors concurs with the comments of the Commission, it shall approve the recommended Advisory Report and forward it to the Lehigh County Conservation Easement Administrator and the landowner. Otherwise, the Board of Supervisors shall prepare its own Advisory Report and submit it to the said County official and the landowner.

d) Filing of Advisory Report. A copy of the Advisory Report shall be attached to the deed or other document which conveys the Agricultural Conservation Easement and as such shall be recorded with the document filed with the Recorder of Deeds Office.

SECTION III

SUBMISSION, REVIEW AND ADMINISTRATION

3.100 GENERAL PROCEDURES FOR PLAN SUBMISSION AND APPROVAL

A sketch plan shall be submitted to the Administrator by the owner of any land to be subdivided, resubdivided or developed, for the purpose of classification and preliminary discussion of the proposed subdivision or land development. If the subdivision or land development is classified as major then a preliminary and final plan will be required; if however, it is classified as minor, then the preliminary plan may be omitted.

Preliminary subdivision and land development plan, application and fees together with all supporting data shall be submitted to the Administrator. After such a submission, two copies shall be sent to the County Planning Commission and copies shall be sent to the Soil Conservation Service, Pennsylvania Department of Environmental Protection, Township Solicitor, Utility Companies and the Engineer for their review and report. A public hearing may then be held on the Preliminary Plan by the Planning Commission after which the Commission shall determine the conformity of the Preliminary Plan with this Ordinance, and shall thereupon recommend approval or disapproval of said Preliminary Plan to the Township Board of Supervisors. The Board of Supervisors shall then take action upon the application and plan, subject where applicable, to the proper installation or guarantee of street or other improvements and subject to the receipt of an acceptable Final Plan.

After receiving approval of a Preliminary Plan, the subdivider shall then either install or guarantee the installation of the improvements required in the subdivision or land development. The installation of the improvements shall be for all or for a portion of the subdivision or land development as approved by the Township Supervisors. The Final subdivision and land development plan, application and fees together with supporting data shall be submitted to the Administrator. Upon review of said Final Plan and approval by the Township Supervisors, the subdivider shall within ninety days, officially record the Final Plan in the Recorder of Deeds office of the County. Lots may then be sold and building development may then take place.

3.101 Upon submission of a sketch plan, required filing fee and agreement to pay all engineering and legal review fees, any subdivider and/or land developer, with the written consent of the record property owner(s), may submit a written request to the Board of Supervisors and Township Planning Commission asking that the Board of Supervisors waive the subdivision and/or land development process and

the compliance with the terms, conditions and requirements of the Subdivision and Land Development Ordinance, as amended, with respect to the subject matter fairly described on the sketch plan.

3.102 Upon receipt of such sketch plan, and after the time for receiving comments from Township Planning Commission shall have elapsed or such comments shall have been received, whichever occurs first, the Board Supervisors may, in its sound discretion, grant the written request for waiver from the subdivision and/or land development process and compliance with the terms, conditions and requirements of the Subdivision and Land Development Ordinance, as amended, provided that all of the following matters are resolved, and supporting evidence is presented, to the satisfaction of the Board of Supervisors:

a) The area and/or improvements, along with all related structures and curtilage and areas connecting these things, which might or do qualify as a "subdivision" and/or "land development" within the meaning of the Municipalities Planning Code shall take up no more than 4,000 square feet; and

b) The parent tract containing such area and/or improvements shall have at least five contiguous acres in Lowhill Township in a single legal description and under the same ownership; and

c) The area and/or improvements, along with all related structures and curtilage and areas connecting these things, when used in accordance with the sketch shall qualify as a use permitted by right, special exception or conditional use within the zoning district within which it would be found at the time of the submission of the sketch plan; and

d) The area and/or improvements, along with all related structures and curtilage and areas connecting these things, when used in accordance with the sketch shall not require extraction, generation or use of water or facilities for disposal of sewage; and

e) Waiver of the subdivision and/or land development process and the compliance with the terms, conditions and requirements of the Subdivision and Land Development Ordinance, as amended, with respect to the subject matter fairly described on the sketch plan would not harm the interest of the health, safety and general welfare of the public; and

f) The property owner, subdivider and/or land developer agree, in a written agreement intending to bind their successors, heirs and assigns to be recorded in the office of Recorder of Deeds, to allow periodic inspections by designated appointees of the Township of the subject areas and/or improvements to

(i) determine the compliance of the subdivider and land developer with all other legal authority and (ii) ensure the current condition and use of the subject area and/or improvements is substantially the same as when it was described in the sketch submission; and

g) The property owner, subdivider and/or land developer recognize in said agreement that failure to comply with such legal authority and/or maintain the condition and use of the subject area and/or improvements as substantially the same as when it was described in the sketch submission shall qualify as a violation of the Township Subdivision and Land Development Ordinance of 1971, as amended.

3.200 SPECIFIC PROCEDURES FOR PLAN SUBMISSION AND APPROVAL

All plans, applications and supporting data shall be submitted in person or by certified mail, to the Administrator who, with or without the assistance of the Engineer shall check their compliance with this Ordinance. The Administrator shall then take any action required under this Ordinance and shall transmit copies of the application and plan to the County Planning Commission. He shall also refer the plan to other agencies or individuals for their review and comment.

All plans and applications shall be reviewed by the Commission at their next regularly scheduled meeting after receipt of the plans by the Administrator, provided that such plans are received at least two weeks prior to the regularly scheduled meeting.

The subdivider, land developer or his duly authorized representative, shall upon request attend the Commission meetings to discuss the Plan. The specified plans which shall be submitted are described below:

3.201 Sketch Plan. The subdivider shall submit a Sketch Plan Application. Such application shall include six copies of a Sketch Plan with information required in Section 3.301 and necessary supporting data. The Sketch Plan Application shall be for the purpose of establishing in advance, the overall objectives of the subdivider, the extent to which the proposed subdivision conforms with the provisions of this Ordinance and all ordinances of the Township and if said plan shall qualify as a major or minor subdivision or land development.

The Commission shall review the Sketch Plan to determine its conformance to the standards contained in this Ordinance and other applicable municipal ordinances and shall require or recommend such changes and modifications as it shall deem necessary or advisable in the public interest to the Township Supervisors for action.

No recommendation shall be made by the Township Planning Commission nor action taken by the Township Supervisors until the Township has received and considered the written report of the County Planning Commission, provided, however, that if the County Planning Commission shall fail to report within forty-five (45) days from the date the Sketch Plan was forwarded, then the Township may officially act without having received and considered such report. In no event shall the Board of Supervisors or the Planning Commission render its decision and communicate it to the applicant later than ninety (90) days following the date of the regular meeting of the Planning Commission following the date the application is filed, provided that should the said next regular meeting occur more than thirty days following the filing of the application, the said ninety (90) day period shall be measured from the thirtieth day following the day the application has been filed.

Submission of a Sketch Plan shall not constitute official submission of a subdivision or land development plan to the Township.

Within six months of Sketch Plan review, the subdivider or developer shall submit an application for approval of the Preliminary or Final Plan as required. Failure to do so shall require resubmission of Sketch Plan to the Planning Commission.

3.202 Preliminary Plan. Developers shall submit five copies of a completed form provided by the Administrator entitled "Application for Subdivision or Land Development" and ten copies of the Preliminary Plan and five copies of the street profiles and cross-sections and other necessary supporting data to the Administrator in person or by certified mail accompanied by the required fee in accordance with the current fee schedule.

a) Submission Receipt. After the Commission has determined that the Preliminary Plan submission includes the required material as specified by this Ordinance, the Commission shall issue a receipt for the Preliminary Plan at a regular meeting provided that this Preliminary Plan was submitted at least two weeks prior to said meeting.

b) Referrals. Within five days of submission receipt date, the Administrator shall refer the plan to the County Planning Commission and may refer as necessary the plan and supporting data as follows:

Agency or Individual	Plan	Supporting Documents
County Planning Commission	2	1
Pennsylvania Department of Transportation	1	1
Pennsylvania Department of Environmental Protection	1	
U.S. Soil Conservation Service	1	
Engineer	1	1
Solicitor	1	
Utility Companies	1	

c) Township Planning Commission Action. The Commission may hold a public hearing on the Preliminary Plan within sixty (60) days of the submission receipt date. Comments from the above reviewers will be considered if such comments are received within forty-five (45) days from the date the plan was forwarded to such agency or individual. The Commission shall determine the extent to which the plan complies with this Ordinance and shall recommend to the Township Supervisors that the Plan be approved entirely, that it be conditionally approved or disapproved. The Township Board of Supervisors shall then take final action on the plan within ten days. Failure of the Board of Supervisors to render a decision and communicate it to the applicant and Commission shall be deemed a concurrence with the Planning Commission's recommendation. In no event shall the Board of Supervisors or the Planning Commission render its decision and communicate it to the applicant later than ninety (90) days following the date of the regular meeting of the Planning Commission following the date the application is filed, provided that should the said next regular meeting occur more than thirty days following the filing of the application, the said ninety day period shall be measured from the thirtieth (30) day following the day the application has been filed.

The decision of the Township Supervisors or the Township Planning Commission shall be in writing and shall be communicated to the applicant personally or mailed to him at his last known address not later than fifteen days following the decision.

Any approval of a Preliminary Plan shall be subject to a guarantee of the installation of improvements as provided below and subject to the receipt of an acceptable Final Plan.

The approval of the Commission, if requested by the subdivider may permit the undertaking of the required improvements and of the preparation of the Final Plan to be completed in a series of stages or sections, each covering a portion of the entire proposed subdivision as shown on the Preliminary Plan.

3.203 Final Plan. Developers shall have one year from the date of the Preliminary Plan approval in which to submit a Final Plan. Any extension required shall be requested in writing to the Administrator and the Commission may grant such extension.

a) Submission. The Final Plan shall be submitted after the approval of the Preliminary Plan and the completion of all improvements or the posting of adequate security in lieu of improvements as required by this Ordinance and as may be required by the conditional approval of the Preliminary Plan.

Said Final Plan may include all or a portion of the area shown on the Preliminary Plan as approved by the Commission. It shall be accompanied by three copies of the Application for Subdivision or Land Development and the required fee in accordance with the current fee schedule.

Six blue or black line prints and an original tracing in waterproof ink on a permanent reproducible material acceptable to the Administrator accompanied by a special warranty deed to all lands to be dedicated to the public and stating that the title thereof is good and marketable and unencumbered. This Final Plan as approved will be used for official recording of the subdivision and/or land development.

b) Submission Receipt. After the Commission has determined that the Final Plan submission includes the required material as specified by this Ordinance, the Commission shall issue a receipt for the Final Plan. The time of submission shall be considered to be the date of the regular monthly meeting of the Planning Commission provided that the Final Plan was submitted at least two weeks prior to said meeting.

c) Referrals. Within five days of submission receipt date, the Administrator shall send two copies of the Plan and one copy of the required supporting documents to the County Planning Commission. It shall have forty-five (45) days from the date the application was forwarded to them in which to report on the Plan.

d) Action. The Commission and/or the Engineer will examine the plan to ascertain (1) the technical details of the plan itself have been checked and found satisfactory, and (2) all required improvements have been satisfactorily completed unless adequate security has been filed for completion of the work as specified in this Ordinance.

The Commission may hold a public hearing if the Final Plan departs substantially from the Preliminary Plan. After the copy of the Final Plan has been checked, the Commission will recommend to the Township Board of Supervisors that the Final Plan be approved or disapproved. If the Township Board of Supervisors concur, they shall enter any approval in writing upon the Final Plan along with the signatures of the Board Chairman, Secretary and the date. The approval of the Final Plan by the Township Board of Supervisors shall not constitute an acceptance of the dedication of any street or other proposed public way, space or area shown on said plan. Any such acceptance shall be specifically stated along with the signatures required above.

The Administrator shall communicate the Board of Supervisors' decision in writing to the applicant not later than fifteen days following the decision. When the application is not approved, the decision shall specify defects found in the application and describe the requirements which have not been met and shall, in each case, cite the provisions of the statute or ordinance relied upon.

In no event shall the Board of Supervisors or the Planning Commission render its decision and communicate it to the applicant later than ninety (90) days following the date of the regular meeting of the Planning Commission following the date the application is filed, provided that should the said next regular meeting occur more than thirty days following the filing of the application, the said ninety day period shall be measured from the thirtieth (30) day following the day the application has been filed.

Failure of the Board to render a decision within this time and in the manner specified shall be deemed an approval of the Final Plan as presented unless the applicant has agreed in writing to an extension of time or change of the prescribed manner of notification.

3.300 PLAN REQUIREMENTS

All Sketch, Preliminary and Final plans submitted for approval shall meet the requirements outlined in the following sections.

3.301 Information To Be Shown On All Plans. All Sketch, Preliminary and Final plans shall contain the following data, legibly drawn to scale.

a) Name and address of record owner.

b) Name of sudivider or developer if different than owner.

c) Proposed name of subdivision or land development.

d) Tract boundaries, if appropriate, showing bearings and distances.

e) Rights-of-way or other restrictive covenants which might affect land development.

f) Site data showing acres of entire tract, number of lots and zoning district.

g) Proposed and existing street(s) on, immediately adjoining, and providing access from the tract to the nearest improved streets, including name(s) right(s)-of-way, width, street(s) surface and lineal feet of all such street(s), with lot layout and approximate dimensions of lots.

h) North arrow, indicating whether the Meridian is Magnetic or True.

i) Graphic scale.

j) Date.

k) Name of Registered Engineer, Surveyor, Qualified Planner, Architect or Landscape Architect responsible for the plan, provided, however, that all Final Plans must bear the seal of a Registered Engineer or Surveyor.

l) The names of owners or subdivisions of all adjoining properties.

m) All existing water courses, streams, ponds, lakes, swamps and their names, etc.

n) A small location map at a scale of one inch equals 2,000 feet accurately traced from the Township base map. It shall show the location of the proposed development in relation to major Township roads and other points of reference.

3.302 Additional Information To Be Shown On Preliminary and Final Plans

a) Plans shall be prepared on a standard sheet of either 15 inches by 21 inches, 24 inches by 36 inches or 30 inches by 42 inches.

b) Plans should be drawn at a scale of one inch equals 50 or 100 feet provided all courses, metes, bounds and other information can be legibly and accurately presented on the plan.

c) Location, width and purpose of existing and proposed easements, utilities and improvements.

d) Tax map sheet, block and lot numbers from the County tax assessor's office.

e) Copies of the proposed deed restrictions, protective and restrictive covenants referenced to the drawing.

f) Certification of on-lot sewage system: When the subdivision is to be served by individual on-lot sewage disposal systems, the developer shall submit two copies of the on-lot sewage disposal report certified by the Pennsylvania Department of Environmental Resources, that an approved sewage system can be installed on every lot except lots not to be improved, such as, but not by way of limitation, lots to be used for purely agricultural purposes.

3.303 Additional Information To Be Shown On Preliminary Plan Only. The following information shall be shown on or accompanying the Preliminary Plans:

a) Swampy areas and areas subjected to annual flooding and other conditions which would adversely affect the subdivision or land development.

b) Site amenities such as outstanding views, significant tree masses, major rock outcrops.

c) Map of entire holdings of owner (not necessarily to the same scale), indicating area or scope of proposed subdivision.

d) Sketch Plan of proposed road system for the remainder of the area not included in the Preliminary Plan.

e) Dimensions of streets, lots and proposed community areas.

f) Proposed street names.

g) Contours at vertical intervals not greater than five feet.

h) Building setback or front yard lines.

i) Preliminary profiles, typical cross-sections and specifications for proposed street improvements, sanitary and storm sewage and water systems.

j) Water Supply: Whenever water is to be provided by means other than by private wells owned and maintained by the individual owners of lots within the subdivision or development, applicants shall present evidence to the Board of Supervisors or planning agency, as the case may be, that the subdivision or development is to be supplied by a certified public utility, a bona fide cooperative association of lot owners, or by a municipal corporation, authority or utility. A copy of a Certificate of Public Convenience from the Pennsylvania Public Utility Commission or an application for such certificate,

a cooperative agreement, or a commitment or agreement to serve the area in question, whichever is appropriate, shall be acceptable evidence.

k) Certification of central sewage disposal system:

1) Public: When the subdivision is to be served by a sewer company or authority, the developer shall submit two copies of a letter from the company or authority which states that the company or authority can adequately serve the subdivision.

2) Private: When the subdivision is to be served by a private central sewage disposal system, the developer shall submit two copies of a letter from the Pennsylvania Department of Environmental Resources which states that the system meets the State of Pennsylvania's minimum requirements.

l) Reserved.

m) The following additional data shall be submitted upon request of the Township Planning Commission:

1) Subsurface conditions of the tract.

2) Drainage plan which shows storm sewers, culverts, natural water courses, drainage easements and existing and proposed topographic contours.

3.304 Information To Be Shown On Final Plan Only

a) The Final Plan shall conform with the Preliminary Plan as modified by the Commission comments at the time of its conditional approval of the Preliminary Plan.

b) It shall not be necessary to resubmit supportive data submitted with the Preliminary Plan, provided there has been no change.

c) The boundary lines of the area being subdivided. These boundaries shall be determined by accurate field survey, closed with an error not to exceed one in five thousand and balanced.

d) Street lines, lot lines, rights-of-way, easements, community or public areas and areas to be dedicated.

e) Sufficient bearings, lengths of lines, radii, arc lengths, street widths, right-of-way and easement widths, of all lots, streets, rights-of-way, easements, and community or public areas, to accurately and completely reproduce each and every course on the ground.

f) All dimensions shall be shown in feet and hundredths of a foot.

g) All bearings shall be shown to at least the nearest ten seconds of arc.

h) Block and/or lot numbers.

i) Location and type of permanent monuments and markers.

j) Certificate of dedication of streets and other public property.

k) Certification by a registered engineer or registered land surveyor stating that (1) the plot represents a survey made by him and that all monuments indicated thereon actually exist and their location, size and material are correctly shown and (2) that all requirements of the subdivision and land development ordinance have been fully complied with.

l) The latest source of title to the land as shown by the deed, page number and book of the County Recorder, accompanied by an affidavit signed by the record owners of the parcel being subdivided.

m) A place on the plan for approval by the Commission and for the enforcement of the Board of Supervisors - Chairman and Secretary's names and the date.

n) Final profiles, cross-sections, and specifications for street improvements, and sanitary and storm sewage, and water distribution systems shall be shown on one or more separate sheets.

3.400 GUARANTEE OF IMPROVEMENTS

3.401 Guarantee of Construction. The Final Plan shall be accompanied by one of the following:

a) A certificate that all required improvements and installations to the subdivision have been made or installed in accordance with this Ordinance; or

b) A corporate bond, certified check or other security filed with the Township which shall:

1) Be made payable to the Township.

2) Be in an amount determined by the Township Supervisors to be sufficient to complete the improvements and installations in compliance with this Ordinance. In the case where the Commission has authorized the submission of the Final Plan in stages or sections, the amount of the security may also be provided in stages if acceptable to the Supervisors.

3) Be with a surety satisfactory to the Township.

4) Specify the time for the completion of the improvements and installations, such time to be satisfactory to the Township Supervisors.

c) When the developer has completed all of the necessary and appropriate improvements, he shall notify the Township Board of Supervisors, in writing, by certified mail or registered, of the completion of the aforesaid improvements and shall send a copy thereof to the Township Engineer. The Township Board of Supervisors shall, within ten days after receipt of such notice, direct and authorize the Township Engineer to inspect all of the aforesaid improvements. The Engineer shall, thereupon, file a report, in writing, with the Supervisors, and shall promptly mail a copy of the same to the developer by certified or registered mail. The report shall be made and mailed within thirty days after receipt by the Engineer of the aforesaid authorization from the Township Board of Supervisors; said report shall be detailed and shall recommend approval or rejection of said improvements either in whole or in part, and if said improvements, or any portion thereof, shall not be approved or shall be rejected by the Engineer, said report shall contain a statement of reasons for such non-approval or rejection.

The Township Board of Supervisors shall consider the Engineer's report and render a decision to the developer, in writing, by certified or registered mail.

If the Township Board of Supervisors or the Township Engineer fail to comply with the time limitation provisions contained herein, all improvements will be deemed to have been approved and the developer shall be released from all liability, pursuant to its performance security.

d) If said improvements have been rejected in whole or in part by the Board of Supervisors, the developer shall proceed to complete the same. He would follow the same procedure for notification upon completion as described above.

In the event that the improvements are not finally acceptable, the Board of Supervisors is hereby granted the power to enforce any corporate bond or other security by appropriate legal and equitable means. If the bond or security are insufficient to complete installation, then the Board shall be empowered to institute appropriate legal or equitable action to recover the monies necessary to complete the remainder of the improvements.

3.402 Maintenance Guarantee. The Final Plan shall also be accompanied by a maintenance guarantee in an amount of not less than ten percent of the Township Engineer's estimate, approved by the Supervisors, of the construction cost of all required improvements, guaranteeing that the developer shall maintain all such

improvements in good condition for a period of two years after completion of all such improvements and approval of all such improvements by the Township Board of Supervisors.

3.500 RECORDING OF FINAL PLAN

Upon the approval of a Final Plan, the subdivider shall within 90 days of such final approval record such plan in the office of the Recorder of Deeds of the County. The Recorder of Deeds of the County shall not accept any plan for recording unless such plan notes the approval of the Township Board of Supervisors and the reviews of the Township Planning Commission and the Joint Planning Commission, Lehigh-Northampton Counties.

3.600 RECORDS, REVISIONS AND RESUBDIVISIONS, FEES

3.601 A revision or resubdivision of a recorded plan of an approved Final Plan shall be considered as a new subdivision and shall come under the jurisdiction of this Ordinance.

3.602 Township Records. The Administrator shall keep a record of the findings, decisions and recommendations relative to all subdivision plans recommended for action to the Township Board of Supervisors. Such records shall be open to the public for review.

The Secretary of the Township Board of Supervisors shall also keep a record of the findings, decisions and recommendations relative to all subdivision plans filed for action by the Board of Supervisors. Such records shall be open to the public for review.

