ORDINANCE NO. 101

AN ORDINANCE ESTABLISHING STORM WATER MANAGEMENT REGULATIONS IN WASHINGTON TOWNSHIP; PROVIDING DEFINITIONS, PROCEDURES, DESIGN STANDARDS, REQUIRED IMPROVEMENTS, PLATS AND DATA, FEES AND PENALTIES FOR VIOLATION OF ITS PROVISIONS.

Be it enacted and ordained by the Board of Supervisors of Washington Township, Pennsylvania and it is hereby enacted and ordained by the Authority of the same.

ARTICLE I

GENERAL PROVISIONS

Section 101 Statement of Findings

The Board of Supervisors of Washington Township finds that:

A. Inadequate management of accelerated runoff of storm water resulting from development throughout the Township increases flood flows and velocities, overtaxes the carrying capacity of streams and storm sewers, greatly increases the cost of public facilities to carry and control storm water, undermines flood plain management and flood control efforts in down-stream communities, reduces ground water recharge, and threatens public health and safety.

B. A comprehensive program of storm water management, including reasonable regulation of development and activities causing accelerated storm water run-off, is fundamental to the public health, safety and welfare and the protection of the people of Washington Township and all people of the Commonwealth, their resources and the environment.

Section 102 Goal

The goal of this ordinance is to limit storm water run-off from subdivisior and other land development to pre-development flows as indicated herein. This ordinance is designed to:

A. Control accelerated runoff problems at their source by regulatir activities which cause such problems.

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

C. Encourage recharge of groundwaters where feasible.

D. Maintain the existing flows and quality of streams and water courses in Washington Township and the Commonwealth.

E. Preserve and restore the flood carrying capacity of the storm sewers and streams.

F. Provide for the design, installation and proper maintenance of all permanent storm water management structures which are constructed in Washington Township.

Section 103 Statutory Authority

Washington Township is empowered to regulate these activities by the authority of the Act of October 4, 1978, P.L. 864 (Act 167) the "Storm Water Management Act", and 32 P.S. Section 680.1 et. seq.

Section 104 Applicability

The following activities are included within the scope of this Ordinance.

A. Land Development

B. Subdivision

C. Construction of new or additional impervious or semi-previous surfaces (driveways, parking lots, buildings and additions thereto etc.) which increases the rate of runoff equal to or more than 0.30 cfs as calculated using the Rational Formula for a 10 year storm, except that construction creating less than 5000 square feet of impervious surfaces shall not apply.

D. Diversion or piping of any natural or man-made drainage channel.

E. Installation of storm water systems or appurtenances thereto, except those areas covered by Penn DOT or other governmental agencies.

Section 105 Repealer

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

Section 106 Severability

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

Section 107 Compatibility with Other Permit and Ordinance Requirements

Permits and approvals issued pursuant to this Ordinance do not relieve the applicant of the responsibility to secure required permits or approvals for activities regulated by any other applicable code, rule, act or Ordinance. If more stringent requirements concerning regulation of storm water control are contained in the other code, rule or ordinance, the more stringent regulation shall apply.

ARTICLE II

DEFINITIONS

Cistern - An underground reservoir or tank for storage rainwater.

Conservation District - The Franklin County Conservation District.

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

Design Storm - The magnitude of precipitation from a storm event measured in probability of occurrence (e.g., 50 year storm) and duration (e.g., 24 hour), and used in computing storm water management control systems.

Detention Basin - A basin designed to detain storm water runoff by having a controlled discharge system.

Developer - Any landowner, agent of such landowner or tenant with the permission of such landowner, who makes or causes to be made a sub-division of land or a land development, and shall include the property owner involved in activities as discribed in Section 104 C, D, and E.

Diversion Terrace - A channel and a ridge constructed to a pre-determined grade across a slope, and designed to collect and/or divert runoff from slopes which are subject to erosion.

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

Groundwater Recharge - Replenishment of existing natural underground water supplies.

Hydraulic Grade Line - A line joining points whose vertical distance from the center of the cross section of the fluid flowing in a pipe are proportional to the pressure in the pipe at the point.

Hydraulic Gradient - The slope of the hydraulic grade line.

Impervious Surface - A surface which retards the percolation of water into the ground, e.g., asphalt, concrete, roofs.

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

Land Development - (i) The improvement of one or two or more contiguous lots, tracts or parcels of land for any purpose involving (a) a group of two or more buildings, or (b) the division or allocation of land or space between or 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; (ii) a subdivision of land.

Land_Disturbance_Activity - Any change in the existing contour of the land, e.g., grading, excavating, removal or destruction of the topsoil, trees or other vegetative cover of the land.

Major_Property_Damage - Damage to property, due to storm water runoff, which either destroys or renders the property permanently unusable.

Private_Entity - A partnership, corporation, Homeowner's Association, Condominium Association or any other similar association as distinguished from an individual lot owner.

Municipality - Washington Township, Franklin County, Pennsylvania.

Peak_Discharge - The maximum rate of flow of water at a given point and time resulting from a specified storm event.

Rational_Formula - A rainfall - runoff relation used to estimate peak flow, expressed by the following formula:

$$Q = CIA$$

Q = peak runoff rate in cfs
C = runoff coefficient
I = design rainfall intensity (in/hr) lasting for a critical time, Tc.
Tc = time of concentration
A = drainage area in acres.

Retention_Basin - A basin designed to retard storm water runoff by having a controlled subsurface discharge system.

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

SCS - Soil Conservation Service, U.S. Department of Agriculture.

Seepage_Pit/Seepage_Trench_or_French_Drain - An area excavated in earth filled with loose stone or similar material and into which surface water is directed for infiltration into the ground.

Seepage_Tank - A subsurface concrete tank surrounded by stone into which surface water is directed for infiltration into the ground.

Semi-Previous_Surface - A surface such as stone, rock or other materials which permits some vertical transmission of water.

Soil-Cover_Complex_Method - A method of runoff computation developed by SCS, and found in its publication "Urban Hydrology for Small Watersheds", Technical Release No. 55, SCS, Jan., 1975, Revised 1986.

Storm_Frequency - The number of times that a given storm "event" occurs or is exceeded on the average in a stated period of years.

Storm_Sewer - A system of pipes or conduits which carries intercepted surface runoff, street water or drainage, but excludes domestic sewage

and industrial wastes.

Storm_Water - Drainage runoff from the surface of the land resulting from precipitation or snow or ice melt.

Storm_Water_Management_Plan - The guidelines for managing storm water runoff as per the provisions of this Ordinance

Storm_Water_Structures - Basins, pipes, swales, terraces, etc. designed and installed to collect, transport, detain and/or retain Storm Water.

Subdivision - The division or redivision of a lot, tract or parcel of land by means into two or more lots, tracts, parcels or other divisions of land including changes in existing lot lines for the purpose, whether immediate or future, of lease, transfer of ownership or building or lot development: provided, however, that the subdivision by lease of land for agricultural purposes into parcels of more than 10 acres, not involving any new street or easement of access, shall be exempt.

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

Time_of_Concentration - The time, in minutes, surface storm water runoff takes to travel from the most distant point in the drainage basin to the point under design consideration. This time is the combined total of overland flow time and flow time in pipes or channels, if any.

ARTICLE III

Section 301 General_Requirements

A. Basis of Calculations - Computations for determining storm water runoff and for the design of storm water management facilities shall be based upon the soil cover complex method described in TR-55, Urban Hydrology for Small Watersheds; the United States Department of Agriculture, Soil Conservation Service Engineering Field Manual; or TR-20, where appropriate; excepting that the Rational Method may be used for computing roof and driveway water runoff figures for seepage trench, seepage tank, seepage pit use, etc.

B. Rainfall Frequency Data - The intensity of rainfall shall be determined using the "Rainfall Frequency Atlas of the United States", or other valid data as deemed suitable by the Township with a five (5) year base frequency; a ten (10) year frequency and a one-hundred (100) year frequency.