3.603 Fees. The subdivider or developer shall pay the initial subdivision fees customarily charged by the Township according to the Township's fee schedule which schedule shall be set from time to time by Resolution of the Board of Supervisors and the subdivider or developer shall also reimburse the Township for engineering services, and legal fees incurred in the processing of the subdivision map, improvements and maintenance agreement and recording costs as well as any other incidental expenses reasonably incurred by the Township respecting the subdivision. The Township may, at any time during the course of the plan's review require the subdivider or developer to reimburse the Township for costs incurred to given times, or at the Township's option, require the subdivider or developer to place a sufficient sum in escrow (said sum to be determined solely by the Township) to cover the costs and fees, as hereinabove provided, which the Township estimates it will reasonably incur during the processing and review of the subdivision application and plan. Any amounts which have been placed in escrow in excess of the amounts hereinabove referred to, shall be returned to the individual or entity from which the funds were received, following final plan approval.

3.700 MODIFICATIONS, VARIANCES, APPEALS AND AMENDMENTS

3.701 Modifications

a) The Board of Supervisors or the planning agency, if authorized to approve applications within the subdivision and land development ordinance, may grant a modification of the requirements of one or more provisions if the literal enforcement will exact undue hardship because of peculiar conditions pertaining to the land in question, provided that such modification will not be contrary to the public interest and that the purpose and intent of the ordinance is observed.

b) All requests for a modification shall be in writing and shall accompany and be a part of the application for development. The request shall state in full the grounds and facts of unreasonableness or hardship on which the request is based, the provision or provisions of the ordinance involved and the minimum modification necessary.

c) If approval power is reserved by the Board of Supervisors, the request for modification may be referred to the planning agency for advisory comments.

d) The Board of Supervisors or the planning agency, as the case may be, shall keep a written record of all action on all request for modifications.

3.702 Reconsideration and Appeals. Any subdivider aggrieved by a finding, decision or recommendation may request and receive opportunity to appear, present additional relevant information, and request reconsideration and/or appeal of the original finding, decision or recommendation.

3.703 Procedure for Applying. Applications for modification, variances and appeals shall be submitted in writing. The application shall state fully the grounds and all the facts relied upon by the applicant.

3.704 Appeals. The decisions of the Board of Supervisors with respect to the approval or disapproval of subdivision or land development plans may be appealed directly to court in same manner and within the same time limitations as is provided for zoning appeals in Article X-A of the Pennsylvania Municipalities Planning Code.

3.705 Subdivision and Land Development Ordinance Amendment

a) Amendments to the Subdivision and Land Development Ordinance shall become effective only after a public hearing held pursuant to public notice in the manner prescribed for enactment of a proposed ordinance by Article V of the Municipalities Planning Code.

b) In case of an amendment other than that prepared by the Planning Commission, the Lowhill Township Board of Supervisors shall submit each such amendment to the Planning Commission at least 30 days prior to the date fixed for the public hearing on such proposed amendment.

c) At least thirty (30) days prior to the hearing on the amendment, the Board of Supervisors shall submit the proposed amendment to the Joint Planning Commission of Lehigh-Northampton Counties for recommendations.

d) Within thirty (30) days after adoption, the Secretary of the Board of Supervisors shall forward a certified copy of any amendment to the Subdivision and Land Development Ordinance to the Joint Planning Commission of Lehigh-Northampton Counties.

e) Before adoption of an amendment to the Subdivision and Land Development Ordinance, the Board of Supervisors shall publish, advertise and make available copies of the proposed amendment pursuant to the requirements of Section 506 of the Pennsylvania Municipalities Planning Code.

3.800 REMEDIES

3.801 PREVENTIVE REMEDIES

a) In addition to other remedies, the Board of Supervisors may institute and maintain appropriate actions by law or in equity to restrain, correct or abate violations, to prevent unlawful construction, to recover damages and to prevent illegal occupancy of a building, structure or premises. The description by metes and bounds in the instrument of transfer or other documents used in the process of selling or transferring shall not exempt the seller or transferor from such penalties or from the remedies herein provided.

b) The Board of Supervisors may refuse to issue any permit or grant any approval necessary to further improve or develop any real property which has been developed or which has resulted from a subdivision of real property in violation of any ordinance adopted pursuant to Article V of the Pennsylvania Municipalities Planning Code or prior enabling laws. This authority to deny such a permit or approval shall apply to any of the following applicants:

1) The owner of record at the time of such violation.

2) The vendee or lessee of the owner of record at the time of such violation without regard as to whether such vendee or lessee had actual or constructive knowledge of the violation.

3) The current owner of record who acquired the property subsequent to the time of violation without regard as to whether such current owner had actual or constructive knowledge of the violation.

4) The vendee or lessee of the current owner of record who acquired the property subsequent to the time of violation without regard as to whether such vendee or lessee had actual or constructive knowledge of the violation. As an additional condition for issuance of a permit or the granting of an approval to any such owner, current owner, vendee or lessee for the development of any such real property, the Board of Supervisors may require compliance with the conditions that would have been applicable to the property at the time the applicant acquired an interest in such real property.

3.802 ENFORCEMENT REMEDIES

a) Any person, partnership or corporation who or which has violated the provisions of any Subdivision or Land Development Ordinance enacted under the Pennsylvania Municipalities Planning Code or prior enabling laws shall, upon being found liable therefore in a civil enforcement proceeding commenced by the Board of Supervisors, pay a judgment of not more than five hundred ($500) dollars plus all court costs, including reasonable attorney fees incurred by the Board of Supervisors as a result thereof. No judgment shall commence or be imposed, levied or payable until the date of the determination of a violation by the district justice. If the defendant neither pays nor timely appeals the judgment, the Board of Supervisors may enforce the judgment pursuant to the applicable rules of civil procedure. Each day that a violation continues shall constitute a separate violation, unless the district justice determining that there has been a violation further determines that there was a good faith basis for the person, partnership or corporation violating the ordinance to have believed that there was no such violation, in which event there shall be deemed to have been only one such violation until the fifth day following the date of the determination of a violation by the district justice and thereafter each day that a violation continues shall constitute a separate violation.

b) The Court of Common Pleas of Lehigh County, upon petition, may grant an order of stay, upon cause shown, tolling the per diem judgment pending a final adjudication of the violation and judgment.

c) Nothing contained in this section shall be construed or interpreted to grant to any person or entity other than the Board of Supervisors the right to commence any action for enforcement pursuant to this section.

3.900 CONFLICT AND SEVERABILITY

3.901 Conflict with Other Ordinances. Wherever there is a difference between minimum standards or dimensions specified herein and those contained in the Zoning Ordinance or other official regulations, the highest standard shall apply.

3.902 Severability. If any section, clause, provision or portion of this Ordinance shall be held to be invalid or unconstitutional by any court of competent jurisdiction, such decision shall not affect any other section, clause, provision or portion of this Ordinance.

SECTION IV

DESIGN STANDARDS AND REQUIRED IMPROVEMENTS

4.100 APPLICATION

The design standards and requirements outlined in this section will be applied by the Commission and the Board of Supervisors in evaluating plans for all proposed subdivisions and land developments. A table at the end of this Section indicates where various improvements are required according to the type of subdivision or land development. Construction and location standards follow the required improvements table.

4.101 Planned Residential Development. The development of Planned Residential Development in addition to the requirements in this Ordinance must conform to the Township Planned Residential Development Ordinance.

4.200 DESIGN STANDARDS APPLICABLE TO ALL TYPES OF DEVELOPMENT

4.201 Land Requirements. Land shall be suited to the purpose for which it is to be subdivided. Land subjected to hazards against life, health or property shall not be subdivided unless adequate safeguards are provided and approved by the Commission and the Board of Supervisors.

4.202 Natural and Historic Feature Preservation. The Planning Commission and the Board of Supervisors shall require that the design and development of all subdivisions shall preserve insofar as possible all natural and historic features which will add attractiveness by providing parks, adequate open space for recreation, light and air for proper distribution of population thereby creating conditions favorable to the health, safety, morals and general welfare of the citizens and for the harmonious development of the Township. Some of these features are the natural terrain and natural drainage, large trees or groves, water courses and falls, historic sites and structures, exceptional scenic views and other community assets. Land subject to hazardous conditions such as open quarries, unconsolidated fill, floods, precipices and water supply which does not meet U.S. Public Health Service standards, shall not be subdivided until the hazards have been eliminated or will be overcome by the subdivision and proposed construction.

a) Tree Removal. All trees six inches or more in diameter (measured at a height four and one-half feet above original grade) shall not be removed unless they are located within the proposed cartway or sidewalk portion of the right-of-way, or unless they are within 15 feet of the foundation area of the new building.

b) Topsoil Protection. No topsoil shall be removed from the site or used as spoil. Topsoil must be removed from the areas of construction and stored separately. Upon completion of the construction, the topsoil must be redistributed on the site uniformly. All areas of the subdivision shall be stabilized by seeding or planting on slopes of less than five percent and by sodding on slopes five percent or greater as shown on the final grading plan.

c) Uninhabitable Land. Land subject to flooding and land deemed by the Commission and the Board of Supervisors to be uninhabitable for other reasons shall not be plotted for residential occupancy, nor for such other uses as may increase danger to health, life or property, or aggravate the flood hazard; but such land within a plan shall be set aside for such uses as will not be endangered by periodic or occasional inundation, or will not produce unsatisfactory living conditions.

4.203 Location of Site. The location of proposed subdivisions shall be viewed with regard to the following:

a) Comprehensive Plan and Official Map Requirement. The subdivision must conform to any applicable provisions of the Township Comprehensive Plan which is used as the basis for zoning or other related regulations. It must also conform to the official Township map.

b) Zoning. The use of land in the subdivision must conform to the Township's Zoning Ordinance.

c) Nearby Developments. A subdivision and its street pattern must be coordinated with existing nearby developments or neighborhoods so that the area as a whole may be developed harmoniously.

4.204 Water Supply and Sewage Disposal. All subdivision and land developments shall be served with an adequate water supply and sewage system, either on-lot, public or private central systems acceptable to the Pennsylvania Department of Environmental Resources.

a) Public or Private Central Water System. Subdividers and land developers shall provide connection to a public water system where such system is available, or they shall provide their own central system according to the following:

1) When the residential lot size is to be less than one acre.

2) Whenever public water systems are used, fire hydrants shall be provided by the developer so that no structure is more than 500 feet from a hydrant. Every public or central water system shall also be organized in such a manner as to be placed under the jurisdiction of the appropriate State agency.

3) Wherever a central water system is used and is near to a public system or if any county or regional plan indicates that a public water supply may serve the subdivision within a reasonable time in the future, then six (6) inch lines will be required and fire hydrants will be provided for.

b) Central Sewers. Subdividers or land developers shall provide sewer connections to a public sewer system if such sewer system is nearby. If a county plan or regional plan or subdivision requirement indicates that construction of sanitary sewers may serve the site within a reasonable time in the future, then capped sewers shall be required. When public sanitary sewer systems are not available, then a central sewage, treatment and disposal system (commonly called a package treatment plant) shall be installed by the developer as required by and in accordance with Pennsylvania Department of Environmental Resources regulations.

4.205 Storm Drainage. Storm drainage systems shall be designed by the developer's engineers to permit unimpeded flow of natural water courses; ensure adequate drainage of all low points along the line of streets; intercept storm water runoff along streets at intervals related to the extent and grade of the area drained; provide positive drainage away from building and on-site sewage disposal areas; and take surface water from the bottom of vertical grades, to lead water from springs and to avoid excessive use of cross-gutters at street intersections and elsewhere.

a) General Requirements. A site drainage plan for the proposed subdivision or development shall be prepared which illustrates the following information:

1) Delineation of the watershed area or areas in which the proposed subdivision or development is located.

2) Calculations of runoff for all points of runoff concentration.

3) Complete drainage system(s) for the subdivision or development. All existing drainage features which are to be incorporated in the design shall be so identified. If development is to be performed in stages, a general plan for the entire subdivision or development shall be presented, depicting the proposed staging of drainage system(s) construction.

b) Existing Conditions. The existing points of natural drainage discharge on to adjacent property shall not be altered without the written approval in a form capable of being recorded with the Office of the Recorder of Deeds and capable of binding the land owner's successors in title. No storm water runoff shall be increased or natural drainage water so diverted as to overload existing drainage systems, or create flooding, or the need for additional drainage structures on other private properties or public lands, without approved provisions being made by the developer for properly handling such conditions.

c) Facilities Design. Storm drainage facilities should be designed to not only handle peak discharge from the property being developed, but also the anticipated increase in runoff that will occur when all the property at a higher elevation in the same watershed is fully developed. Storm runoff shall be calculated by the rational method as described in Manual Number 37 of the American Society of Civil Engineers and the report entitled "Drainage and Flood Plains" prepared by the County Planning Commission. Unless otherwise directed by the Township Board of Supervisors, based upon sound engineering practice and judgment, facilities shall be designed to accommodate runoff from a storm of 1:10 years frequency of occurrence.

d) Other Approvals. Drainage structures located on State Highway rights-of-way shall be as approved by the Pennsylvania Department of Transportation. A letter of approval must be received by the Township Planning Commission as a condition to Final Plan approval.

No encroachments, crossings, obstructions or alterations to any stream or body of water shall be made by a developer without first having made written application to and obtained consent or permit, in writing, from the Pennsylvania Department of Environmental Resources. A copy of such letter of consent or permit shall be directed to the Township Planning Commission and such letter of consent or permit shall be a condition to Final Plan approval.

4.206 Utility Easements. Easements shall be:

20 feet when following side or rear lot lines;
or
15 feet when following exterior property lines;
or
10 feet adjacent to street right-of-way;

plus the width of any required pipe or other improvements provided as necessary for utilities.

To the fullest extent possible, easements shall be centered or adjacent to rear or side lot lines. Easements for installation of underground conduits for electric power, telephone and television cable lines shall be provided so that each lot or leased unit can be practically served.

Water courses, shall be provided with a drainage easement of right-of-way conforming substantially with the line of such water course and of such width as will be adequate to preserve natural drainage.

4.207 Streets

a) Street Layout. The street and alley layout shall conform to the Comprehensive Plan and to any plans adopted by the Township for the development of the neighborhood in which the proposed subdivision is located and shall provide access to all lots and parcels of land within the subdivision or land development.

b) Streets and Topography. Proposed streets shall be adjusted to the contour of the land so as to produce usable lots and streets of reasonable gradient.

c) Street Continuations. Where appropriate, proposed streets shall be extended to the boundary line of the tract being subdivided so as to eventually provide for normal circulation of traffic within the vicinity. Wherever there exists a dedicated or platted portion of a street or alley along a boundary of the tract being subdivided or developed the remainder of said street or alley to the prescribed width shall be platted within the proposed development, where this would not adversely affect the proposed subdivision or development.

d) Alleys. Alleys shall ordinarily not be provided in residential districts but shall be included in commercial and industrial areas where needed for loading and unloading or access purposes.

e) Intersections. The centerlines of streets shall intersect at right angles. Intersections of more than two streets at one point shall not be permitted. Where streets intersect other streets, offsets shall not be created. The minimum distance between centerlines of parallel or approximately parallel streets intersecting a cross street from the opposite directions shall be 150 feet for minor local streets, 400 feet for collector streets and 800 feet for major arterial streets.

f) Arterial Street Frontage. Where a subdivision abuts or contains an existing or proposed arterial traffic street or a railroad, the Commission and the Board of Supervisors, may require marginal access streets, rear service alleys, reverse frontage lots or such other treatment as will provide protection for abutting properties, reduction in the number of intersections with the major street, and separation of local and through traffic.

g) Street Right-of-Way and Pavement Widths. Minimum street right-of-way widths, measured from the lot line and minimum pavement widths measured from curb to curb, shall be as shown on the Comprehensive Plan, or if not shown thereon, shall meet the standards as shown on the table on the following page.

h) Curbs and/or Gutters. Curbs and gutters shall be provided when they are needed to facilitate proper drainage in residential areas. Curbs and gutters shall always be required in non-residential developments.

i) Street Alignment

1) Whenever street lines are deflected in excess of five degrees, connection shall be made by horizontal curves.

2) Streets shall be so laid out that there will be unobstructed sight distances along the centerline thereof. Minimum horizontal sight distances shall be as follows, measured as determined by Pennsylvania Department of Transportation specifications:

Arterial Traffic Street:	475 feet
Collector Street:	300 feet
Local Street:	200 feet

3) Between reversed curves on arterial streets, a tangent of not less than two hundred feet shall be provided, on collector streets such a tangent shall be not less than one hundred feet.

j) Street Grades

1) Centerline grades shall not exceed the following:

Arterial Traffic Street:	four percent
Collector Street:	eight percent
Local Street:	eleven percent

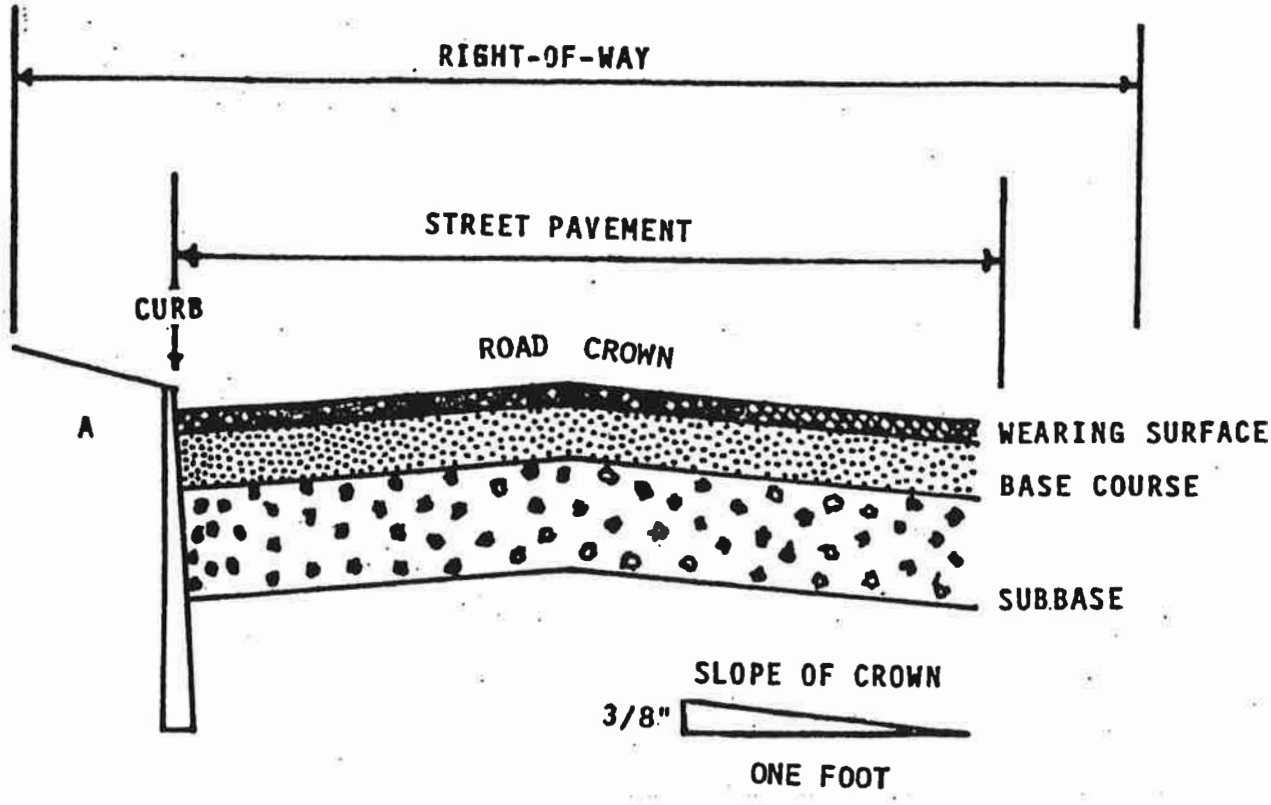
2) Vertical curves shall be used at changes of grade exceeding one percent and shall be designed in relation to the design speed to provide vertical sight distance consistent with the horizontal sight distances specified above.

3) Where the grade on any street at the approach to an intersection exceeds seven percent, a leveling area shall be provided having not greater than four percent grades for a distance of twenty-five feet measured from the nearest right-of-way line of the intersecting street.

4) To provide for adequate drainage, the minimum grade of any street gutter shall be not less than one-half of one percent.

5) All streets shall be so designed as to provide for the discharge of surface water from their rights-of-way.

ILLUSTRATIVE STREET CROSS SECTION



A Unpaved right-of-way for utilities and possible future pavement widening

note: illustration shows relationships and is not to scale

SEE SECTION 4.207 FOR DIMENSION REQUIREMENTS BY TYPE OF SUBDIVISION

k) Clear Sight Triangle. At an intersection, a triangle area shall be graded and/or other sight obstructions removed in such a manner as not to obscure vision between a height of from two to ten feet above the centerline grades of the intersecting streets. Furthermore, by deed restriction, by lease restriction, or by plan amendment, whichever method is applicable, nothing shall be erected, placed, planted or allowed to grow in such a manner as to obstruct vision between a height of from two or ten feet above the centerline grades of the intersecting streets. Such triangular area shall be determined by the intersecting street centerlines and a diagonal connecting two points, one at each street centerline, each of which points is:

1) One hundred fifty (150) feet from the intersection of such street centerlines, if either street is an arterial street.

2) One hundred feet from the intersection of such street centerline if both streets are collector streets or if one is a collector street and the other is a local street.

3) Seventy-five (75) feet from the intersection of such street centerlines, if both streets are local streets.

l) All streets providing access from the tract to the nearest improved street, shall be adequate and safe to bear the average daily traffic, fire apparatus and other emergency vehicles. For purposes of this paragraph, a street meeting the minimum requirements or standards for a local access highway or street (rural) average daily traffic of 50/200 as per Penn Dot Pub. No. 70 or Amendments thereto shall be considered adequate.

4.300 RESIDENTIAL DESIGN STANDARDS

4.301 Application. All subdivisions and land developments proposed for residential use shall conform with the provisions of this Section.

4.302 Blocks

a) Residential blocks shall ordinarily not exceed 1,500 feet in length or exceed 2,000 feet in length in subdivisions which have an average lot size of over one acre, nor shall the block length be less than 500 feet.

b) Blocks shall be of sufficient width to permit two tiers of lots of appropriate depth except where an interior street parallels a Limited Access Highway or Major Street, or except where it backs up to a railroad, creek, or other natural barrier, or unsubdivided area.