C. Maintenance of Natural Drainageways - All natural streams, channels, swales, drainage systems and/or areas of surface water concentration shall be maintained in their existing condition unless an exception is approved by Washington Township or an official representative thereof. All encroachment activities

shall comply with Chapter 105 (Water Obstructions and Encroachments) of title 25, Rules and Regulations of the Pennsylvania Department of Environmental Resources.

D. Methods of Storm Water Runoff Detention and Control - Hereafter is a list of detention and control methods suitable for use in storm water management systems. The selection of control methods is not limited to the ones present on this list.

1. Seepage pits, trenches, seepage tanks or other infiltration structures.

2. Detention and/or retention structures.

3. Cisterns and underground reservoirs.

4. Grass channels and vegetated strips.

5. Routed flow over grass.

6. Decreased impervious areas coverage.

7. Porous pavement and concrete lattice block surface.

8. Roof - top storage.

9. Parking lot and street ponding.

Washington Township's primary interest, where feasible and desirable, is to discharge storm water to the subsurface.

Certain other control methods which meet the criteria of this section will be permitted when approved by the Township or an official representative thereof.

Section 302 Design Criteria

A. Total System Requirements - All pre-development calculations shall be based upon existing land use features, excepting, however, that agricultural lands shall be considered as using conservation treatment or in good condition irrespective of the current use. Pre-development storm water runoff shall be calculated for a 5-year frequency.

1. Release rates from subdivisions or land developments shall be based on the runoff from the 5-year pre-development storm event.

2. Storage structures shall be designed that the post-development 10-year peak discharge will not exceed to pre-development 5-year peak discharge.

3. All storage structures or facilities will be designed with emergency spillways sufficient to handle the 100 -

year post development storm event without causing major property damage.

4. Culverts, pipes and other water carrying structures shall be designed to handle the peak discharge from the 10-year post-development storm event. All pipes shall be provided with end section or end wall.

B. Storm Water Runoff Volumes - Storm water runoff shall be based on the following 24-hour storm events; or other valid data as deemed suitable by the Township:

Storm Frequency	Storm Volume in inches of Rainfall
2 years	2.9 inches
5 years	3.8 inches
10 years	4.8 inches
25 years	5.1 inches
100 years	6.4 inches

C. Storm Water Inlets - The maximum spacing between storm water inlets shall be designed according to the 10 year storm flow and the capacity of the inlets, taking into account maximum allowable street flooding and drainage-way capacity. When a possibility of clogging of grates, side opening, or combination inlets exists, use the capacity reduction factors shown in table 4 applied to the theoretical capacity of the inlet. The maximum amount of water that should be bypassed on to the next downstream inlet for inlets on continuous grades is ten percent.

D. Pipes - The minimum allowable pipe diameter shall be fifteen inches unless approved by the Township or an official representative thereof. Horizontal and vertical curves with radii of 100 feet or greater are allowed for all pipe sizes. Friction losses in the pipe shall be calculated using the Manning formula HF = . Values for "n" are found in Table 8.5. The minimum value for "v" in pipes shall be 3.0 feet per second. The maximum value for "v" in pipes shall be based on engineering judgement and experience. Pressure flow is permitted in storm sewers. The elevation of the hydraulic gradient shall be at least one foot below ground level. Pressure heads up to 25 feet can be used with concrete pipe with rubber gasketed joints.

E. Spacing of Structures - The maximum allowable spacing between structures to be used for inspecting and cleaning storm sewers shall be based on the pipe size and spacing shown in table 6.

F. Open Channels - Maximum allowable velocities of flow in swales, open channels, and ditches as relating to slope and grass cover are shown in Table 1. Higher velocities require invert stabilization. If they don't present a hazard, velocity dissipators may be considered.

G. Where seepage pits, seepage tanks, seepage trenches and/or french drains are proposed, the developer shall include an analysis of the potential for accelerated sinkhole development in the specific geology of the site due to the concentration of water introduction to the subsurface.

H. Equivalent Discharge - Alternative means of stormwater discharge and retention, resulting in the equivalent discharge per Section 302A are allowable when approved by the Township Board of Supervisors.