4.303 Lots. Lots within the requirements of the Township Zoning Ordinance, the size, shape and orientation of lots shall be appropriate for the type of development and use contemplated.

a) The natural terrain shall be retained wherever possible with cut and fill operations being kept to a minimum. Areas with natural slopes greater than fifteen percent shall generally not be planned for developed uses. If such land is planned for development, the natural slope of the usable building site or sites shall be fifteen percent or less. The building site for single family residential purposes shall be at least fifty (50) feet by eighty (80) feet.

1) The minimum lot area requirements shall not include or be split by any land that has natural limitations that would require the minimum lot area of the Environmental Protection District.

b) The depth-to-width ratio of the usable area of a lot shall ordinarily not be greater than 3 to 1.

c) All lots shall abut on a street in conformance with the standards of this Ordinance. Lots for sale shall abut on a public or publicly dedicated street.

d) Side lines of lots shall be at approximately right angles to straight streets and on radial lines on curved streets. Some variation from this rule is permissible, but pointed or very irregular lots shall be avoided.

e) Double frontage lots shall ordinarily not be platted, except as specifically provided herein. In that event, a planting strip for a screen, at least twenty feet in width, shall be provided along the back of the lot.

f) Corner residential lots shall be wider than interior lots to permit equal setbacks from both streets to a distance as may be required by the Zoning Ordinance, except where lots are back to back.

g) If remnants of land exist after subdividing, they shall be incorporated in existing or proposed lots or reserved for public use if acceptable to the Commission and the Board of Supervisors.

h) Flag type lots may be allowed under special circumstances relating to unusual topography or land parcel configuration. Such lots shall not be proposed principally as an alternative to street construction. Where, and when such lots are deemed by the Township Planning Commission to be a viable alternative, the width of the corridor between the lot and public road shall be not less than 50% of the required lot width. Access driveways shall be of such width and alignment so as to permit the passage of emergency vehicles.

4.304 Cul-de-Sac Streets

a) Dead-end streets are prohibited unless designed as a cul-de-sac street.

b) Cul-de-sac streets, permanently designed as such, shall not exceed one thousand (1,000) feet in length (by centerline description) or shall not furnish access to more than twenty-five (25) dwelling units.

c) All cul-de-sac streets shall be provided at the closed end with a fully paved turnaround. The turnaround may be offset to the left but turnarounds offset to the right shall be discouraged.

1) If parking will be prohibited on the turnaround the minimum radius to the pavement edge or curb line shall be forty (40) feet, and the minimum radius of the right-of-way line shall be fifty (50) feet.

2) If parking will be permitted on the turnaround the minimum radius to the pavement edge or curb line shall be fifty (50) feet, and the minimum radius of the right-of-way line shall be sixty (60) feet.

d) The centerline grade on a cul-de-sac street shall not exceed eleven (11) percent, and the grade of the diameter of the turnaround shall not exceed five (5) percent.

e) The minimum radius to the pavement edge or curb line shall be one hundred forty (140) feet between the bulb and stem of the cul-de-sac; the minimum radius of the street right-of-way line shall be one hundred fifty (150) feet.

4.305 Off-Street Parking. Every type of residential land development or subdivision shall provide off-street space for at least two vehicles for each proposed dwelling unit. Such off-street parking spaces may be in an individual garage, carport, or driveway (within the building line) or in a common compound area convenient to the dwelling units to be served.

4.306 Driveways. The centerline grade of any private driveway shall not exceed 13% at any point from the ultimate street right-of-way line to any other point within the confines of the lot and the average grade to not exceed 11%. A leveling area shall be provided having not greater than a 4% grade for a distance of 25 feet measured from the ultimate street right-of-way line.

Driveways shall not be permitted to have direct access to arterial roads, State roads or highways unless authorized by the Engineer and the Pennsylvania Department of Transportation through issuance of an occupancy permit.

The minimum distance between a driveway or point of access to a street shall be as follows:

Type of Subdivision or Land Development	Distance Between Centerlines of Access Road* and Nearest Intersecting Road by Type of Intersecting Road		
	Arterial	Collector	Loca
Residential	150 ft.	100 ft.	75 ft.
Nonresidential	300 ft.	200 ft.	150 ft

4.307 PLAYLOTS AND NEIGHBORHOOD PARKS

a) In proposed subdivisions which are intended to provide housing for more than twenty-five (25) families, the Board of Supervisors, upon the recommendation of the Township Planning Commission, shall require that the developer dedicate land for open space and recreation in accordance with the following guidelines:

Families to be Served	Minimum Open Space and Recreation Acreages
26-50	3.0
51-100	6.0
101-150	9.0
For each additional 50 families	2.0

b) In circumstances where the recreation needs of a development could better be met through the use of off-site facilities, cash to be used for these facilities may be accepted by the Board of Supervisors in lieu of open space dedication. The contribution shall be made according to the fee schedule adopted by the Board of Supervisors.

c) In proposed subdivisions intended to provide housing for twenty-five (25) families or less, cash in lieu of open space dedication may be required by the Board of Supervisors and must be used for recreational purposes in accordance with the standards set forth in Section 503(11) of the Pennsylvania Municipalities Planning Code.

4.400 MULTI-FAMILY DWELLING DEVELOPMENT DESIGN STANDARDS

The general design standards, the residential design standards and the following additional standards shall apply to multi-family dwelling subdivisions and developments.

4.401 Sewage and Water Systems. All sewage disposal and water supply systems proposed to serve said developments shall comply with the Pennsylvania Department of Environmental Resources.

4.402 Set Back. Space between buildings shall be no less than the height of the tallest building involved.

4.403 Number of Units. There shall be a maximum of 12 dwelling units per building for multi-family buildings which are under 2-1/2 stories or which are under 35 feet in height.

4.500 MOBILE HOME PARK DESIGN STANDARDS

The general design standards and the residential design standards shall apply to mobile home park subdivisions or developments even though streets may not be submitted for dedication. The development of mobile home parks must conform to the Township Mobile Home Park Ordinance.

4.600 COMMERCIAL AND INDUSTRIAL SUBDIVISION DESIGN STANDARDS

4.601 Application. All commercial and industrial subdivisions shall conform with the provisions of this Section and provisions of the Township Zoning Ordinance.

4.602 Size. Approval of lot or parcel size will be determined by the following factors:

a) The total area shall be sufficient to provide adequate space for off-street parking and loading, landscaping and other facilities.

b) Whenever possible, commercial parcels should include enough land to provide for a group of commercial establishments, planned, developed, and operated as a unit. In no case will highway strip-type development be approved.

4.603 Street Systems

a) Traffic movements in and out of commercial and industrial areas should not interfere with external traffic, nor should it create hazards for adjacent residential areas.

b) The design of streets, service drives and pedestrian ways should provide for safe and hazard free internal circulation.

4.604 Block Layout. Block layout shall conform with due consideration of site conditions, the best possible service to customers, traffic and parking circulation and pick-up and delivery services.

4.605 Off-Street Parking

a) Commercial subdivisions shall provide not less than three square feet of paved parking area inclusive of access lanes, for every one square foot of interior floor area, exclusive of storage areas. In addition, paved truck loading areas

shall be provided such that all truck loading, unloading and maneuvering can be accommodated within the property lines.

b) Industrial subdivisions shall provide not less than two parking spaces for each three employees (on any one shift) to be normally employed. In addition, paved truck loading area shall be provided such that all truck loading, unloading and maneuvering can be accommodated within the property lines.

4.700 REQUIRED IMPROVEMENTS AND CONSTRUCTION STANDARDS

4.701 Application. The minimum improvements required for all subdivisions and land developments, which shall be provided by the subdivider, shall be as set forth in this Section. Additional or higher type improvements may be required in specific cases where in the opinion of the Commission and the Board of Supervisors they are necessary to create conditions essential to the health, safety morals, and general welfare of the Township citizens and to protect the environment of the Township.

4.702 Summary of Required Improvements. The accompanying schedule summarizes the required improvements for various types of subdivision and/or land developments. The remainder of the article sets forth the construction standards for several of the required improvements. Other construction standards shall be evaluated and approved by the Engineer.

SCHEDULE OF REQUIRED IMPROVEMENTS

Minimum Improvements Required by Type of Subdivision or Land Development

Type of Improvements	Residential: Large Lots Over 30,000 sq.ft.	Residential: Small Lots Under 30,000 sq.ft.	Multi-Family	Commercial	Industrial
Streets	X	X	X	X	X
Alleys				a	a
Curbs	a	c	X	X	X
Gutters	c	c	X	X	X
Sidewalks		c	X	X	X
Street Trees	X	X	X	X	X
Street Lights	a	c	X	X	X
Off-Street Parking	X	X	X	X	X
Loading				X	X
Central Water	b	b	b	b	b
Central Sewer	b	b	b	b	b
Storm Sewer	c	c	X	X	X
Underground Utilities	d	d	d	d	d

Note: X = Indicates a requirement for that particular type of subdivision or land development.

a = Permitted to provide service as needed.

b = Required according to the number of units and size of nonresidential development planned for the development.

c = The Township Planning Commission and the Board of Supervisors may require according to individual site characteristics.

d = As required by an Order Nisi issued by the Pennsylvania Public Utility Commission on December 23, 1968 and amendments thereto.

4.703 Monuments and Markers. Monuments and markers shall be placed so that the scored or marked point shall coincide exactly with the intersection of lines to be marked, and shall be set so that the top of the monument or marker is level with the surface of the surrounding ground.

a) Monuments shall be of concrete or stone with a minimum size of six inches by six inches by thirty-six inches, and shall be marked on top with a one-half inch round brass pin, or a drilled hole.

Monuments shall be set in readily accessible locations at all angles of the property or in the right-of-way of existing streets.

b) Markers shall consist of iron pipes or iron or steel bars at least fifteen inches long, and not less than three-quarters inch in diameter.

Markers shall be set as follows:

1) At the beginning and ending of all curves along street property lines;

2) At all points where lot lines intersect curves, either front or rear;

3) At all angles in property lines of lots;

4) At all other lot corners.

c) Any monuments or markers that are removed shall be replaced by a competent engineer at the expense of the person removing them.

4.704 Streets

a) Streets (and alleys where provided) shall be graded, surfaced and improved to the grades and dimensions shown on plans, profiles and cross-section submitted by the subdivider and approved by the Commission and the Board of Supervisors.

b) Street Construction Standards

1) Paved Shoulders. Where curbs are not required, paved shoulders shall be provided, pursuant to - see Section 4.207 above. All shoulders shall be of the "paved shoulder" type, constructed of penetration macadam to a depth of four inches otherwise conforming to DP-1 specifications of the current editions of the Pennsylvania Department of Transportation (refer to P.D.T. Manual, Form 408).

2) Right-of-Way Grading. The entire right-of-way shall be graded to the approved cross-section. All trees, stumps and other material deemed unsuitable by the Engineer shall be removed to a depth of two feet below sub-grade and the excavation shall be backfilled and suitably compacted to the satisfaction of the Engineer. The finished road surface both tangent and curve shall be crowned at 3/8" per foot away from the centerline. A proper super-elevation shall be required on arterials and collector when the curve radii are less than 1200 feet and on minor local streets when the curve radii are less than 600 feet.

3) Grading Beyond Right-of-Way. Where the approved profile of the centerline requires excavation of land fill to a depth exceeding twelve inches in a single family residential subdivision with a maximum density of 2.0 dwelling units/acre, or exceeding six inches in all other subdivisions, the subdivider shall grade beyond the right-of-way line in order to provide a continuous slope from the right-of-way line to the proposed elevation of the abutting property. In areas of earth excavation or earth fill such grading shall be done to a maximum slope of one foot vertical to two feet horizontal. In areas of rock excavation such grading shall be done to a maximum slope of four feet vertical to one foot horizontal.

4) Sub-base, Base and Surface Course. As a minimum, pavement structure shall consist of the following:

either 1-1/2" ID-2A or T wearing surface
on 4-1/2" Bituminous concrete base course
on 6" Sub-base
or 2-1/2" ID-2A or T wearing surface
on 6" Crushed aggregate base course
on 6" Sub-base

All specifications shall be in conformance with the latest edition of the Pennsylvania Department of Transportation Manual Form 408.

Other alternatives may be proposed by the subdivider and are subject to the approval of the Township Board of Supervisors.

If the subdivider can prove to the satisfaction of the Engineer that natural sub-base material has adequate bearing capacity and is well drained, the sub-base required above may be omitted.

All materials and construction procedures shall conform with the Pennsylvania Department of Transportation's Manual, Form 408. All construction is subject to the inspection of the Engineer.

TRAFFIC PLANNING STANDARDS

Street Classification	Function	Width (ft.) R/W	Cartway	Traffic Lanes No.	Width	Parking	Strip	Left turn holding lanes	Pedestrian Way
Arterial	Major street for carrying large volume of through traffic in the area. Controlled by traffic signs and signals.	80'	60' in commercial area	4	2 @ 12' 2 @ 10'	Parallel 2@8'	None	Yes	Sidewalk width 2 @ 10'
		80'	56' in residential area	4	4 @ 10'	Parallel 2 @ 8'	None	Yes	Sidewalk width 2 @ 6.5 min.
		80'	58' in industrial area	4	4 @ 10'	Parallel 2 @ 8'	2'	Yes	Sidewalk with 2 @ 6.5 min.
Collector	Main street within neighborhood or in industrial area; traffic controlled by signs.	60'	60' in commercial area	4	4 @ 10'	Off-street only	None	Yes	Optional width with min. of 6.5'
		60'	36' in residential area	2	2 @ 10'	Parallel 2 @ 8'	None	No	Sidewalk width 2 @ 6.5 min.
		60'	34' in industrial area	2	2 @ 12'	Off-street only	10' to 2	Yes	Optional width with min. of 6.5'
Local	Residential street or local access road to individual properties only	50'	36' in residential area	2	2 @ 10'	Parallel 2 @ 8'	None	No	Sidewalk width with 2 @ 4.5 min.
Service	Service street for delivery or utilities, etc.	20'	14' in all areas	1	Width	In Emergency Only	--	No	Sidewalks optional

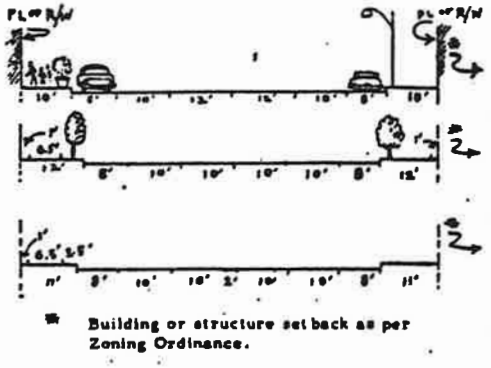
Cross-sections Minimum Standards

Arterial
Min. 80' R/W

Commercial area
Large volumes of both vehicle and pedestrian traffic.

Residential area
Large volume of pedestrian traffic - lower volumes of vehicle traffic

Industrial area
Large volume of heavy vehicle traffic and low volume of pedestrian traffic.



* Building or structure set back as per Zoning Ordinance.

Collector
Min. 60' R/W

Commercial area

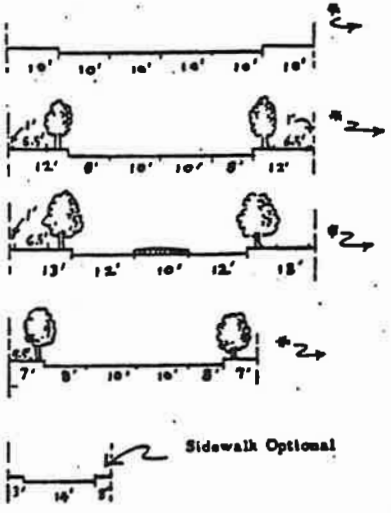
Residential area

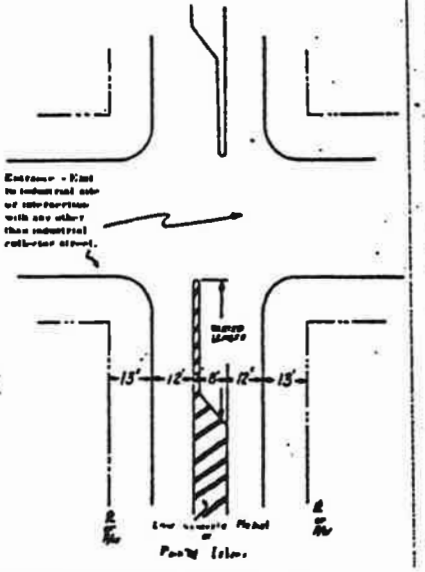
Industrial area

Local
Min. 50' R/W

Residential area only

Service or Alley
Min. 20' R/W





COLLECTOR IN INDUSTRIAL AREA - DETAILS OF LEFT TURN HOLDING LANE

Note: Refer to Section 4.704 and Section 4.705 for street and curb construction standards.

4.705 Curbs and Gutters. Minimum curb construction standards are as follows:

a) Straight curbs of portland cement concrete shall be 21 inches in depth, 6 inches wide at the top and 8 inches wide at the bottom, and shall have an exposed face between 6 inches and 8 inches. Expansion joints shall be provided at least every 20 feet.

b) Rolled curbs shall be 14 inches in depth, 24 inches in width, 6 inches wide at the top and have a 17 inch curb return, except at corners where it shall have a 15 inch curb return.

The Engineer and/or the Planning Commission and the Board of Supervisors may require steel reinforcing of portland cement concrete curbs.

Gutter requirements shall be in conformance with good engineering practice and subject to the approval of the Engineer.

4.706 Driveway Entrances

a) Driveway entrances or aprons within the street right-of-way shall be surfaced to be the same as specified for streets in this Ordinance.

4.707 Sewers and Water Facilities

a) Sanitary sewers shall be installed to adequately serve all lots with connections to any public or private central system which might exist, and shall be subject to inspection by the Engineer and approval by the Commission and the Board of Supervisors.

b) Where the developer provides the subdivision with a complete water main supply system, he may be required to include fire hydrants, and be subject to inspection by the Engineer and approval by the Commission and the Board of Supervisors.

c) An adequate storm sewer system consisting of inlets and other underground drainage structures with approved outlets shall be constructed where the run-off of storm water and the prevention of erosion cannot be accomplished satisfactorily by surface drainage facilities. Outlets shall be approved by the Commission and by the Board of Supervisors.

4.708 Sidewalks. Sidewalks shall be located within the street right-of-way and no closer than one foot from the right-of-way line nor closer than three feet from the curb line. A grass planting strip shall be planted between the curb and sidewalk.

Minimum widths of sidewalks and curbs shall be as follow:

a) Sidewalks in single family residential subdivisions shall have a minimum width of four feet. Street crosswalks shall have a minimum width of three feet.

b) Sidewalks in multi-family and nonresidential subdivision or land developments shall have a minimum width of four feet. Street crosswalks shall have a minimum width of four feet.

The type of construction permitted is as follows. Sidewalks and crosswalks shall be portland cement mortar of at least four inches thick underlain by three inches of compacted cinder, gravel, crushed stone. Sidewalks at drivewalk crossings shall be at least six inches thick underlain by four inches of compacted cinder, gravel, crushed stone.

4.709 Street Signs. The developer shall provide the subdivision or land development with adequate street signs at the intersections of all streets.

4.710 Street Lights. Street lights may be required when the Commission and the Board of Supervisors deem them necessary to provide safe traffic circulation.

4.711 Street Trees. Within all subdivisions the subdivider shall plant shade trees meeting the following specifications:

a) Type of Trees Permitted. Trees shall be of nursery stock quality of a species approved by the Township and grown under the same climatic conditions as the location of the development. Site locations, land use, topography, natural and

historical features shall be considered by the subdivider and the Township in selecting and approving species. Trees shall be a deciduous hardwood type non-susceptible to vehicular and other air pollutants.

b) Quality of Trees Permitted. Trees permitted shall be of symmetrical growth, free of insect pests and disease, and durable under the maintenance contemplated. Trees which have died, or have become diseased or pest ridden within 24 months from the time of planting shall be replaced by the subdivider.

c) Size of Trees Permitted. The trunk diameter measured at a height of four feet above the finished grade level shall be a minimum of two inches.

Depending on good planting practice with reference to the particular species to be planted, the Township, if applicable, may modify the size requirements of trees.

d) Location. In all subdivisions, trees shall be planted at intervals between 50 feet and 100 feet. The location of shade trees will be subject to the approval of the Township. If applicable, trees may be planted between the sidewalk and building line at least three feet from the sidewalk or between the curb and sidewalk providing the planting strip is a minimum of five feet in width.

e) Planting. Besides conforming to all parts of this section, all planting shall be done in conformance with good nursery and landscape practice, and to the standards established by the Township.

4.712 Ground Cover Requirements. Exposed ground surface in all parts of the subdivision shall be paved, or covered with stone screenings, or other solid material, or protected with a vegetative growth that is capable of preventing soil erosion and the emanation of dust during dry weather. The vegetative cover shall not be poisonous in nature and shall not harbor rodents, insects, or other pests harmful to man.

ORDAINED AND ENACTED into a law this second day of June in the year 1971, as amended by Township Ordinances T2-78, T2-79 and T1-80.

LOWHILL TOWNSHIP, PENNSYLVANIA

By: Robert H Hess
Chairman of the Board

ATTEST:

By: Barbara L. Kreuley
Secretary of the Board

Approved this 9th day of January, 1980.

APPENDIX

APPLICATION FOR SUBDIVISION OR LAND DEVELOPMENT FILE NO.

DATE OF APPLICATION _____

LOWHILL TOWNSHIP
LEHIGH COUNTY

MAJOR SUBDIVISION	☐	SKETCH PLAN	☐
MINOR SUBDIVISION	☐	PRELIMINARY PLAN	☐
LAND DEVELOPMENT	☐	FINAL PLAN	☐

Name of Subdivision or Development _____

If a Final Plat, indicate:
Section Number, if any _____
Date of Preliminary Plan Approval _____
(if applicable)
Location _____
Owner _____
Address _____ Phone #_____
Applicant _____
Address _____ Phone #_____
Registered Engineer or Surveyor _____
Address _____ Phone #_____
Existing Zoning _____
Number of Lots _____
Total Acreage _____
Minimum Lot Size _____
Lineal Feet of New Streets _____
Water Supply: Public System _____ On Lot System _____
Sewerage System: Public System _____ On Lot System _____
Proposed Use: _____

REMARKS:

_____
Signature of Owner or Applicant

REIMBURSEMENT AND ESCROW AGREEMENT

PURSUANT TO SUBDIVISION ORDINANCE

Section 3.603

In consideration of the Township of Lowhill processing the attached subdivision application, the undersigned, expressly consent and agree, to pay the initial subdivision fees customarily charged by the Township according to the Township's fee schedule, currently in effect, and also as a condition to final plan approval, to reimburse the Township for engineering services, and legal fees and other professional services, incurred in the processing of the subdivision map, improvements and maintenance agreement and recording costs as well as any other incidental expenses reasonably incurred by the Township respecting this subdivision. The Township may, at any time during the course of the plan's review require the undersigned to reimburse the Township for costs incurred at given times, or at the Township's option, require the undersigned to place a sufficient sum in escrow (said sum to be determined solely by the Township) to cover the costs and fees, as hereinabove provided, which the Township estimates it will reasonably incur during the processing and review of the subdivision application and plan. Any amounts which have been placed in escrow in excess of the amounts hereinabove referred to, shall be returned to the individual or entity from which the funds were received, following final plan approval.

IN WITNESS WHEREOF, the undersigned, intending to be legally bound, hereby set our hands and seals this _____ day of _____, 20 .

_____(SEAL)

_____(SEAL)

CAW:IVW:3/23/2007:2007-76

ORDINANCE NO. 2007-2

AN ORDINANCE OF THE TOWNSHIP OF LOWHILL, COUNTY OF LEHIGH, COMMONWEALTH OF PENNSYLVANIA KNOWN AS THE "JORDAN CREEK WATERSHED ACT 167 STORMWATER MANAGEMENT ORDINANCE" ADOPTED PURSUANT TO THE AUTHORITY OF THE ACT OF OCTOBER 4, 1978, P.L. 864 (ACT 167), 32 P.S. § 680.1, *et seq.*, AS AMENDED, THE "Stormwater Management Act AND THE SECOND CLASS TOWNSHIP CODE; PROVIDING A Short Title, Statement of Findings, Purpose, Statutory Authority, Applicability Statement, Exemptions, Repealer, Severability Clause, Compatability Statement, Statement of Duty, Definitions, General Requirements, Permit Requirements, Erosion and Sediment Control Measures, Post Construction Water Quality Criteria, Designation of Stormwater Management Districts, Stormwater Management District Implementations Provisions, Calculation Methodology, Drainage Plan Requirements, Inspections, Fees and Expenses, Stormwater BMP Operations and Maintenance Plan Requirements, Prohibitions, Right of Entry, and Notification and Enforcement Provisions.

BE IT ENACTED AND ORDAINED, by the Board of Supervisors of the Township of Lowhill, County of Lehigh and Commonwealth of Pennsylvania, in lawful session and duly assembled, as follows:

JORDAN CREEK WATERSHED
ACT 167 STORMWATER MANAGEMENT ORDINANCE

ARTICLE 1
GENERAL PROVISIONS

SECTION 101. SHORT TITLE

This Ordinance shall be known and may be cited as the " Jordan Creek Watershed Act 167 Stormwater Management Ordinance".

SECTION 102. STATEMENT OF FINDINGS

The governing body of the municipality finds that:

A. Inadequate management of accelerated runoff of stormwater resulting from development throughout a watershed increases flood flows and velocities, contributes to erosion and sedimentation, changes the natural hydrologic patterns, destroys aquatic habitat, elevates aquatic pollutant concentrations and loadings, overtaxes the carrying capacity of streams and storm sewers, greatly increases the cost of public facilities to carry and control stormwater, undermines floodplain management and flood control efforts in downstream communities, reduces groundwater recharge, and threatens public health and safety.

B. A comprehensive program of stormwater management, including reasonable regulation of development and activities causing accelerated erosion and loss of natural infiltration, is fundamental to the public health, safety and welfare and the protection of the people of the municipality and all of the people of the Commonwealth, their resources and the environment.

C. Stormwater can be an important resource by providing groundwater recharge for water supplies and baseflow of streams, which also protects and maintains surface water quality.

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

* E. Federal and state regulations require certain municipalities to implement a program of stormwater controls. These municipalities are required to obtain a permit for stormwater discharges from their separate storm sewer systems under the National Pollutant Discharge Elimination System (NPDES).

*Throughout the Ordinance, these provisions are from the DEP Guidance on MS4 Ordinance Provisions and are not required for municipalities not subject to the NPDES Phase II regulations.

F. Non-stormwater discharges to municipal separate storm sewer systems can contribute to pollution of waters of the Commonwealth by the municipality.

SECTION 103. PURPOSE

The purpose of this Ordinance is to promote the public health, safety and welfare within the Jordan Creek Watershed by minimizing the damages and maximizing the benefits described in Section 102 of this Ordinance by provisions designed to:

A. Manage stormwater runoff impacts at their source by regulating activities which cause such problems.

B. Utilize and preserve the desirable existing natural drainage systems.

C. Encourage infiltration of stormwater, where appropriate, to maintain groundwater recharge, to prevent degradation of surface and groundwater quality and to otherwise protect water resources.

D. Maintain the 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 for proper maintenance of all permanent stormwater management BMPs that are implemented in the municipality.

G. Provide review procedures and performance standards for stormwater planning, design and management.

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

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

J. Prevent scour and erosion of streambanks and streambeds.

* K. Provide standards to meet the NPDES permit requirements.

SECTION 104. STATUTORY AUTHORITY

The municipality is empowered to regulate these activities by the authority of the Act of October 4, 1978, P.L. 864 (Act 167), 32 P.S. Section 680.1, et seq., as amended, the "Stormwater Management Act" and "The Second Class Township Code."

SECTION 105. APPLICABILITY

This Ordinance shall only apply to those areas of the municipality which are located within the Jordan Creek Watershed(s) as delineated on an official map available for inspection at the municipal office. A map of the Jordan Creek Watershed(s) at a reduced scale is included in Appendix A for general reference. [Municipalities subject to the NPDES Phase II regulations must ensure that all of the ordinance provisions required to meet the MS4 NPDES requirements apply across the entire municipality.]

The following activities are defined as Regulated Activities and shall be governed by this Ordinance:

A. Land development.

B. Subdivision.

C. Construction of new or additional impervious 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 stormwater systems or appurtenances thereto.

* G. Regulated Earth Disturbance Activities.

SECTION 106. EXEMPTIONS

A. Impervious Cover - Any proposed Regulated Activity, except those defined in Section 105.E. and 105.F., which would create 10,000 square feet or less of additional impervious cover is exempt from the Drainage Plan preparation provisions of this Ordinance. All of the impervious cover added incrementally to a site above the initial 10,000 square feet shall be subject to the Drainage Plan preparation provisions of this Ordinance. If a site has previously received an exemption and is proposing additional development such that the total impervious cover on the site exceeds 10,000 square feet, the total impervious cover on the site proposed since the original ordinance date must meet the provisions of this Ordinance.

1. The date of the municipal Ordinance adoption of the original Jordan Creek Watershed Act 167 Stormwater Management Ordinance April 7, 1993 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.

2. For development taking place in stages, the entire development plan must be used in determining conformance with these criteria.

3. Additional impervious cover shall include, but not be limited to, additional indoor living spaces, decks, patios, garages, driveways, storage sheds and similar structures, any roof, parking or driveway areas and any new streets and sidewalks constructed as part of or for the proposed Regulated Activity.

4. Any additional areas proposed to initially be gravel, crushed stone, porous pavement, etc. shall be assumed to be impervious for the purposes of comparison to the exemption criteria. Any existing gravel, crushed stone or hard packed soil areas on a site shall be considered as pervious cover for the purpose of exemption evaluation.

B. Prior Drainage Plan Approval - Any Regulated Activity for which a Drainage Plan was previously prepared as part of a subdivision or land development proposal that received preliminary plan approval from the municipality prior to the effective date of this Ordinance is exempt from the Drainage Plan preparation provisions of this Ordinance, except as cited in Section 106.C., provided that the approved Drainage Plan included design of stormwater facilities to control runoff from the site currently proposed for Regulated Activities consistent with ordinance provisions in effect at the time of approval and the approval has not lapsed under the Municipalities Planning Code. If significant revisions are made to the Drainage Plan after both the preliminary plan approval and the effective date of this Ordinance, preparation of a new Drainage Plan, subject to the provisions of this Ordinance, shall be required. Significant revisions would include a change in control methods or techniques, relocation or redesign of control measures or changes necessary because soil or other conditions are not as stated on the original Drainage Plan.

C. These exemptions shall not relieve the applicant from implementing such measures as are necessary to protect health, safety, property, and State Water Quality Requirements. These measures include adequate and safe conveyance of stormwater on the site and as it leaves the site. These exemptions do not relieve the applicant from the responsibility to secure required permits or approvals for activities regulated by any other applicable code, rule, act or ordinance.

D. No exemptions shall be provided for Regulated Activities as defined in Sections 105.E. and 105.F.

SECTION 107. 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 108. 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 109. 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.

SECTION 110. DUTY OF PERSONS ENGAGED IN THE DEVELOPMENT OF LAND

Notwithstanding any provisions of this Ordinance, including exemption and waiver provisions, any landowner and any person engaged in the alteration or development of land which may affect stormwater runoff characteristics shall implement such measures as are reasonably necessary to prevent injury to health, safety or other property. Such measures shall include such actions as are required to manage the rate, volume, direction and quality of resulting stormwater runoff in a manner which otherwise adequately protects health and property from possible injury.

ARTICLE 2
DEFINITIONS

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

Accelerated Erosion – The removal of the surface of the land through the combined action of human activities and natural processes, at a rate greater than would occur because of the natural processes alone.

Best Management Practice (BMP) – Activities, facilities, measures or procedures used to manage stormwater quantity and quality impacts from the Regulated Activities listed in Section 105, to meet State Water Quality Requirements, to promote groundwater recharge and to otherwise meet the purposes of this Ordinance.

Best Management Practice Operations and Maintenance Plan – Documentation, included as part of a Drainage Plan, detailing the proposed BMPs, how they will be operated and maintained and who will be responsible.

Bioretention - Densely vegetated, depressed features that store stormwater and filter it through vegetation, mulch, planting soil, etc. Ultimately stormwater is evapotranspirated, infiltrated, or

discharged. Optimal bioretention areas mimic natural forest ecosystems in terms of species diversity, density, distribution, use of native plants, etc.

Buffer – (1) Streamside Buffer - A zone of variable width located along a stream that is vegetated and is designed to filter pollutants from runoff.

(2) Special Geologic Feature Buffer – A required isolation distance from a special geologic feature to a proposed BMP needed to reduce the risk of sinkhole formation due to stormwater management activities.

Capture/Reuse - Stormwater management techniques such as cisterns and rain barrels which direct runoff into storage devices, surface or sub-surface, for later re-use, such as for irrigation of gardens and other planted areas. Because this stormwater is utilized and no pollutant discharge results, water quality performance is superior to other non-infiltration BMPs.

Carbonate Bedrock – Rock consisting chiefly of carbonate minerals, such as limestone and dolomite; specifically a sedimentary rock composed of more than 50% by weight of carbonate minerals that underlies soil or other unconsolidated, superficial material.

Cistern - An underground reservoir or tank for storing rainwater.

Closed Depression - A distinctive bowl-shaped depression in the land surface. It is characterized by internal drainage, varying magnitude, and an unbroken ground surface.

Conservation District - The Lehigh or Northampton County Conservation District, as applicable.

Constructed Wetlands - Constructed wetlands are similar to wet ponds (see below) and consist of a basin which provides for necessary stormwater storage as well as a permanent pool or water level, planted with wetland vegetation. To be successful, constructed wetlands must have adequate natural hydrology (both runoff inputs as well as soils and water table which allow for maintenance of a permanent pool of water). In these cases, the permanent pool must be designed carefully, usually with shallow edge benches, so that water levels are appropriate to support carefully selected wetland vegetation.

Culvert - A pipe, conduit or similar structure including appurtenant works which carries surface water.

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

DEP - The Pennsylvania Department of Environmental Protection.

Design Storm - The depth and time distribution of precipitation from a storm event measured in probability of occurrence (e.g., 100-yr. storm) and duration (e.g. 24-hour) and used in computing stormwater management control systems.

Detention Basin - A basin designed to retard stormwater runoff by temporarily storing the runoff and releasing it at the appropriate Release 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 (Site) - The specific tract of land for which a Regulated Activity is proposed.

Diffused Drainage – See Sheet Flow.

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

Drainage Plan - The documentation of the proposed stormwater quantity and quality management controls to be used for a given development site, including a BMP Operations and Maintenance Plan, the contents of which are established in Section 403.

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

Erosion - The removal of soil particles by the action of water, wind, ice, or other geological agents.

Existing Uses –Those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards. (25 Pa. Code Chapter 93.1)

Fill – Man-made deposits of natural soils or rock products and waste materials.

Filter Strips – See Vegetated Buffers.

Freeboard - The incremental depth in a stormwater management structure, provided as a safety factor of design, above that required to convey the design runoff event.

Groundwater Recharge - Replenishment of existing natural underground water supplies.

Hardship Waiver Request – A written request for a waiver alleging that the provisions of this Ordinance inflict unnecessary hardship upon the applicant. A Hardship Waiver does not apply to and is not available from the water quality provisions of this Ordinance and should not be granted.

Hydrologic Soil Group (HSG) – Soils are classified into four HSGs (A, B, C and D) to indicate the minimum infiltration rates, which are obtained for bare soil after prolonged wetting. The Natural Resources Conservation Service (NRCS) of the US Department of Agriculture defines the four groups and provides a list of most of the soils in the United States and their group classification. The soils in the area of the development site may be identified from a soil survey

report that can be obtained from local NRCS offices or conservation district offices. Soils become less permeable as the HSG varies from A to D.

Hot Spot Land Uses – A land use or activity that generates higher concentrations of hydrocarbons, trace metals or other toxic substances than typically found in stormwater runoff. These land uses are listed in Section 304.P.

Impervious Surface (Impervious Cover) - A surface which prevents the percolation of water into the ground.

Infiltration Practice - A practice designed to direct runoff into the ground, e.g. French drain, seepage pit, seepage trench or bioretention area.

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

Land Development – Any of the following activities:

(1) The improvement of one lot or two or more contiguous lots, tracts or parcels of land for any purpose involving (i) a group of two 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 (ii) the division or allocation of land or space, whether initially or cumulatively, between or among two or more existing or prospective occupants by means of, or for the purpose of streets, common areas, leaseholds, condominiums, building groups or other features.

(2) A subdivision of land.

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

Loading Rate – The ratio of the land area draining to the system, as modified by the weighting factors in Section 307.B., compared to the base area of the infiltration system.

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

"Local" Runoff Conveyance Facilities - Any natural channel or man-made conveyance system which has the purpose of transporting runoff from the site to the Mainstem.

Mainstem (Main Channel) - Any stream segment or other conveyance used as a reach in the Jordan Creek hydrologic model.

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

Maryland Stormwater Design Manual – A stormwater design manual written by the Maryland Department of the Environment and the Center for Watershed Protection. As of January 2004, the Manual can be obtained through the following web site: www.mde.state.md.us.

Minimum Disturbance/Minimum Maintenance Practices (MD/MM) - Site design practices in which careful limits are placed on site clearance prior to development allowing for maximum retention of existing vegetation (woodlands and other), minimum disturbance and compaction of existing soil mantle and minimum site application of chemicals post-development. Typically, MD/MM includes disturbance setback criteria from buildings as well as related site improvements such as walkways, driveways, roadways, and any other improvements. These criteria may vary by community context as well as by type of development being proposed. Additionally, MD/MM also shall include provisions (e.g., deed restrictions, conservation easements) to protect these areas from future disturbance and from application of fertilizers, pesticides, and herbicides.

Municipality - Lowhill Township, Lehigh County, , Pennsylvania.

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

NPDES - National Pollutant Discharge Elimination System.

NRCS - Natural Resources Conservation Service - U.S. Department of Agriculture. (Formerly the Soil Conservation Service.)

Oil/Water Separator – A structural mechanism designed to remove free oil and grease (and possibly solids) from stormwater runoff.

Outfall – "Point source" as described in 40 CFR § 122.2 at the point where the municipality's storm sewer system discharges to surface waters of the Commonwealth.

Owner – One with an interest in and often dominion over a property.

Peak Discharge - The maximum rate of flow of stormwater runoff at a given location and time resulting from a specified storm event.

Penn State Runoff Model (PSRM) - The computer-based hydrologic modeling technique adapted to each watershed for the Act 167 Plans. The model was "calibrated" to reflect actual flow values by adjusting key model input parameters.

Person – An individual, partnership, public or private association or corporation, firm, trust, estate, municipality, governmental unit, public utility or any other legal entity whatsoever which is recognized by law as the subject of rights and duties.

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

Preliminary Site Investigation – The determination of the depth to bedrock, the depth to the seasonal high water table and the soil permeability for a possible infiltration location on a site through the use of published data and on-site surveys. In carbonate bedrock areas, the location of special geologic features must also be determined along with the associated buffer distance to the possible infiltration area. See Appendix G.

Public Water Supplier – A person who owns or operates a Public Water System.

Public Water System – A system which provides water to the public for human consumption which has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year. (See 25 Pa. Code Chapter 109)

Qualified Geotechnical Professional – A licensed professional geologist or a licensed professional engineer who has a background or expertise in geology or hydrogeology.

Rational Method - A method of peak runoff calculation using a standardized runoff coefficient (rational 'c'), acreage of tract and rainfall intensity determined by return period and by the time necessary for the entire tract to contribute runoff. The rational method formula is stated as follows: $Q = ciA$, where "Q" is the calculated peak flow rate in cubic feet per second, "c" is the dimensionless runoff coefficient (see Appendix C), "i" is the rainfall intensity in inches per hour, and "A" is the area of the tract in acres.

Reach - Any of the natural or man-made runoff conveyance channels used for watershed runoff modeling purposes to connect the subareas and transport flows downstream.

Recharge Volume (REv) – The portion of the water quality volume (WQv) used to maintain groundwater recharge rates at development sites. (see Section 304.J.)

Regulated Activities - Actions or proposed actions which impact upon proper management of stormwater runoff and which are governed by this Ordinance as specified in Section 105.

Regulated Earth Disturbance Activities – Earth disturbance activity other than agricultural plowing or tilling of one acre or more with a point source discharge to surface waters or to the municipality's storm sewer system or earth disturbance activity of five acres or more regardless of the planned runoff. This includes earth disturbance on any portion of, part or during any stage of a larger common plan of development.

Release Rate - The percentage of the pre-development peak rate of runoff for a development site to which the post-development peak rate of runoff must be controlled to avoid peak flow increases throughout the watershed.

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

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

Runoff - That part of precipitation which flows over the land.

Sediment Traps/Catch Basin Sumps – Chambers which provide storage below the outlet in a storm inlet to collect sediment, debris and associated pollutants, typically requiring periodic clean out.

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

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

Sheet Flow – Stormwater runoff flowing in a thin layer over the ground surface.

Soil-Cover-Complex Method - A method of runoff computation developed by NRCS which is based upon relating soil type and land use/cover to a runoff parameter called a Curve Number.

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

Spill Prevention and Response Program – A program that identifies procedures for preventing and, as needed, cleaning up potential spills and makes such procedures known and the necessary equipment available to appropriate personnel.

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

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

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

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

Storage Indication Method – A method of routing or moving an inflow hydrograph through a reservoir or detention structure. The method solves the mass conservation equation to determine an outflow hydrograph as it leaves the storage facility.

Storm Drainage Problem Areas - Areas which lack adequate stormwater collection and/or conveyance facilities and which present a hazard to persons or property. These areas are either documented in Appendix B of this Ordinance or identified by the municipality or municipal engineer.

Storm Sewer - A system of pipes or other conduits which carries intercepted surface runoff, street water and other wash waters, or drainage, but excludes domestic sewage and industrial wastes.

Stormwater – The surface runoff generated by precipitation reaching the ground surface.

Stormwater Filters - Any number of structural mechanisms such as multi-chamber catch basins, sand/peat filters, sand filters, and so forth which are installed to intercept stormwater flow and remove pollutants prior to discharge. Typically, these systems require periodic maintenance and clean out.

Stormwater Management Plan - The plan for managing stormwater runoff adopted by Lehigh and/or Northampton County for the Jordan Creek Watershed as required by the Act of October 4, 1978, P.L. 864, (Act 167), as amended, and known as the "Stormwater Management Act".

Stream - A Watercourse.

Subarea - The smallest unit of watershed breakdown for hydrologic modeling purposes for which the runoff control 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 ten acres, not involving any new street or easement of access or any residential dwelling, shall be exempted.

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

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

Technical Best Management Practice Manual & Infiltration Feasibility Report, November 2002 – The report written by Cahill Associates that addresses the feasibility of infiltration in carbonate bedrock areas in the Little Lehigh Creek Watershed. The report is available at the Lehigh Valley Planning Commission offices.

Trash/Debris Collectors – Racks, screens or other similar devices installed in a storm drainage system to capture coarse pollutants (trash, leaves, etc.).

Vegetated Buffers - Gently sloping areas that convey stormwater as sheet flow over a broad, densely vegetated earthen area, possibly coupled with the use of level spreading devices. Vegetated buffers should be situated on minimally disturbed soils, have low-flow velocities and extended residence times.

Vegetated Roofs - Vegetated systems installed on roofs that generally consist of a waterproof layer, a root-barrier, drainage layer (optional), growth media, and suitable vegetation. Vegetated roofs store and eventually evapotranspirate the collected rooftop rainfall; overflows may be provided for larger storms.

Vegetated Swales – (1) – Vegetated earthen channels designed to convey stormwater. These swales are not considered to be water quality BMPs.

(2) - Broad, shallow, densely vegetated, earthen channels designed to treat stormwater while slowly infiltrating, evapotranspirating, and conveying it. Swales should be gently sloping with low flow velocities to prevent erosion. Check dams may be added to enhance performance.

Watercourse - Any channel of conveyance of surface water having defined bed and banks, whether natural or artificial, with perennial or intermittent flow.

Water Quality Inserts – Any number of commercially available devices that are inserted into storm inlets to capture sediment, oil, grease, metals, trash, debris, etc.

Water Quality Volume (WQv) – The volume needed to capture and treat 90% of the average annual rainfall volume. (see Section 304.B.)