ARTICLE IV

PLAN REQUIREMENTS

Section 401 General Requirements

Prior to the final approval of subdivision, land development or any activity listed in Section 104, or the issuance of any permit, or the commencement of any land disturbance activity, the owner, subdivider, developer, or his agent shall submit a storm water management plan to Washington Township for approval. The plan shall meet the requirements set forth herein, and shall also meet all requirements of Title 25 Rules and Regulations - Chapter 102 of the Pennsylvania Department of Environmental Resources.

Section 402 Plan Requirements

The following items, where appropriate, shall be included in the plan:

A. General

1. General description of project.

2. General description of storm water controls both during and after development.

3. Expected project time schedule, including anticipated start and completion dates.

4. Training and experience of person(s) preparing the plan.

5. An executed signature block by a Registered Professional Engineer as follows: "I, _____, have prepared and hereby certify that the storm water management plan meets all design standards and criteria of Washington Township's Storm Water Management Ordinance".

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 8%), five-foot contour intervals may be used.

3. Streams, lakes, ponds, or other bodies of water within the project area or adjacent to the site which will be affected by runoff from the project.

4. Other physical features including existing drainage swales and areas of natural vegetation to be preserved.

5. Location of existing overhead and underground utilities, sewers and water lines.

6. Location of proposed underground utilities, sewers and water lines.

7. Soil types and boundaries.

8. Proposed changes to land surface and vegetative cover.

9. Areas to be cut or filled.

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

11. Final contours at intervals of two (2) feet. In areas of steep slope (greater than 8%) five-foot contour intervals may be used.

12. Location of where water will exit the site and the means for discharging.

C. Storm Water Management Controls:

All storm water management controls must be shown on a map and described, including:

1. Groundwater recharge methods such as seepage pits, seepage tanks beds or trenches. When these structures are used, the location of septic tank infiltration areas and wells must be shown, and a cross section shall be provided.

2. 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.

3. Schedule for installation of the control measures and devices.

4. All calculations, assumptions and criteria used in the design of the control device or method must be shown.

5. A 25 foot right-of-way around all storm water management structures and from such structures to a public right of

way.

D. Maintenance Program - A maintenance program for all storm water management control facilities must be included. This program must include the proposed ownership of the control facilities and detail the financial responsibility for any required maintenance.

E. Priorities - the following priority process is established for facility ownership and maintenance.

1. As first priority, the facilities shall be incorporated within individual lots so that the respective lot owners will own and be responsible for maintenance in accordance with recorded deed restrictions;

2. As second priority, in the event the first priority cannot be achieved, ownership and maintenance shall be the responsibility of a Home Owners Association. The stated responsibilities of the Home Owners Association in terms of owning and maintaining the stormwater management facilities shall be submitted with Final Plans for determination of their adequacy, and upon their approval shall be recorded with the approved plans among the land records of Franklin County, Pennsylvania. In addition, the approved plan and any deed written from said plan for a lot or lots shown herein shall contain a condition that it shall be manditory for the owner or owners of said lot to be members of said Home Owners Association; and

3. The third priority, in the event the above priorities cannot be achieved, is to dedicate the facilities to the Township in accordance with this Ordinance.

Section 403 Plan Submission

A. The plan shall be accompanied by the requisite fee, as set forth in Article VI of this Ordinance.

B. Four (4) copies of the completed plan and calculations must be submitted.

Section 404 Plan Approval

A. Washington Township shall forward a copy of the plan to the Franklin County Conservation District for review and comment.

B. Washington Township or their designee shall review the plan and comments from the Franklin County Conservation District and shall recommend whether the plan be approved or disapproved.

C. Washington Township or their designee shall notify the applicant within 45 days from receipt of a completed plan submission of its decision.

D. A disapproval shall contain the reasons for disapproval and a listing of the plan deficiencies.

E. Failure of Washington Township or their designee to render a decision within 45 days time limit shall be deemed an approval.