Watershed – The entire region or area drained by a river or other body of water, whether natural or artificial.

Wet Detention Ponds – Basins that provide for necessary stormwater storage as well as a permanent pool of water. To be successful, wet ponds must have adequate natural hydrology (both runoff inputs as well as soils and water table which allow for maintenance of a permanent pool of water) and must be able to support a healthy aquatic community so as to avoid creation of mosquito and other health and nuisance problems.

ARTICLE 3
STORMWATER MANAGEMENT REQUIREMENTS

SECTION 301. GENERAL REQUIREMENTS

A. All Regulated Activities in the municipality shall be subject to the stormwater management requirements of this Ordinance.

B. Storm drainage systems shall be provided to permit unobstructed flow in natural watercourses except as modified by stormwater detention facilities, recharge facilities, water quality facilities, pipe systems or open channels consistent with this Ordinance.

C. The existing locations of concentrated drainage discharge onto adjacent property shall not be altered without written approval of the affected property owner(s).

D. Areas of existing diffused drainage discharge onto adjacent property shall be managed such that, at minimum, the peak diffused flow does not increase in the general direction of discharge, except as otherwise provided in this Ordinance. If diffused flow is proposed to be concentrated and discharged onto adjacent property, the developer must document that there are adequate downstream conveyance facilities to safely transport the concentrated discharge to the point of pre-development flow concentration, to the stream reach or otherwise prove that no harm will result from the concentrated discharge. Areas of existing diffused drainage discharge shall be subject to any applicable release rate criteria in the general direction of existing discharge whether they are proposed to be concentrated or maintained as diffused drainage areas.

E. Where a site is traversed by watercourses other than those for which a 100-year floodplain is defined by the municipality, there shall be provided drainage easements conforming substantially with the line of such watercourses. The width of any easement shall be adequate to provide for unobstructed flow of storm runoff based on calculations made in conformance with Section 307 for the 100-year return period runoff and to provide a freeboard allowance of one-half (0.5) foot above the design water surface level. The terms of the easement shall prohibit excavation, the placing of fill or structures, and any alterations which may adversely affect the flow of stormwater within any portion of the easement. Also, periodic maintenance of the easement to ensure proper runoff conveyance shall be required. Watercourses for which the 100-year floodplain is formally defined are subject to the applicable municipal floodplain regulations.

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

G. Post construction BMPs shall be designed, installed, operated and maintained to meet the requirements of the Clean Streams Law and implementing regulations, including the established practices in 25 Pa. Code Chapter 102 and the specifications of this Ordinance as to prevent accelerated erosion in watercourse channels and at all points of discharge.

H. No Earth Disturbance Activities associated with any Regulated Activities shall commence until approval by the municipality of a plan which demonstrates compliance with the requirements of this Ordinance.

I. Techniques described in Appendix F (Low Impact Development) of this Ordinance are encouraged because they reduce the costs of complying with the requirements of this Ordinance and the State Water Quality Requirements.

J. Infiltration for stormwater management is encouraged where soils and geology permit, consistent with the provisions of this Ordinance and, where appropriate, the Recommendation Chart for Infiltration Stormwater Management BMPs in Carbonate Bedrock in Appendix D.

SECTION 302. PERMIT REQUIREMENTS BY OTHER GOVERNMENT ENTITIES

A. The following permit requirements apply to certain Regulated and Earth Disturbance Activities and must be met prior to commencement of Regulated and Earth Disturbance activities, as applicable:

1. All Regulated and Earth Disturbance activities subject to permit requirements by DEP under regulations at 25 Pa. Code Chapter 102.

2. Work within natural drainageways subject to permit by DEP under 25 Pa. Code Chapter 102 and Chapter 105.

3. Any stormwater management facility that would be located in or adjacent to surface waters of the Commonwealth, including wetlands, subject to permit by DEP under 25 Pa. Code Chapter 105.

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

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

SECTION 303. EROSION AND SEDIMENT CONTROL DURING REGULATED EARTH DISTURBANCE ACTIVITIES

A. No Regulated Earth Disturbance Activities within the municipality shall commence until approval by the municipality of an Erosion and Sediment Control Plan for construction activities. Written approval by DEP or a delegated County Conservation District shall satisfy this requirement.

B. An Erosion and Sediment Control Plan is required by DEP regulations for any Earth Disturbance Activity of 5,000 square feet or more under Pa. Code § 102.4(b).

C. A DEP NPDES Stormwater Discharges Associated with Construction Activities Permit is required for Regulated Earth Disturbance Activities under Pa. Code Chapter 92.

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

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

SECTION 304. POST CONSTRUCTION WATER QUALITY CRITERIA

A. No Regulated Earth Disturbance Activities within the municipality shall commence until approval by the municipality of a Drainage Plan which demonstrates compliance with this Ordinance. This Ordinance provides standards to meet NPDES Permit requirements associated with construction activities and MS4 permit requirements.

B. The Water Quality Volume (WQv) shall be captured and treated. The WQv shall be calculated two ways. First, WQv shall be calculated using the following formula:

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

Where WQv = water quality volume in acre-feet
c = Rational Method post-development runoff coefficient for the 2-year storm
P = 1.25 inches
A = Area in acres of proposed Regulated Activity

Second, the WQv shall be calculated as the difference in runoff volume from pre-development to post-development for the 2-year return period storm. The effect of closed depressions on the site shall be considered in this calculation. The larger of these two calculated volumes shall be used as the WQv to be captured and treated, except that in no case shall the WQv be permitted to exceed 1.25-inches of runoff over the site area. This standard does not limit the volume of infiltration an applicant may propose for purposes of water quantity/peak rate control.

C. The WQv shall be calculated for each post-development drainage direction on a site for sizing BMPs. Site areas having no impervious cover and no proposed disturbance during development may be excluded from the WQv calculations and do not require treatment.

D. If an applicant is proposing to use a dry extended detention basin, wet pond, constructed wetland or other BMP that ponds water on the land surface and may

receive direct sunlight, the discharge from that BMP must be treated by infiltration, a vegetated buffer, filter strip, bioretention, vegetated swale or other BMP that provides a thermal benefit to protect the High Quality waters of the [Watershed Name] from thermal impacts.

E. The WQv for a site as a result of the Regulated Activities must either be treated with infiltration or two acceptable BMPs such as those listed in Section 304.O., except for minor areas on the periphery of the site that cannot reasonably be drained to an infiltration facility or other BMP.

F. Infiltration BMPs shall not be constructed on fill unless the applicant demonstrates that the fill is stable and otherwise meets the infiltration BMP standards of this Ordinance.

G. The applicant shall document the bedrock type(s) present on the site from published sources. Any apparent boundaries between carbonate and non-carbonate bedrock shall be verified through more detailed site evaluations by a qualified geotechnical professional.

H. For each proposed Regulated Activity in the watershed where an applicant intends to use infiltration BMP's, the applicant shall conduct a Preliminary Site Investigation, including gathering data from published sources, a field inspection of the site, a minimum of one test pit and a minimum of two percolation tests, as outlined in Appendix G. This investigation will determine depth to bedrock, depth to the seasonal high water table, soil permeability and location of special geologic features, if applicable. This investigation may be done by a certified Sewage Enforcement Officer (SEO) except that the location(s) of special geologic features shall be verified by a qualified geotechnical professional.

I. Sites where applicants intend to use infiltration BMPs must meet the following criteria:

- Depth to bedrock below the invert of the BMP greater than or equal to 2 feet
- Depth to seasonal high water table below the invert of the BMP greater than or equal to 3 feet; except for infiltration of residential roof runoff where the seasonal high water table must be below the invert of the BMP. (If the depth to bedrock is between 2 and 3 feet and the evidence of the seasonal high water table is not found in the soil, no further testing to locate the depth to seasonal high water table is required.)
- Soil permeability (as measured by the adapted 25 PA Code § 73.15. percolation test in Appendix G) greater than or equal to 0.5 inches/hour and less than or equal to 12 inches per hour
- Setback distances or buffers as follows:
  - 100 feet from water supply wells
  - 15 feet downgradient or 100 feet upgradient from building foundations; except for residential development where the required

set back is 15 feet downgradient or 40 feet upgradient from building foundations.

- 50 feet from septic system drainfields; except for residential development where the required setback is 25 feet from septic system drainfields.
- 50 feet from a geologic contact with carbonate bedrock unless a Preliminary Site Investigation is done in the carbonate bedrock to show the absence of special geologic features within 50 feet of the proposed infiltration area.
- 100 feet from the property line unless documentation is provided to show that all setbacks from existing or potential future wells, foundations and drainfields on neighboring properties will be met; except for one and two family residential dwellings where the required setback is 40 feet unless documentation is provided to show that all setbacks from existing or potential future wells, foundations and drainfields on neighboring properties will be met.

J. For entirely non-carbonate sites, the Recharge Volume (REv) shall be infiltrated unless the applicant demonstrates that it is infeasible to infiltrate the REv for reasons of seasonal high water table, permeability rate, soil depth or setback distances; or except as provided in Section 304.U.

1. The REv shall be calculated as follows:

$$REv = (0.25) * (I)/12$$

Where REv = Recharge Volume in acre-feet
I = impervious area in acres

2. The Preliminary Site Investigation described in Section 304.H. is required and shall continue on different areas of the site until a potentially suitable infiltration location is found or the entire site is determined to be infeasible for infiltration. For infiltration areas that appear to be feasible based on the preliminary site investigation, the Additional Site Investigation and Testing as outlined in Appendix G shall be completed.

3. If an Applicant proposes infiltration, the municipality may determine infiltration to be infeasible if there are known existing conditions or problems that may be worsened by the use of infiltration.

4. The site must meet the conditions listed in Section 304.I.

5. If it is not feasible to infiltrate the full REv, the applicant shall infiltrate that portion of the REv that is feasible based on the site characteristics. If none of the REv can be infiltrated, REv shall be considered as part of the WQv and shall be captured and treated as described in Section 304.O.

6. If REv is infiltrated, it may be subtracted from the WQv required to be captured and treated.

K. In entirely carbonate areas, where the applicant intends to us infiltration BMPs, the Preliminary Site Investigation described in Section 304.H. shall be conducted. For infiltration areas that appear feasible based on the Preliminary Site Investigation, the applicant shall conduct the Additional Site Investigation and Testing as outlined in Appendix G. The soil depth, percolation rate and proposed loading rate, each weighted as described in Section 307, along with the buffer from special geologic features shall be compared to the Recommendation Chart for Infiltration Stormwater Management BMPs in Carbonate Bedrock in Appendix D to determine if the site is recommended for infiltration. In addition to the recommendation from Appendix D, the conditions listed in Section 304.I. are required for infiltration in carbonate areas.

Applicants are encouraged to infiltrate the REv, as calculated in Section 304.J., but are not required to use infiltration BMPs on a carbonate site even if the site falls in the "Recommended" range on the chart in Appendix D. Any amount of volume infiltrated can be subtracted from the WQv to be treated by non-infiltration BMPs. If infiltration is not proposed, the full WQv shall be treated by two acceptable BMPs, as specified in Section 304.O.

L. If a site has both carbonate and non-carbonate areas, the applicant shall investigate the ability of the non-carbonate portion of the site to fully meet this Ordinance to meet the requirements for REv for the whole site through infiltration. If that proves infeasible, infiltration in the carbonate area as described in Section 304.K. or 2 other non-infiltration BMPs as described in Section 304.O. must be used. No infiltration structure in the non-carbonate area shall be located within 50 feet of a boundary with carbonate bedrock, except when a Preliminary Site Investigation has been done showing the absence of special geologic features within 50 feet of the proposed infiltration area.

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

N. Site areas proposed for infiltration shall be protected from disturbance and compaction except as necessary for construction of infiltration BMPs.

O. If infiltration of the entire WQv is not proposed, the remainder of the WQv shall be treated by two acceptable BMPs in series for each discharge location. Sheet flow draining across a pervious area can be considered as one BMP. Sheet flow across impervious areas and concentrated flow shall flow through two BMPs. If sheet flow from an impervious area is to be drained across a pervious area as one BMP, the length of the pervious area must be equal to or greater than the length of impervious area. In no case may the same BMP be employed consecutively to meet the requirement of this section. Acceptable BMPs are listed below along with the recommended reference for design.

Best Management Practice	Design Reference Number[C]
Bioretention[A]	4, 5, 11, 16
Capture/Reuse[B]	4, 14
Constructed Wetlands	4, 5, 8, 10, 16
Dry Extended Detention Ponds	4, 5, 8, 12, 18
Minimum Disturbance/ Minimum Maintenance Practices	1, 9
Significant Reduction of Existing Impervious Cover	N/A
Stormwater Filters[A] (Sand, Peat, Compost, etc.)	4, 5, 10, 16
Vegetated Buffers/Filter Strips	2, 3, 5, 11, 16, 17
Vegetated Roofs	4, 13
Vegetated Swales[A]	2, 3, 5, 11, 16, 17
Water Quality Inlets[D]	4, 7, 15, 16, 19
Wet Detention Ponds	4, 5, 6, 8

[A] This BMP could be designed with or without an infiltration component. If infiltration is proposed, the site and BMP will be subject to the testing and other infiltration requirements in this Ordinance.

[B] If this BMP is used to treat the entire WQv then it is the only BMP required because of this BMPs superior water quality performance.

[C] See table below.

[D] Water Quality Inlets include such BMPs as Oil/Water Separators, Sediment Traps/Catch Basin Sumps, and Trash/Debris Collectors in Catch Basins.

Number	Design Reference Title
1	"Conservation Design For Stormwater Management – A Design Approach to Reduce Stormwater Impacts From Land Development and Achieve Multiple Objectives Related to Land Use", Delaware Department of Natural Resources and Environmental Control, The Environmental Management Center of the Brandywine Conservancy, September 1997
2	"A Current Assessment of Urban Best Management Practices: Techniques for Reducing Nonpoint Source Pollution in the Coastal Zone", Schueler, T. R., Kumble, P. and Heraty, M., Metropolitan Washington Council of Governments, 1992.
3	"Design of Roadside Channels with Flexible Linings", Federal Highway Administration, Chen, Y. H. and Cotton, G. K., Hydraulic Engineering Circular 15, FHWA-IP-87-7, McLean Virginia, 1988.
4	"Draft Stormwater Best Management Practices Manual", Pennsylvania Department of Environmental Protection, January 2005.
5	"Evaluation and Management of Highway Runoff Water Quality", Federal Highway Administration, FHWA-PD-96-032, Washington, D.C., 1996.
6	"Evaporation Maps of the United States", U.S. Weather Bureau (now NOAA/National Weather Service) Technical Paper 37, Published by Department of Commerce, Washington D.C., 1959.
7	"Georgia Stormwater Manual", AMEC Earth and Environmental, Center for Watershed Protection, Debo and Associates, Jordan Jones and Goulding, Atlanta Regional Commission, Atlanta, Georgia, 2001.
8	"Hydraulic Design of Highway Culverts", Federal Highway Administration, FHWA HDS 5, Washington, D.C., 1985 (revised May 2005).
9	"Low Impact Development Design Strategies *An Integrated Design Approach*, Prince Georges County, Maryland Department of Environmental Resources, June 1999.

Number	Design Reference Title
10	"Maryland Stormwater Design Manual", Maryland Department of the Environment, Baltimore, Maryland , 2000.
11	"Pennsylvania Handbook of Best Management Practices for Developing Areas", Pennsylvania Department of Environmental Protection, 1998.
12	"Recommended Procedures for Act 167 Drainage Plan Design", LVPC, Revised 1997.
13	"Roof Gardens History, Design, and Construction", Osmundson, Theodore. New York: W.W. Norton & Company, 1999.
14	"The Texas Manual on Rainwater Harvesting", Texas Water Development Board, Austin, Texas, Third Edition, 2005.
15	"VDOT Manual of Practice for Stormwater Management", Virginia Transportation Research Council, Charlottesville, Virginia, 2004.
16	"Virginia Stormwater Management Handbook", Virginia Department of Conservation and Recreation, Richmond, Virginia, 1999.
17	"Water Resources Engineering", Mays, L. W., John Wiley & Sons, Inc., 2005.
18	"Urban Hydrology for Small Watersheds", Technical Report 55, US Department of Agriculture, Natural Resources Conservation Service, 1986.
19	US EPA, Region 1 New England web site (as of August 2005) http://www.epa.gov/NE/assistance/ceitts/stormwater/techs/html.

P. Stormwater runoff from Hot Spot land uses shall be pre-treated. In no case, may the same BMP be employed consecutively to meet this requirement and the requirement in Section 304.O. Acceptable methods of pre-treatment are listed below.

Hot Spot Land Use	Pre-treatment Method(s)
Vehicle Maintenance and Repair Facilities including Auto Parts Stores	-Water Quality Inlets -Use of Drip Pans and/or Dry Sweep Material Under Vehicles/Equipment -Use of Absorbent Devices to Reduce Liquid Releases -Spill Prevention and Response Program
Vehicle Fueling Stations	-Water Quality Inlets -Spill Prevention and Response Program
Storage Areas for Public Works	-Water Quality Inlets -Use of Drip Pans and/or Dry Sweep Material Under Vehicles/Equipment -Use of Absorbent Devices to Reduce Liquid Releases -Spill Prevention and Response Program -Diversion of Stormwater away from Potential Contamination Areas
Outdoor Storage of Liquids	-Spill Prevention and Response Program
Commercial Nursery Operations	-Vegetated Swales/Filter Strips -Constructed Wetlands -Stormwater Collection and Reuse
Salvage Yards and Recycling Facilities*	-BMPs that are a part of a Stormwater Pollution Prevention Plan under an NPDES Permit

Hot Spot Land Use	Pre-treatment Method(s)
Fleet Storage Yards and Vehicle Cleaning Facilities*	-BMPs that are a part of a Stormwater Pollution Prevention Plan under an NPDES Permit
Facilities that Store or Generate Regulated Substances*	-BMPs that are a part of a Stormwater Pollution Prevention Plan under an NPDES Permit
Marinas*	-BMPs that are a part of a Stormwater Pollution Prevention Plan under an NPDES Permit
Certain Industrial Uses (listed under NPDES)*	-BMPs that are a part of a Stormwater Pollution Prevention Plan under an NPDES Permit

*Regulated under the NPDES Stormwater Program

Design references for the pre-treatment methods, as necessary, are listed below. If the applicant can demonstrate to the satisfaction of the municipality that the proposed land use is not a Hot Spot, then the pre-treatment requirement would not apply.

Pre-treatment Method	Design Reference^
Constructed Wetlands	4, 5, 8, 10, 16
Diversion of Stormwater Away from Potential Contamination Areas	4, 11
Stormwater Collection and Reuse (especially for irrigation)	4, 14
Stormwater Filters (Sand, Peat, Compost, etc.)	4, 5, 10, 16
Vegetated Swales	2, 3, 5, 11, 16, 17
Water Quality Inlets	4, 7, 15, 16, 19

^These numbers refer to the Design Reference Title Chart in Section 304.O. above.

Q. The use of infiltration BMPs is prohibited on Hot Spot land use areas.

R. Stormwater infiltration BMPs shall not be placed in or on a special geologic feature(s). Additionally, stormwater runoff shall not be discharged into existing on-site sinkholes.

S. Applicants shall request, in writing, Public Water Suppliers to provide the Zone I Wellhead Protection radius, as calculated by the method outlined in the Pennsylvania Department of Environmental Protection Wellhead Protection regulations, for any public water supply well within 400 feet of the site. In addition to the setback distances specified in Section 304.I., infiltration is prohibited in the Zone I radius as defined and substantiated by the Public Water Supplier in writing. If the applicant does not receive a response from the Public Water Supplier, the Zone I radius is assumed to be 100 feet.

T. The volume and rate of the net increase in stormwater runoff from the Regulated Activities must be managed to prevent the physical degradation of receiving waters from such effects as scour and streambank destabilization, to satisfy State Water Quality Requirements, by controlling the 2-year post-development runoff to a 30% Release Rate.

U. The municipality may, after consultation with DEP, approve alternative methods for meeting the State Water Quality Requirements other than those in this Section,

provided that they meet the minimum requirements of and do not conflict with State law including but not limited to the Clean Streams Law.

SECTION 305. STORMWATER MANAGEMENT DISTRICTS

A. Mapping of Stormwater Management Districts - To implement the provisions of the Jordan Creek Watershed Stormwater Management Plan, the municipality is hereby divided into Stormwater Management Districts consistent with the Jordan Creek Release Rate Map presented in the Plan Update. The boundaries of the Stormwater Management Districts are shown on an official map which is available for inspection at the municipal office. A copy of the official map at a reduced scale is included in Appendix A for general reference.

B. Description of Stormwater Management Districts - Two types of Stormwater Management Districts may be applicable to the municipality, namely Conditional/Provisional No Detention Districts and Dual Release Rate Districts as described below.

1. Conditional/Provisional No Detention Districts - Within these districts, the capacity of the "local" runoff conveyance facilities (as defined in Article 2) must be calculated to determine if adequate capacity exists. For this determination, the developer must calculate peak flows assuming that the site is developed as proposed and that the remainder of the local watershed is in the existing condition. The developer must also calculate peak flows assuming that the entire local watershed is developed per current zoning and that all new development would use the runoff controls specified by this Ordinance. The larger of the two peak flows calculated will be used in determining if adequate capacity exists. If adequate capacity exists to safely transport runoff from the site to the main channel (as defined in Article 2), these watershed areas may discharge post-development peak runoff without detention facilities. If the capacity calculations show that the "local" runoff conveyance facilities lack adequate capacity, the developer shall either use a 100% release rate control or provide increased capacity of downstream elements to convey increased peak flows consistent with Section 306.P. Any capacity improvements must be designed to convey runoff from development of all areas tributary to the improvement consistent with the capacity criteria specified in Section 306.D. By definition, a storm drainage problem area associated with the "local" runoff conveyance facilities indicates that adequate capacity does not exist. Sites in these districts are still required to meet all of the water quality requirements in Section 304.

2. Dual Release Rate Districts - Within these districts, the 2-year post-development peak discharge must be controlled to 30% of the pre-development 2-year runoff peak. Further, the 10-year, 25-year and 100-year post-development peak runoff must be controlled to the stated percentage of the pre-development peak. Release Rates associated with the 10- through 100-year events vary from 50% to 100% depending upon location in the watershed.

SECTION 306. STORMWATER MANAGEMENT DISTRICT IMPLEMENTATION PROVISIONS

A. Applicants shall provide a comparative pre- and post construction stormwater management hydrograph analysis for each direction of discharge and for the site overall to demonstrate compliance with the provisions of this Ordinance.

B. Any stormwater management controls required by this Ordinance and subject to a dual release rate criteria shall meet the applicable release rate criteria for each of the 2-, 10-, 25- and 100-year return period runoff events consistent with the calculation methodology specified in Section 307.

C. 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 provided as part of the Drainage Plan. The District boundaries as originally drawn coincide with topographic divides or, in certain instances, are drawn from the intersection of the watercourse and a physical feature such as the confluence with another watercourse or a potential flow obstruction (e.g. road, culvert, bridge, etc.). The physical feature is the downstream limit of the subarea and the subarea boundary is drawn from that point up slope to each topographic divide along the path perpendicular to the contour lines.

D. Any downstream capacity analysis conducted in accordance with this Ordinance shall use the following criteria for determining adequacy for accepting increased peak flow rates:

1. Natural or man-made channels or swales must be able to convey the increased runoff associated with a 2-year return period event within their banks at velocities consistent with protection of the channels from erosion.

2. Natural or man-made channels or swales must be able to convey the increased 25-year return period runoff without creating any hazard to persons or property.

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

E. For a proposed development site located within one release rate category subarea, the total runoff from the site shall meet the applicable release rate criteria. For development sites with multiple directions of runoff discharge, individual drainage directions may be designed for up to a 100% release rate so long as the total runoff from the site is controlled to the applicable release rate.

F. For a proposed development site located within two or more release category subareas, the peak discharge rate from any subarea shall be the pre-development peak discharge for that subarea multiplied by the applicable release rate. The calculated peak discharges shall apply regardless of whether the grading plan changes the drainage area by subarea. An exception to the above may be granted if discharges from multiple subareas re-combine in proximity to the site. In this case, peak discharge in any direction may be a 100% release rate provided that the overall site discharge meets the weighted average release rate.

G. For a proposed development site located partially within a release rate category subarea and partially within a Conditional/Provisional No Detention subarea, the size of the pre-development drainage area on a site may not be changed post-development to create potentially adverse conditions on downstream properties except as part of a "No Harm" or Hardship waiver procedure.

H. No portion of a site may be regraded between the [Watershed Name] Watershed and any adjacent watershed except as part of a "No Harm" or Hardship Waiver procedure.

I. Within a release rate category area, for a proposed development site which has areas which drain to a closed depression(s), the design release from the site will be the lesser of (a) the applicable release rate flow assuming no closed depression(s) or (b) the existing peak flow actually leaving the site. In cases where (b) would result in an unreasonably small design release, the design discharge of less than or equal to the release rate will be determined by the available downstream conveyance capacity to the main channel calculated using Section 306.D. and the minimum orifice criteria.

J. Off-site areas which drain through a proposed development site are not subject to release rate criteria when determining allowable peak runoff rates. However, on-site drainage facilities shall be designed to safely convey off-site flows through the development site using the capacity criteria in Section 306.D. and the detention criteria in Section 307.

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

L. Where the site area to be impacted by a proposed development activity differs significantly from the total site area, only the proposed impact area shall be subject to the release rate criteria. The impact area includes any proposed cover or grading changes.

M. Development proposals which, through groundwater recharge or other means, do not increase either the rate or volume of runoff discharged from the site compared to pre-development are not subject to the release rate provisions of this Ordinance.

N. "No Harm" Water Quantity Option - For any proposed development site not located in a Conditional/Provisional No Detention district, the developer has the option of using a less restrictive runoff control (including no detention) if the developer can prove that special circumstances exist for the proposed development site and that "no harm" would be caused by discharging at a higher runoff rate than that specified by the Plan. Special circumstances are defined as any hydrologic or hydraulic aspects of the development itself not specifically considered in the development of the Plan runoff control strategy. Proof of "no harm" would have to be shown from the development site through the remainder of the downstream drainage network to the confluence of the creek with the Delaware or Lehigh River. Proof of "no harm" must be shown using the capacity criteria specified in Section 306.D. if downstream capacity analysis is a part of the "no harm" justification.

Attempts to prove "no harm" based upon downstream peak flow versus capacity analysis shall be governed by the following provisions:

1. The peak flow values to be used for downstream areas for the design return period storms (2-, 10-, 25- and 100-year) shall be the values from the calibrated PSRM Model for the [Watershed Name] or as calculated by an applicant using an alternate method acceptable to the municipality. The flow values from the PSRM Model would be supplied to the developer by the municipality upon request.

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

3. Developer-proposed runoff controls which would generate increased peak flow rates at storm drainage problem areas would, by definition, be precluded from successful attempts to prove "no harm", except in conjunction with proposed capacity improvements for the problem areas consistent with Section 306.P.

Any "no harm" justifications shall be submitted by the developer as part of the Drainage Plan submission per Article 4. Developers submitting "no harm" justifications must still meet all of the water quality requirements in Section 304.

O. Regional Detention Alternatives - For certain areas within the study area, it may be more cost-effective to provide one control facility for more than one development site than to provide an individual control facility for each development site. The initiative and funding for any regional runoff control alternatives are the responsibility of prospective developers. The design of any regional control basins must incorporate reasonable development of the entire upstream watershed. The peak outflow of a regional basin would be determined based on the required release rate at the point of discharge.

P. Capacity Improvements - In certain instances, primarily within the Conditional/Provisional No Detention areas, local drainage conditions may dictate more stringent levels of runoff control than those based upon protection of the entire watershed. In these instances, if the developer could prove that it would be feasible to provide capacity improvements to relieve the capacity deficiency in the local drainage network, then the capacity improvements could be provided by the developer in lieu of runoff controls on the development site. Peak flow calculations shall be done assuming that the local watershed is in the existing condition and then assuming that the local watershed is developed per current zoning and using the specified runoff controls. Any capacity improvements would be designed using the larger of the above peak flows and the capacity criteria specified in Section 306.D. All new development in the entire subarea(s) within which the proposed development site is located shall be assumed to implement the developer's proposed discharge control, if any.

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

SECTION 307. CALCULATION METHODOLOGY

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

B. Infiltration BMP loading rate percentages in the Recommendation Chart for Infiltration Stormwater Management BMPs in Carbonate Bedrock in Appendix D shall be calculated as follows:

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

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

All disturbed areas to be made impervious:	weight at 100%
All disturbed areas to be made pervious:	weight at 50%
All undisturbed pervious areas:	weight at 0%
All existing impervious areas:	weight at 100%

C. Soil thickness is to be measured from the bottom of any proposed infiltration system. The effective soil thickness in the Recommendation Chart for Infiltration Stormwater Management BMPs in Carbonate Bedrock in Appendix D is the measured soil thickness multiplied by the thickness factor based on soil permeability (as measured by the adapted 25 PA Code § 73.15. percolation test in Appendix G), as follows:

PERMEABILITY RANGE*	THICKNESS FACTOR
6.0 to 12.0 inches/hour	0.8
2.0 to 6.0 inches/hour	1.0
1.0 to 2.0 inches/hour	1.4
0.75 to 1.0 inches/hour	1.2
0.5 to 0.75 inches/hour	1.0

*If the permeability rate (as measured by the adapted 25 PA Code § 73.15. percolation test in Appendix G) falls on a break between two thickness factors, the smaller thickness factor shall be used.

Sites with soil permeability greater than 12.0 in/hr or less than 0.5 in/hr, as measured by the adapted 25 PA Code § 73.15. percolation test in Appendix G, are not recommended for infiltration.

D. The design of any detention basin intended to meet the requirements of this Ordinance shall be verified by routing the design storm hydrograph through the proposed basin using the storage indication method or other methodology demonstrated to be more appropriate. For basins designed using the Rational Method technique, the design hydrograph for routing shall be either the Universal Rational Hydrograph or the Modified Rational Method trapezoidal hydrograph which maximizes detention volume. Use of the Modified Rational hydrograph shall be consistent with the procedure described in Section "PIPE.RAT" of the Users' Manual for the Penn State Urban Hydrology Model (1987).

E. BMPs designed to store or infiltrate runoff and discharge to surface runoff or pipe flow shall be routed using the storage indication method.

F. BMPs designed to store or infiltrate runoff and discharge to surface runoff or pipe flow shall provide storage volume for the full WQv below the lowest outlet invert.

G. Wet Detention Ponds designed to have a permanent pool for the WQv shall assume that the permanent pool volume below the primary outlet is full at the beginning of design event routing for the purposes of evaluating peak outflows.

H. All stormwater detention facilities shall provide a minimum 1.0 foot freeboard above the maximum pool elevation associated with the 2- through 25-year runoff events. A 0.5 foot freeboard shall be provided above the maximum pool elevation of the 100-year runoff event. The freeboard shall be measured from the maximum pool elevation to the invert of the emergency spillway. The 2- through 100-year storm events shall be controlled by the primary outlet structure. An emergency spillway for each basin shall be designed to pass the 100-year return frequency storm peak basin inflow rate with a minimum 0.5 foot freeboard measured to the top of basin. The freeboard criteria shall be met considering any offsite areas tributary to the basin as developed, as applicable. If this detention facility is considered to be a dam as per DEP Chapter 105, the design of the facility must be consistent with the Chapter 105 regulations, and may be required to pass a storm greater than the 100-year event.

I. The minimum circular orifice diameter for controlling discharge rates from detention facilities shall be three (3) inches. Designs where a lesser size orifice would be

required to fully meet release rates shall be acceptable with a 3-inch orifice provided that as much of the site runoff as practical is directed to the detention facilities. The minimum 3 inch diameter does not apply to the control of the WQv.

J. Runoff calculations using the soil-cover-complex method shall use the Natural Resources Conservation Service Type II 24-hour rainfall distribution. The 24-hour rainfall depths for the various return periods to be used consistent with this Ordinance may be taken from NOAA Atlas 14, Volume 2 Version 2.1, 2004 or the PennDOT Intensity - Duration - Frequency Field Manual ("PDT-IDF") (May 1986) for Region 4. The following values are taken from the PDT-IDF Field Manual:

Return Period	24-Hour Rainfall Depth
1-year	2.40 inches
2-year	3.00 inches
5-year	3.60 inches
10-year	4.56 inches
25-year	5.52 inches
50-year	6.48 inches
100-year	7.44 inches

A graphical and tabular presentation of the Type II-24 hour distribution is included in Appendix C.

K. Runoff calculations using the Rational Method shall use rainfall intensities consistent with appropriate times of concentration and return periods and NOAA Atlas 14, Volume 2 Version 2.1, 2004 or the Intensity-Duration-Frequency Curves as presented in Appendix C.

L. Runoff Curve Numbers (CN's) to be used in the soil-cover-complex method shall be based upon the matrix presented in Appendix C.

M. Runoff coefficients for use in the Rational Method shall be based upon the table presented in Appendix C.

N. All time of concentration calculations shall use a segmental approach which may include one or all of the flow types below:

1. Sheet Flow (overland flow) calculations shall use either the NRCS average velocity chart (Figure 3-1, Technical Release-55, 1975) or the modified kinematic wave travel time equation (equation 3-3, NRCS TR-55, June 1986). If using the modified kinematic wave travel time equation, the sheet flow length shall be limited to 50 feet for designs using the Rational Method and limited to 150 feet for designs using the Soil-Cover-Complex method.

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

3. Open Channel Flow travel times shall be determined from velocities calculated by the Manning Equation. Bankfull flows shall be used for determining velocities. Manning 'n' values shall be based on the table presented in Appendix C.

4. Pipe Flow travel times shall be determined from velocities calculated using the Manning Equation assuming full flow and the Manning 'n' values from Appendix C.

O. If using the Rational Method, all pre-development calculations for a given discharge direction shall be based on a common time of concentration considering both on-site and any off-site drainage areas. If using the Rational Method, all post-development calculations for a given discharge direction shall be based on a common time of concentration considering both on-site and any off-site drainage areas.

P. The Manning Equation shall be used to calculate the capacity of watercourses. Manning 'n' values used in the calculations shall be consistent with the table presented in Appendix C or other appropriate standard engineering 'n' value resources. Pipe capacities shall be determined by methods acceptable to the municipality.

Q. The Pennsylvania DEP, Chapter 105, Rules and Regulations, apply to the construction, modification, operation or maintenance of both existing and proposed dams, water obstructions and encroachments throughout the watershed. Criteria for design and construction of stormwater management facilities according to this Ordinance may differ from the criteria that are used in the permitting of dams under the Dam Safety Program.

ARTICLE 4
DRAINAGE PLAN REQUIREMENTS

SECTION 401. GENERAL REQUIREMENTS

For any of the Regulated Activities of this Ordinance, prior to the final approval of subdivision and/or land development plans, or the issuance of any permit, or the commencement of any Regulated Earth Disturbance Activity, the owner, subdivider, developer or his agent shall submit a Drainage Plan and receive municipal approval of the Plan.

SECTION 402. EXEMPTIONS

Exemptions from the Drainage Plan Requirements are as specified in Section 106.

SECTION 403. DRAINAGE PLAN CONTENTS

The following items shall be included in the Drainage Plan:

A. General

1. General description of project.

2. General description of proposed permanent stormwater controls.

3. The name and address of the project site, the name and address of the owner of the property and the name of the individual or firm preparing the Drainage Plan.

B. Map(s) of the Project Area Showing:

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

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

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

4. Other features including flood hazard boundaries, existing drainage swales, wetlands, closed depressions, sinkholes and areas of natural vegetation to be preserved.

5. Locations of proposed underground utilities, sewers and water lines. The locations of all existing and proposed utilities, sanitary sewers and water lines within 50 feet of property lines of the project site.

6. An overlay showing soil types and boundaries based on the Lehigh or Northampton County Soil Survey, as applicable, latest edition. Any hydric soils present on the site should be identified as such.

7. An overlay showing geologic types, boundaries and any special geologic features present on the site.

8. Proposed changes to land surface and vegetative cover.

9. Proposed structures, roads, paved areas and buildings.

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

11. Stormwater Management District boundaries applicable to the site.

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

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

14. A schematic showing all tributaries contributing flow to the site and all existing man-made features beyond the property boundary that would be affected by the project.

15. The location of all public water supply wells within 400 feet of the project and all private water supply wells within 100 feet of the project.

C. Stormwater Management Controls and BMPs

1. All stormwater management controls and BMPs shall be shown on a map and described, including:

a. Groundwater recharge methods such as seepage pits, beds or trenches. When these structures are used, the locations of septic tank infiltration areas and wells shall be shown.

b. Other control devices or methods such as roof-top storage, semi-pervious paving materials, grass swales, parking lot ponding, vegetated strips, detention or retention ponds, storm sewers, etc.

2. All calculations, assumptions and criteria used in the design of the BMPs shall be shown.

3. All site testing data used to determine the feasibility of infiltration on a site.

4. All details and specifications for the construction of the stormwater management controls and BMPs.

D. The BMP Operations and Management Plan, as required in Article 7, describing how each permanent stormwater BMP will be operated and maintained and the identity of the person(s) responsible for operations and maintenance. A statement must be included, signed by the landowner, acknowledging that the stormwater BMPs are fixtures that cannot be altered or removed without approval by the municipality.

E. An Environmental Resources Site Design Assessment that describes the following:

1. The extent to which the proposed grading and impervious cover avoid disturbance of significant environmental resources and preserve existing site hydrology.

2. An assessment of whether alternative grading and impervious cover site design could lessen the disturbance of significant environmental resources and/or make better use of the site hydrologic resources.

3. A description of how the proposed stormwater management controls and BMPs serve to mitigate any adverse impacts on environmental resources on the site.

Significant environmental resources considered in the site design assessment include, but are not limited to, steep slopes, ponds, lakes, streams, wetlands, hydric soils, floodplains, riparian vegetation, native vegetation and special geologic features.

SECTION 404. PLAN SUBMISSION

A. For Regulated Activities specified in Sections 105.A. and 105.B.:

1. The Drainage Plan shall be submitted by the developer to the municipal secretary (or other appropriate person) as part of the Preliminary Plan submission for the subdivision or land development.

2. Four (4) copies of the Drainage Plan shall be submitted.

3. Distribution of the Drainage Plan will be as follows:

   a. One (1) copy to the municipal governing body.

   b. One (1) copy to the municipal engineer.

   c. Two (2) copies to the Lehigh Valley Planning Commission, except for Drainage Plans involving less than 10,000 square feet of additional impervious cover.

4. Drainage Plans involving more than 10,000 square feet of additional impervious cover shall be submitted by the developer (possibly through the municipality) to the Lehigh Valley Planning Commission as part of the Preliminary Plan submission. The Lehigh Valley Planning Commission will conduct an advisory review of the Drainage Plan for consistency with the [Watershed Name] Watershed Stormwater Management Plan. The LVPC will not review details of the Erosion and Sedimentation Plan or the BMP Operations and Maintenance Plan.

   a. Two (2) copies of the Drainage Plan shall be submitted.

   b. The LVPC will provide written comments to the developer and the municipality, within a time frame consistent with established procedures under the Municipalities Planning Code, as to whether the Drainage Plan has been found to be consistent with the Stormwater Management Plan.

B. For Regulated Activities specified in Sections 105.C. and 105.D., the Drainage Plan shall be submitted by the developer to the municipal building permit officer as part of the building permit application.

C. For Regulated Activities specified in Sections 105.E., 105.F. and 105.G.:

1. The Drainage Plan shall be submitted by the developer to the Lehigh Valley Planning Commission for coordination with the DEP permit application process under Chapter 105 (Dam Safety and Waterway Management), Chapter 106 (Flood Plain Management) of DEP's Rules and Regulations and the NPDES regulations.

2. One (1) copy of the Drainage Plan shall be submitted.

D. Earthmoving for all regulated activities under Section 105 shall be conducted in accordance with the current federal and State regulations relative to the NPDES and DEP Chapter 102 regulations.

SECTION 405. DRAINAGE PLAN REVIEW

A. The municipality shall review the Drainage Plan, including the BMP Operations and Maintenance Plan, for consistency with the adopted [Watershed Name] Watershed Stormwater Management Plan as embodied by this Ordinance and with any permits issued by DEP. The municipality shall also review the Drainage Plan against any additional storm drainage provisions contained in the municipal subdivision and land development or zoning ordinance, as applicable.

B. The municipality shall notify the applicant in writing whether the Drainage Plan, including the BMP Operations and Maintenance Plan, is approved.

C. The municipality shall not approve any subdivision or land development (Regulated Activities 105.A. and 105.B.) or building permit application (Regulated Activities 105.C. and 105.D.) if the Drainage Plan has been found to be inconsistent with the Stormwater Management Plan.

D. The municipality may require an "As-Built Survey" of all stormwater BMPs and an explanation of any discrepancies with the Drainage Plan.

SECTION 406. MODIFICATION OF PLANS

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

SECTION 407. HARDSHIP WAIVER PROCEDURE

The municipality may hear requests for waivers where it is alleged that the provisions of this Ordinance inflict unnecessary hardship upon the applicant. The waiver request shall be in writing and accompanied by the requisite fee based upon a fee schedule adopted by the municipality. A copy of the waiver request shall be provided to each of the following:

municipality, municipal engineer, municipal solicitor and Lehigh Valley Planning Commission. The request shall fully document the nature of the alleged hardship.

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

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

2. That because of such physical circumstances or conditions, there is no possibility that the property can be developed in strict conformity with the provisions of this Ordinance, including the "no harm" provisions, and that the authorization of a waiver is therefore necessary to enable the reasonable use of the property;

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

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

5. That financial hardship is not the criteria for granting of a hardship waiver.

In granting any waiver, the municipality may attach such conditions and safeguards as it may deem necessary to implement the purposes of this Ordinance. If a Hardship Waiver is granted, the applicant must still manage the quantity, velocity, direction and quality of resulting storm runoff as is necessary to prevent injury to health, safety or other property.

A. For regulated activities described in Section 105.A. and B., the Board of Supervisors shall hear requests for and decide on hardship waiver requests on behalf of the municipality.

B. For regulated activities in Section 105.C., D., E., F. and G. the Zoning Hearing Board shall hear requests for and decide on hardship waiver requests on behalf of the municipality.

C. The municipality shall not waive the water quality provisions of this Ordinance.

ARTICLE 5
INSPECTIONS

SECTION 501. SCHEDULE OF INSPECTIONS

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

B. During any stage of the Regulated Earth Disturbance Activities, if the municipality or its designee determines that any BMPs are not being implemented in accordance with this Ordinance, the municipality may suspend or revoke any existing permits issued

by the municipality or other approvals issued by the municipality until the deficiencies are corrected.

ARTICLE 6
FEES AND EXPENSES

SECTION 601. GENERAL

The municipality may charge a reasonable fee for review of the Drainage Plan, including the BMP Operations and Maintenance Plan, to defray review costs incurred by the municipality. The applicant shall pay all such fees.

SECTION 602. EXPENSES COVERED BY FEES

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

A. The review of the Drainage Plan, including the BMP Operations and Maintenance Plan, by the municipality.

B. The site inspection.

C. The inspection of required controls and improvements during construction.

D. The final inspection upon completion of the controls and improvements required in the plan.

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

E. Administrative and clerical costs.

ARTICLE 7
STORMWATER BMP OPERATIONS AND MAINTENANCE PLAN REQUIREMENTS

SECTION 701. GENERAL REQUIREMENTS

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

SECTION 702. RESPONSIBILITIES FOR OPERATIONS AND MAINTENANCE OF BMPS

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

1. If a Plan includes structures or lots which are to be separately owned and in which streets, sewers and other public improvements are to be dedicated to the municipality, stormwater BMPs may also be dedicated to and maintained by the municipality;

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

B. The municipality shall make the final determination on the continuing operations and maintenance responsibilities. The municipality reserves the right to accept or reject the operations and maintenance responsibility for any or all of the stormwater BMPs.

SECTION 703. ADHERENCE TO APPROVED BMP OPERATIONS AND MAINTENANCE PLAN

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

SECTION 704. OPERATIONS AND MAINTENANCE AGREEMENT FOR PRIVATELY OWNED STORMWATER BMPS

A. The property owner shall sign an operations and maintenance agreement with the municipality covering all stormwater BMPs that are to be privately owned. The agreement shall be substantially the same as the agreement in Appendix E of this Ordinance.