Section 405 Modification of Plans

A modification to an approved storm water management plan 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 approved application (as determined by Washington Township or their designee), shall be considered after resubmission by the plan under the procedures contained in Section 404 of this Ordinance. Washington Township or their designee shall notify the applicant when such plan modifications are required.

ARTICLE V

INSPECTION & CERTIFICATIONS

Section 501 Schedule of Inspections

The developer must submit a certification by a Pennsylvania Registered Professional Engineer; which certificate shall certify that all elements of the approved plan have been constructed as designed and approved.

A. Washington Township or their designee may inspect all phases of development of the site including, but not limited to:

1. Completion of preliminary site preparation including stripping of vegetation, stockpiling of topsoil, and construction of temporary storm water management and erosion control facilities.

2. Completion of rough grading, but prior to placing topsoil, permanent drainage or other site development improvements and ground covers.

3. During construction of the permanent storm water facilities at such times as specified by Washington Township or their designee.

4. Upon completion of permanent storm water management facilities, including established ground covers and plantings.

5. Upon completion of any final grading, vegetative control measures or other site restoration work done in accordance with the approved plan and permit.

B. It is the responsibility of the developer to notify Washington Township or their designee 48 hours in advance of the completion of each identified phase of development.

C. Any portion of the work which does not comply with the approved plan must be corrected by the developer. No work may proceed on any subsequent phase of the storm water management plan, the subdivision or land development or building construction until the required corrections have been made.

D. If at any stage of the work, Washington township or their designee determines that the soil or other conditions are not as stated or shown in the approved application or plan, it may refuse to approve further work and Washington Township or their designee may revoke existing permits and approvals until a revised plan is submitted and approved, as required by Section 405 of this Ordinance.

Section 502 As-Builts

Following construction, the developer shall submit drawings bearing the seal of a Pennsylvania Registered Professional Engineer Pennsylvania Registered or Land Surveyor indicating the "As-Built" improvements called for in the approved plan.

ARTICLE VI

FEES AND EXPENSES

Section 601 General

Fees covering costs to Washington Township for plan review, and inspections shall be established by resolution of Washington Township. No approval to begin any work on the project shall be issued until the requisite fees have been paid.

Section 603 Modification of Plans

If it is determined that a modification to the existing storm water management plan is required under Section 405 of this Ordinance, a new approval shall not be issued until the additional fees have been paid by the applicant.

ARTICLE VII

FINANCIAL GUARANTEES AND MAINTENANCE

Section 701 Construction Guarantees

The developer or lot owner shall provide financial security as a construction guarantee in a form to be approved by the Township Solicitor, in an amount equal to One Hundred Ten (110%) Percent of the full cost to install the facilities required by the approved plan. The financial security shall be released only after receipt by the Township of certification and "As-Builts" as required.

Section 702 Maintenance Guarantees

Upon acceptance of any storm water management facilities by Washington Township, the developer shall provide a financial security, in a form approved by the Township Solicitor for maintenance guarantees, as follows:

A. Construction maintenance bond. The construction maintenance bond shall be in an amount equal to fifteen percent of the cost of the installation, and shall be used as financial security to guarantee the stability of the newly established basin and revegetation for a period of one year.

B. Long-term maintenance bond. The long term maintenance bond shall be in an amount equal to a figure which shall be determined by the Township to be the estimated cost of maintenance of the storm water management facility for a period of ten years.

Section 703 Maintenance By Private Entity

When a private entity (such as a homeowner's association) retains ownership of any storm water management facility, such entity shall be responsible for maintenance of the facility. In such case, approval of storm water management facility plans shall be conditioned upon the private entity agreeing to be responsible for all maintenance of the storm water management facility. Any such agreement shall be in writing, shall be in recordable form, and shall, in addition to any other terms deemed necessary by the Township, contain a provision permitting inspection at any reasonable time by Washington Township or its designee of all such facilities deemed critical to the public welfare.