B. Other items may be included in the agreement where determined by the municipality to be reasonable or necessary to guarantee the satisfactory operation and maintenance of all permanent stormwater BMPs. The agreement shall be subject to the review and approval of the municipality.

SECTION 705. STORMWATER MANAGEMENT EASEMENTS

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

SECTION 706. RECORDING OF APPROVED BMP OPERATIONS AND MAINTENANCE PLAN AND RELATED AGREEMENTS

A. The owner of any land upon which permanent BMPs will be placed, constructed or implemented, as described in the BMP Operations and Maintenance Plan, shall record the following documents in the Office of the Recorder of Deeds for Lehigh or

Northampton County, as applicable, within 90 days of approval of the BMP Operations and Maintenance Plan by the municipality:

1. The Operations and Maintenance Plan or a summary thereof

2. Operations and Maintenance Agreements under Section 704

3. Easements under Section 705

B. The municipality may suspend or revoke any approvals granted for the project site upon discovery of the failure of the owner to comply with this Section.

SECTION 707. MUNICIPAL STORMWATER BMP OPERATIONS AND MAINTENANCE FUND

A. If stormwater BMPs are accepted by the municipality for dedication, the municipality may require the applicant to pay a specified amount to the Municipal Stormwater BMP Operations and Maintenance Fund to help defray costs of operations and maintenance activities. The amount may be determined as follows:

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

2. The amount shall then be converted to present worth of the annual series values.

B. If a BMP is proposed that also serves as a recreation facility (e.g. ball field, lake), the municipality may adjust the amount due accordingly.

ARTICLE 8
PROHIBITIONS

SECTION 801. PROHIBITED DISCHARGES

A. No person in the municipality shall allow or cause to allow stormwater discharges into the municipality's separate storm sewer system which are not composed entirely of stormwater except as provided in subsection B below or as allowed under a State or Federal permit.

B. Discharges that may be allowed based on the municipality finding that the discharge(s) do not significantly contribute pollution to surface waters of the Commonwealth are listed below.

1. Discharges from fire fighting activities

2. Potable water sources including dechlorinated water line and fire hydrant flushings

3. Irrigation drainage

4. Routine external building washdown which does not use detergents or other compounds

5. Air conditioning condensate

6. Water from individual residential car washing

7. Springs

8. Water from crawl space pumps

9. Uncontaminated water from foundation or footing drains

10. Flows from riparian habitats and wetlands

11. Lawn watering

12. Pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spill material has been removed) and where detergents are not used

13. Dechlorinated swimming pool discharges

14. Uncontaminated groundwater

C. In the event that the municipality determines that any of the discharges identified in Section 801.B. significantly contribute to pollution of waters of the Commonwealth or is so notified by DEP, the municipality will notify the responsible person to cease the discharge.

D. Upon notice provided by the municipality under Section 801.C., the discharger will have a reasonable time, as determined by the municipality, to cease the discharge consistent with the degree of pollution caused by the discharge.

E. Nothing in this Section shall affect a discharger's responsibilities under state law.

SECTION 802. PROHIBITED CONNECTIONS

A. The following connections are prohibited, except as provided in Section 801.B. above:

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

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

SECTION 803. ROOF DRAINS

A. Roof drains shall not be connected to streets, sanitary or storm sewers or roadside ditches, except as provided in Section 803.B.

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

C. Roof drains shall discharge to infiltration areas or vegetative BMPs to the maximum extent practicable.

SECTION 804. ALTERATION OF BMPS

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

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

ARTICLE 9
RIGHT OF ENTRY, NOTIFICATION AND ENFORCEMENT

SECTION 901. RIGHT OF ENTRY

A. Upon presentation of proper credentials and with the consent of the land owner, duly authorized representatives of the municipality may enter at reasonable times upon any property within the municipality to inspect the implementation, condition or operation and maintenance of the stormwater BMPs or to investigate or ascertain the condition of the subject property in regard to any aspect regulated by this Ordinance.

B. In the event that the land owner refuses admission to the property, duly authorized representatives of the municipality may seek an administrative search warrant issued by a district justice to gain access to the property.

SECTION 902. NOTIFICATION

A. Whenever the municipality finds that a person has violated a prohibition or failed to meet a requirement of this Ordinance, the municipality may order compliance by written notice to the responsible person. Such notice may require without limitation:

1. The name of the owner of record and any other person against whom the municipality intends to take action

2. The location of the property in violation

3. The performance of monitoring, analyses and reporting

4. The elimination of prohibited connections or discharges

5. Cessation of any violating discharges, practices or operations

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

7. Payment of a fine to cover administrative and remediation costs

8. The implementation of stormwater BMPs

9. Operation and maintenance of stormwater BMPs

B. Such notification shall set forth the nature of the violation(s) and establish a time limit for correction of the violation(s). Said notice may further advise that should the violator fail to take the required action within the established deadline, the work will be done by the municipality or designee and the expense thereof, together with all related lien and enforcement fees, charges and expenses, shall be charged to the violator.

C. Failure to comply within the time specified shall also subject such person to the penalty provisions of this Ordinance. All such penalties shall be deemed cumulative and shall not prevent the municipality from pursuing any and all other remedies available in law or equity.

SECTION 903. PUBLIC NUISANCE

A. The violation of any provision of this Ordinance is hereby deemed a Public Nuisance.

B. Each day that an offense continues shall constitute a separate violation.

SECTION 904. SUSPENSION AND REVOCATION OF PERMITS AND APPROVALS

A. Any building, land development or other permit or approval issued by the municipality may be suspended or revoked by the municipality for:

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

2. A violation of any provision of this Ordinance

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

B. A suspended permit or approval shall be reinstated by the municipality when:

1. The municipality or designee has inspected and approved the corrections to the stormwater BMPs or the elimination of the hazard or nuisance.

2. The municipality is satisfied that the violation of the ordinance, law or rule and regulation has been corrected.

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

C. A permit or approval which has been revoked by the municipality cannot be reinstated. The applicant may apply for a new permit under the procedures outlined in this Ordinance.

SECTION 905. PENALTIES

A. Any person, partnership or corporation who or which has violated the provisions of this Ordinance shall, upon being found liable therefor in a civil enforcement proceeding commenced by the municipality, pay a judgment of not more than Five Hundred ($500.00) Dollars plus all court costs, including reasonable attorney's fees incurred by the municipality as a result thereof. No judgment shall commence or be imposed, levied or payable until the date of the determination of a violation by the district justice. If the defendant neither pays nor timely appeals the judgment, the municipality may enforce the judgment pursuant to a separate violation, unless the district justice, determining that there has been a violation, further determines that there was a good faith basis for the person, partnership, or corporation violating this Chapter to have believed that there was no such violation, in which event there shall be deemed to have been only one such violation until the fifth (5^{th}) day following the date of the determination of a violation by the district justice and thereafter each day that a violation continues shall constitute a separate violation.

B. The court of common pleas, upon petition, may grant an order of stay upon cause shown, tolling the per diem judgment pending a final adjudication of the violation and judgment.

C. Nothing contained in this Section shall be construed or interpreted to grant to any person or entity other than the municipality the right to commence any action for enforcement pursuant to this Section.

D. District justices shall have initial jurisdiction in proceedings brought under this Section.

E. In addition, the municipality, through its solicitor, may institute injunctive, mandamus or any other appropriate action or proceeding at law or in equity for the enforcement of this 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 906. APPEALS

Any person aggrieved by any action of the municipality or its designee relevant to the provisions of this Ordinance may appeal using the appeal procedures established in the Pennsylvania Municipalities Planning Code.

SECTION 990. REPEALER

All ordinances and parts of ordinances inconsistent herewith be, and the same, are hereby repealed.

SECTION 1000. EFFECTIVE DATE

The provisions of this Ordinance shall become effective five (5) days following enactment of this Ordinance.

DULY ENACTED AND ORDAINED this 5 day of April, 2007, by the Board of Supervisors of the Township of Lowhill, Lehigh County, Pennsylvania, in lawful session and duly assembled.

BOARD OF SUPERVISORS OF THE TOWNSHIP OF LOWHILL

By: Eugene R. Weiner
Eugene R. Weiner, Chairman

By: Richard B. Hughes
Richard B. Hughes,
Vice Chairman

By: Frank R. Dengler
Frank R. Dengler, Supervisor

ATTEST:

Lucille C. Hahn
Lucille C. Hahn, Secretary, Lowhill Township

APPENDIX A

A-1 Map of JORDAN CREEK Watershed

APPENDIX B

B-1 Map of Storm Drainage Problem Areas

B-2 Description of Storm Drainage Problem Areas

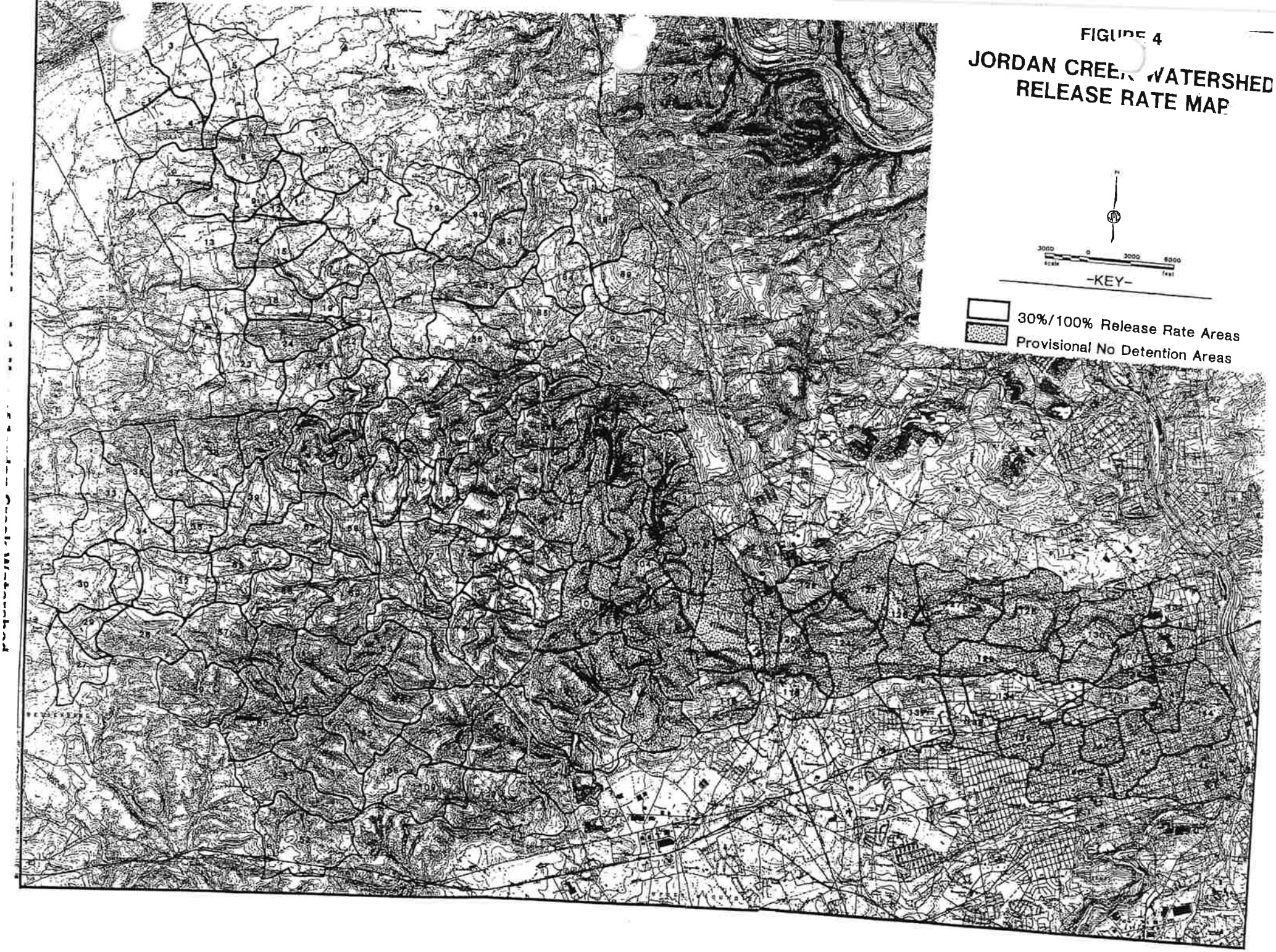


FIGURE 4
JORDAN CREEK WATERSHED
RELEASE RATE MAP
3000
0
3000
6000
-KEY-
30%/100% Release Rate Areas
Provisional No Detention Areas

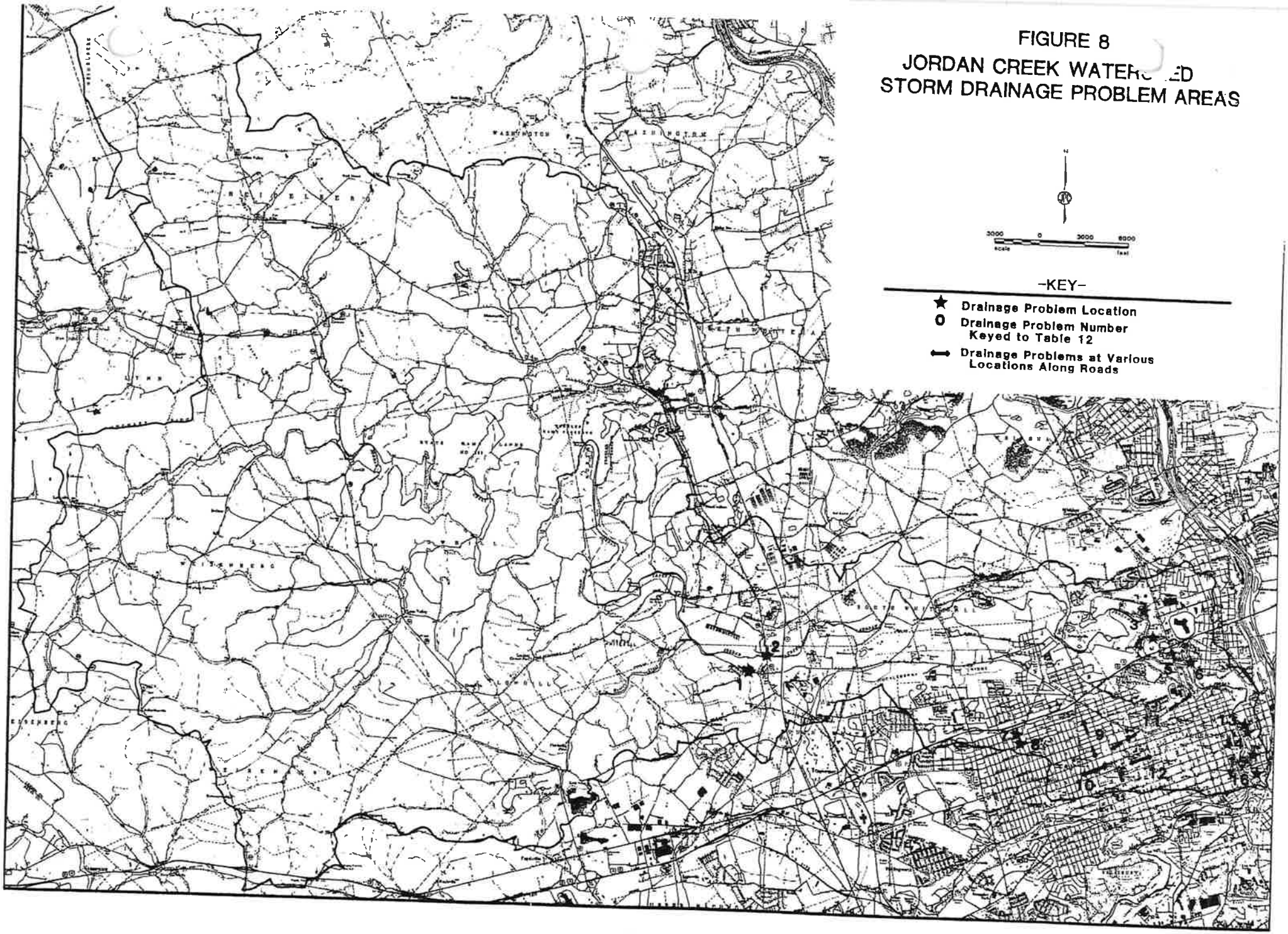


FIGURE 8
JORDAN CREEK WATERSHED
STORM DRAINAGE PROBLEM AREAS
N
3000 0 3000 6000
scale feet
-KEY-
Drainage Problem Location
Drainage Problem Number Keyed to Table 12
Drainage Problems at Various Locations Along Roads

TABLE 12
JORDAN CREEK WATERSHED
STORM DRAINAGE PROBLEM AREAS

No.	Location	Municipality	Problem Description	Subarea No.	Reach No.	Proposed Solution
1	Main Street at Guthsville	South Whitehall	Street Flooding	117	115, 116	None proposed
2	Rt. 309 over Jordan Creek at Guthsville	South Whitehall	Street Flooding	120	119	None proposed
3	Helfrich Springs Apts.	Whitehall	Property Flooding	130	--	None proposed
4	Whitehall Estates Townhouses	Whitehall	Street and Property Flooding	131	--	None proposed
5	North 7th Street (between City Line and Rt. 22)	Whitehall	Street Flooding	131, 133, 143	--	None proposed
6	Park View Apts.	Whitehall	Property Flooding	143	136	None proposed
7	Pennsylvania Street (between 26th and 27th Streets)	South Whitehall	Street Flooding	139	--	Storm Sewers
8	26th and Highland Streets	Allentown	Street Flooding	139	--	Improve collection system (by South Whitehall Township)
9	19th Street (between Tilghman and Highland Streets)	Allentown	Street Flooding	140	--	Relief Line
10	Andrew Street (between 18th and 21st)	Allentown	Street Flooding, Undersized collection conduit	140	--	None proposed

TABLE 12 (cont'd)
JORDAN CREEK WATERSHED
STORM DRAINAGE PROBLEM AREAS

No.	Location	Municipality	Problem Description	Subarea No.	Reach No.	Proposed Solution
11	Sumner Avenue (between 6th and 17th Streets)	Allentown	Street Flooding	141, 142, 143	--	Add/Improve inlets
12	Liberty Street (between 13th and 15th Streets)	Allentown	Street Flooding	142	--	Improve Inlets
13	224 North 3rd Street	Allentown	Street and Property Flooding	144	--	None proposed
14	3rd & Gordon Streets	Allentown	Street Flooding	145	--	None proposed
15	3rd & Linden Streets	Allentown	Street Flooding from debris	145	--	Removal of RR piers and bridge
16	3rd & Union Streets	Allentown	Street Flooding	145	--	None proposed

APPENDIX C

C-1 NRCS Type II 24-Hour Rainfall Distribution (Graphic & Tabular)

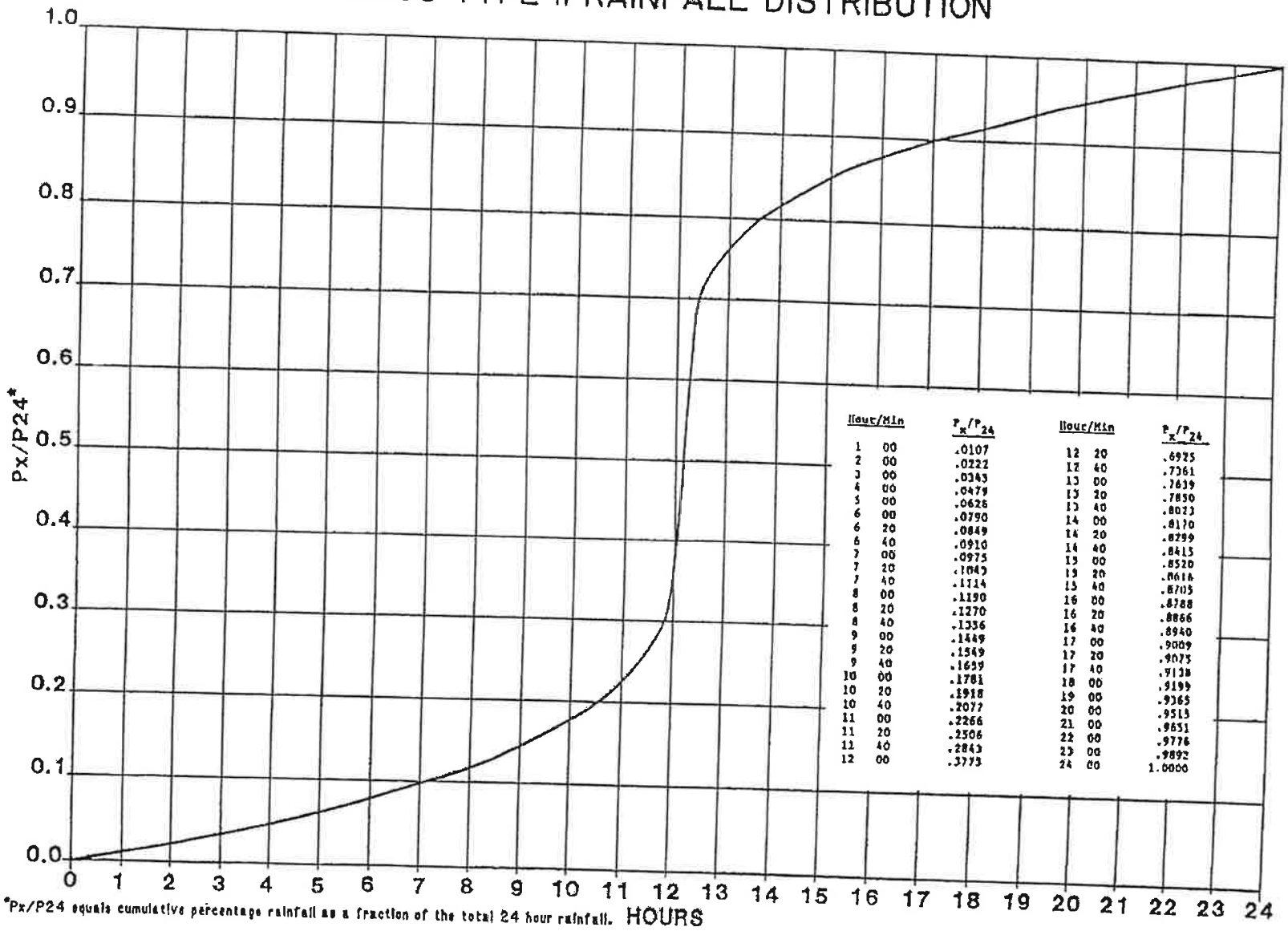
C-2 Intensity-Duration-Frequency Curves

C-3 Runoff Curve Numbers and Percent Imperviousness Values

C-4 Runoff Coefficients for the Rational Method

C-5 Manning 'n' Values

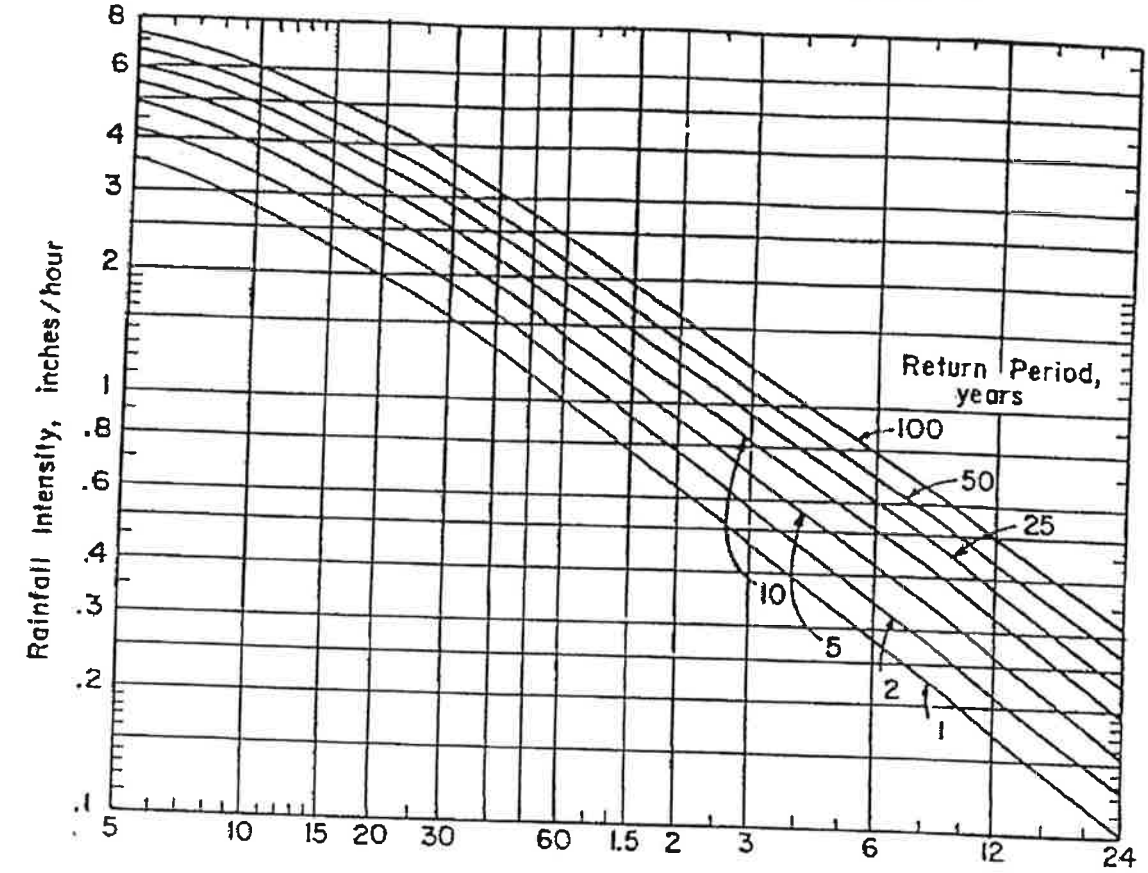
NRCS TYPE II RAINFALL DISTRIBUTION

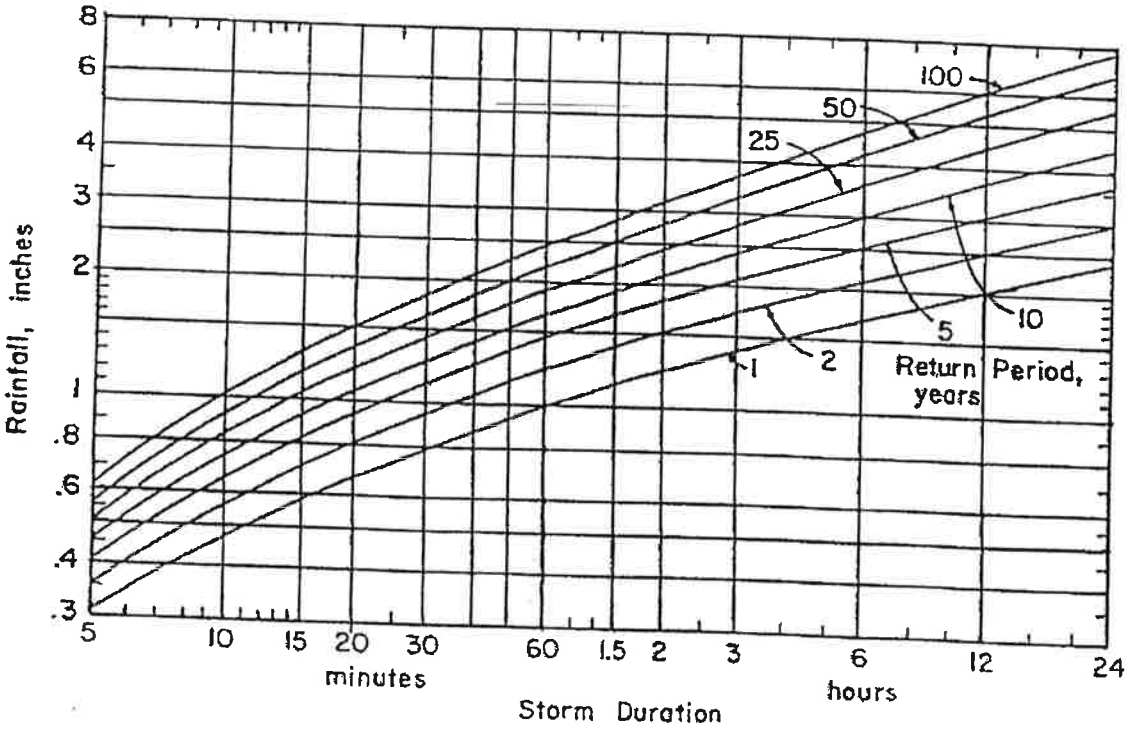


Hour/Min	P_x/P_{24}	Hour/Min	P_x/P_{24}
1 00	.0107	12 20	.6925
2 00	.0222	12 40	.7361
3 00	.0343	13 00	.7639
4 00	.0479	13 20	.7850
5 00	.0626	13 40	.8023
6 00	.0790	14 00	.8170
6 20	.0849	14 20	.8299
6 40	.0910	14 40	.8413
7 00	.0975	15 00	.8520
7 20	.1049	15 20	.8616
7 40	.1114	15 40	.8705
8 00	.1190	16 00	.8788
8 20	.1270	16 20	.8866
8 40	.1336	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	.9513
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.

INTENSITY–DURATION–FREQUENCY CURVES*





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

RUNOFF CURVE NUMBERS AND PERCENT IMPERVIOUSNESS VALUES*

Cover Description		Curve numbers for hydrologic soil group**			
Land Use/Cover Type	Average percent impervious area	A	B	C	D
Open space (lawns, parks, golf courses, cemeteries, etc.):					
Good condition (grass cover greater than 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
⅛ acre or less (townhouses)	65	77	85	90	92
¼ acre	38	61	75	83	87
⅓ acre	30	57	72	81	86
½ acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Woods		30	55	70	77
Agriculture		Refer to Table 2-2b in source document (TR55) by crop type and treatment.			

*Source: Natural Resources Conservation Service Technical Release No. 55, Second Edition, June 1986.

**Hydrologic Soil Group based on the County Soil Survey latest edition.

RUNOFF COEFFICIENTS FOR THE RATIONAL METHOD* HYDROLOGIC SOIL GROUP AND SLOPE RANGE**												
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[A]	[a]0.18 [b]0.23	0.23 0.29	0.28 0.34	0.24 0.30	0.29 0.36	0.33 0.40	0.30 0.36	0.34 0.41	0.38 0.45	0.33 0.39	0.37 0.44	0.41 0.48
Pasture[B]	0.09 0.12	0.13 0.17	0.17 0.23	0.19 0.24	0.24 0.30	0.29 0.36	0.27 0.33	0.31 0.38	0.36 0.43	0.31 0.37	0.35 0.42	0.39 0.46
Meadow, Lawn[C]	0.05 0.07	0.08 0.12	0.12 0.17	0.15 0.19	0.20 0.25	0.24 0.30	0.23 0.28	0.28 0.34	0.32 0.39	0.28 0.33	0.32 0.39	0.36 0.43
Forest, Woods	0.03 0.04	0.05 0.08	0.08 0.12	0.11 0.15	0.16 0.21	0.20 0.26	0.20 0.25	0.25 0.31	0.29 0.36	0.25 0.31	0.30 0.37	0.34 0.41
Gravel	0.24 0.30	0.29 0.36	0.33 0.40	0.32 0.38	0.36 0.43	0.40 0.47	0.35 0.42	0.39 0.46	0.43 0.50	0.37 0.44	0.41 0.48	0.44 0.51
Parking, Other Impervious	0.85 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
Residential, Commercial, Industrial and Other "Developed"	Runoff coefficients should be calculated based upon weighted average of impervious area coefficients and pervious area coefficients from above based upon soil type, slope and the particular development proposal.											

*Coefficients for all land uses except parking and other impervious cover are based on the Rossmiller Equation for translating NRCS curve numbers into Rational Method 'c' values. The source for the parking and other impervious cover coefficients is RAWLS, W.J., S.L. WONG and R.H. McCUEN, 1981. Comparison of urban flood frequency procedures. Preliminary draft report prepared for the Soil Conservation Service, Beltsville, MD.

**Hydrologic Soil Group based on the county soil survey latest edition.

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

[A]Represents average of cultivated land with and without conservation treatment from TR-55, January 1975. These values are consistent with several categories of cultivated lands from TR-55, June 1986.
[B]Represents grasslands in fair condition with 50% to 75% grass cover.
[C]Represents grasslands in good condition with greater than 75% grass cover.

MANNING 'n' VALUES BY TYPICAL REACH DESCRIPTION

Reach Description	Manning 'n'
Natural stream, clean, straight, no rifts Or pools	0.030
Natural stream, clean, winding, some pools And shoals	0.040
Natural stream, winding, pools, shoals, Stony with some weeds	0.050
Natural stream, sluggish with deep pools And weeds	0.070
Natural stream or swale, very weedy or With timber under brush	0.100
Concrete pipe, culvert or channel	0.012
Corrugated metal pipe	0.012-0.027*

*Depending upon type and diameter.

ROUGHNESS COEFFICIENTS (MANNING 'n') FOR SHEET FLOW

Surface Description	Manning 'n'[1]
Smooth surfaces (concrete, asphalt, gravel, or bare soil)	0.011
Fallow (no residue)	0.050
Cultivated soils:	
Residue cover <= 20%	0.060
Residue cover > 20%	0.170
Grass:	
Short grass prairie	0.150
Dense grasses[2]	0.240
Bermuda grass	0.410
Range (natural)	0.130
Woods:[3]	
Light underbrush	0.400
Dense underbrush	0.800

[1]The n values are a composite of information compiled by Engman (1986).
[2]Includes species such as weeping lovegrass, bluegrass, buffalo grass, blue grama grass and native grass mixtures.
[3]When selecting n, consider cover to a height of about 0.1 ft. this is the only part of the plant cover that will obstruct sheet flow.

APPENDIX D

Recommendation Chart for Infiltration Stormwater Management BMPs in Carbonate Bedrock*

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

RECOMMENDED

NOT RECOMMENDED

* Source: Developed by Cahill Associates based on information in "Technical Best Management Practice Manual & Infiltration Feasibility Report", November 2002 and input from the LVPC, 2003.

** Special Geologic Feature Buffer widths are as follows:

Low Buffer is less than 50 feet
Medium Buffer is 50 feet to 100 feet
High Buffer is greater than 100 feet

*** Rates greater than 500% not recommended.

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

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

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

APPENDIX E

STORMWATER BEST MANAGEMENT PRACTICES OPERATIONS AND MAINTENANCE AGREEMENT

THIS AGREEMENT, made and entered into this _____ day of _____, 200__, by and between _____, (hereinafter the "Landowner"), and _____, _____ County, Pennsylvania, (hereinafter "municipality");

WITNESSETH

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

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

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

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

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

- BMP – "Best Management Practice;" activities, facilities, designs, measures or procedures used to manage stormwater impacts from land development, to protect and maintain water quality and groundwater recharge and to otherwise meet the purposes of the Municipal Stormwater Management Ordinance, including but not limited to infiltration trenches, seepage pits, filter strips, bioretention, wet ponds, permeable paving, rain gardens, grassed swales, forested buffers, sand filters and detention basins.
- Infiltration Trench – A BMP surface structure designed, constructed, and maintained for the purpose of providing infiltration or recharge of stormwater into the soil and/or groundwater aquifer,
- Seepage Pit – An underground BMP structure designed, constructed, and maintained for the purpose of providing infiltration or recharge of stormwater into the soil and/or groundwater aquifer,
- Rain Garden – A BMP overlain with appropriate mulch and suitable vegetation designed, constructed, and maintained for the purpose of providing infiltration or recharge of stormwater into the soil and/or underground aquifer, and

WHEREAS, the municipality requires, through the implementation of the Plan, that stormwater management BMPs as required by said Plan and the Municipal Stormwater

Management Ordinance be constructed and adequately operated and maintained by the Landowner, his successors and assigns, and

NOW, THEREFORE, in consideration of the foregoing promises, the mutual covenants contained herein, and the following terms and conditions, the parties hereto agree as follows:

1. The BMPs shall be constructed by the Landowner in accordance with the plans and specifications identified in the Plan.
2. The Landowner shall operate and maintain the BMP(s) as shown on the Plan in good working order acceptable to the municipality and in accordance with the specific maintenance requirements noted on the Plan.
3. The Landowner hereby grants permission to the municipality, its authorized agents and employees, to enter upon the property, at reasonable times and upon presentation of proper identification, to inspect the BMP(s) whenever it deems necessary. Whenever possible, the municipality shall notify the Landowner prior to entering the property.
4. In the event the Landowner fails to operate and maintain the BMP(s) as shown on the Plan in good working order acceptable to the municipality, the municipality or its representatives may enter upon the Property and take whatever action is deemed necessary to maintain said BMP(s). This provision shall not be construed to allow the municipality to erect any permanent structure on the land of the Landowner. It is expressly understood and agreed that the municipality is under no obligation to maintain or repair said facilities, and in no event shall this Agreement be construed to impose any such obligation on the municipality.
5. In the event the municipality, pursuant to this Agreement, performs work of any nature, or expends any funds in performance of said work for labor, use of equipment, supplies, materials, and the like, the Landowner shall reimburse the municipality for all expenses (direct and indirect) incurred within 10 days of receipt of invoice from the municipality *and if not timely paid, a municipal lien shall be placed upon the premises for 110% of the invoice amount, plus statutorily allowed fees, expenses and costs.*
6. The intent and purpose of this Agreement is to ensure the proper maintenance of the onsite BMP(s) by the Landowner; provided, however, that this Agreement shall not be deemed to create or effect any additional liability of any party for damage alleged to result from or be caused by stormwater runoff.
7. The Landowner, its executors, administrators, assigns, and other successors in interests, *hereby* release *and hold harmless* the municipality's employees and designated representatives from all damages, accidents, casualties, occurrences or claims which might arise or be asserted against said employees and representatives from the construction, presence, existence, or maintenance of the BMP(s) by the Landowner or municipality. In the event that a claim is asserted against the municipality, its designated representatives or employees, the municipality shall promptly notify the Landowner and the Landowner shall defend, at his own expense, any suit based on the claim. If any judgment or claims against the municipality's employees or designated representatives shall be allowed, the Landowner shall pay all costs and expenses regarding said judgment or claim.
8. The municipality shall inspect the BMP(s) *as necessary* to ensure their continued functioning.

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

ATTEST:

WITNESS the following signatures and seals:

(SEAL) For the municipality:

_____

(SEAL) For the Landowner:

_____

ATTEST:

_____ (City, Borough, Township)

County of _____, Pennsylvania

I, _____, a Notary Public in and for the County and State aforesaid, whose commission expires on the _____ day of _____, 200_, do hereby certify that _____ whose name(s) is/are signed to the foregoing Agreement bearing date of the _____ day of _____, 200_, has acknowledged the same before me in my said County and State.

GIVEN UNDER MY HAND THIS _____ day of _____, 200_.

_____ _____

NOTARY PUBLIC **(SEAL)**

APPENDIX F

LOW IMPACT DEVELOPMENT PRACTICES

ALTERNATIVE APPROACH FOR MANAGING STORMWATER RUNOFF

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

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

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

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

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

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

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

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

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

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

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

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

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

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

APPENDIX G

PRELIMINARY SITE INVESTIGATION AND TESTING REQUIRMENTS

Required Data and Site Information: The following data shall be gathered utilizing standard testing procedures as part of a Preliminary Site Investigation:

- Bedrock composition – Any apparent boundaries between carbonate and non-carbonate bedrock must be verified by a qualified geotechnical professional.
- Bedrock structural geology – This includes the possible presence of faults and mapping of conspicuous fracture traces or lineaments.
- Overburden and soil mantle composition and thickness
- Permeability of the soil
- Depth to the seasonal high water table
- Presence of special geologic features – This includes sinkholes, closed depressions, fracture traces, lineaments, joints, faults, caves , pinacles and geologic contacts between carbonate and non-carbonate bedrock

Preliminary Site Investigation Required for Sites Intending to Use Infiltration

Review of Available Data, Maps and Reports: Some of the required information, as listed above, can be found in existing published data. Suggested resources include the following:

- Geologic maps and references for the development area
- The Little Lehigh Creek Basin Carbonate Prototype Area Closed Depression Map – available at the LVPC
- USGS topographic maps
- Lehigh and Northampton County soil survey maps
- Aerial photographs from the LVPC or other sources
- Relevant Pennsylvania Geologic Survey Open File Reports that provide maps of sinkholes and Karst features for Lehigh County (OF 87-01) and Northampton County (OF 87-02)
- Kochanov and Reese (2003). Density of Mapped Karst Feature in South-Central and Southeastern Pennsylvania (Map 68)
- DCNR Online Sinkhole Inventory - (http://www.dcnr.state.pa.us/topogeo/hazards/sinkhole/default.asp)

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

Soil Test Pit and Percolation Test Requirements: A minimum of one test pit and a minimum of 2 percolation tests are required for every site. A test pit is a 2-3 foot wide, 8 foot deep trench excavated with a backhoe for observing subsurface conditions. The test pits will be used to describe soil depth and quality, including soil horizons, and testing of permeability or percolation rates and can be conducted by a certified Sewage Enforcement Officer.

Percolation tests are to be conducted as follows (adapted from § 73.15. "Percolation Tests" of the Pennsylvania Code)

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

2. An "Initial Presoak" should not be performed.

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

4. Holes having a uniform diameter of 6 to 10-inches shall be bored or dug as follows:
   a. To the depth of the bottom of the possible infiltration BMP
   b. Alternate depths if the test pits/auger holes indicate that the soils are more suitable at a different depth (i.e., if a clay horizon is identified and more suitable soils are located beneath the horizon, and infiltration test should be performed in the suitable horizon).

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

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

7. The drop in the water level during the last 30 minutes of the final presoaking period shall be applied to the following standard to determine the time interval between readings for each percolation hole:
   a. If water remains in the hole, the interval for readings during the percolation test shall be 30 minutes.
   b. If no water remains in the hole, the interval for readings during the percolation test may be reduced to 10 minutes.

8. After the final presoaking period, water in the hole shall again be adjusted to approximately 6-inches over the gravel and readjusted when necessary after each reading.
   a. Measurement to the water level in the individual percolation holes shall be made from a fixed reference point and shall continue at the interval determined from step No. 7 (above) for each individual percolation hole until a minimum of eight readings are completed or until a stabilized rate of drop is obtained, whichever occurs first. A stabilized rate of drop means a difference of ¼-inch or less of drop between the highest and lowest readings of four consecutive readings.
   b. The drop that occurs in the final period in percolation test holes, expressed as inches per hour, shall be used to calculate the average percolation rate.
   c. When the rate of drop in a percolation test is too slow to obtain a measurable rate, the rate of 0.25 inches per hour shall be assigned to that

hole for use in calculating the average percolation rate. The infiltration area may be placed over holes with no measurable rate when the average percolation rate for the possible infiltration area is within the acceptable range.

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

Additional Site Investigation and Testing Required if Infiltration is Proposed

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

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

*No. of Test Pits required = Infiltration sq. ft./43,560 sq. ft. x test pit density from chart rounded up to the nearest whole number

** No. of Percolation Tests required = Infiltration sq. ft./43,560 sq. ft. x percolation tests from chart rounded up to the nearest whole number

***Auger testing is only required on Carbonate sites.

Soil Auger Testing Requirements for Carbonate Areas: Because soil depth is not uniform in many carbonate areas, test pits will not be sufficient to accurately determine the depth to bedrock. Augering provides this essential data as inexpensively as possible. Track-rig rotary soil auger test drilling allows relatively inexpensive, qualitative determination of the presence of overburden voids and will generally penetrate to the top-of-bedrock. Augers typically extend to depths of 20 feet. Special augers extend to as much as 50 feet. Augers do not extend into the bedrock. Auger testing should be performed in a grid pattern across the proposed infiltration area, spaced as indicated in the above table.

Percolation Testing Requirements: For each proposed infiltration area, a minimum of six percolation tests shall be conducted with a vertical component permeability test unless the applicant can demonstrate that fewer tests accurately represent the percolation rate of the proposed infiltration area. Additional testing shall be required if the initial test results show significant variability in the vertical component percolation rate. For larger infiltration areas, percolation tests shall be conducted at the densities listed in the table above.