Section 704 Maintenance by Individual Lot Owners

When any storm water management facility is located on an individual lot, and when maintenance thereof is the responsibility of that landowner, a description of the facility or systems and the terms of the required maintenance shall be incorporated on a plat of the property. The plat shall be recorded with the Franklin County Recorder of Deeds within ninety (90) days following Township approval. In addition, the Township may require as a condition of approval that any deed conveying any interest in such lot contain language indicating that the conveyance is subject to an express covenant by the grantee that the grantee will maintain the storm water management facility.

Section 705 Failure To Maintain

The failure of any person, individual lot owner or private entity to properly maintain any storm water management facility shall be construed to be a violation of this Ordinance and is declared to be a public nuisance, subject to Article VIII, Enforcement and Penalties.

ARTICLE VIII

VIOLATIONS AND PENALTIES

Section 801 Violations

Any activity conducted in violation of this ordinance is declared to be a public nuisance.

A. Notice. Whenever any person shall have violated the terms of this Ordinance, the Code Enforcement Officer shall cause a written notice to be served upon the owner, applicant, developer, property manager, or other person responsible for the property or the violation, directing him to comply with all the terms of this Ordinance within seven (7) days, or such additional period, not to exceed thirty (30) days, as the Code Enforcement Officer shall deem reasonable, and further the Code Enforcement Officer shall give notice to the owner, applicant, developer, property manager or other person responsible for the property or the violation that if the violation is not corrected, the municipality may correct the same and charge the landowner or other person responsible the cost thereof plus penalties as specified herein for failure to comply.

B. Service of Notice. Such notice may be delivered by the United States mail, first class, postage prepaid, or by certified or registered mail; or by personal service; or, if the property is occupied, by posting the notice at a conspicuous place upon the subject property.

Section 802 Penalties for Failure to Comply

Any person who fails to comply with this Ordinance within the period stated in the notice of the Code Enforcement Officer shall, upon conviction thereof, be guilty of a summary offense, and shall be sentenced to pay a penalty of not less than one hundred ($100.00) dollars nor more than three hundred ($300.00) dollars. Each and every day of continued violation shall constitute a separate violation.

A. Corrective Measures by Township; Costs. In the event that the owner, developer, occupant, applicant, property manager or other person responsible fails to comply with the terms of this Ordinance within the time specified by the Code Enforcement Officer, the Municipality may take any actions necessary to remove the public nuisance. The costs of removal of the violation shall be in addition to any penalties for violations for failure to comply.

B. Additional Legal Proceedings. In addition to the fines for violations, costs and penalties provided for by this Article, the Municipality may institute proceedings in Courts of Law or Equity, to collect damages to require owners and/or occupants of real estate to comply with the provisions of this Ordinance.

C. Municipal Lien. The cost of removal, fine, and penalties hereinabove mentioned may be entered by the Municipality as a lien against such property in accordance with existing provisions of law.

D. Existing Rights and Remedies Preserved. The collection of any penalty under the provisions of this Ordinance shall not be construed as estopping the Commonwealth of Pennsylvania, the County of Franklin, Washington Township, or any aggrieved person from proceeding in Courts of Law or Equity to abate nuisances under existing law or to restrain, as law or in equity, a violation of this Ordinance. Moreover, it is hereby declared to be the purpose of this Ordinance to provide additional and cumulative remedies to abate nuisances.

Section 803 License

Upon presentation of proper credentials, duly authorized representatives of Washington Township may enter at any reasonable time upon any property within the Township to investigate or to ascertain the condition of the subject property with regard to any matter regulated by this Ordinance.

ARTICLE IX

APPEALS

Section 901 Appeals

Any person aggrieved by any action of the designee of Washington Township may appeal to the Board of Supervisors within thirty (30) days of that action.

TABLE 1

PERMISSIBLE VELOCITIES FOR SWALES, OPEN CHANNELS AND DITCHES WITHIN UNIFORM STANDS OF VARIOUS GRASS COVERS, WELL MAINTAINED a b

Cover	Slope Range Percent	Permissible Velocity on: Erosion Resistant Soils (fps)c	Easily Eroded Soils (fps)d
Bermudagrass	0 - 5	8	6
	5 - 10	7	5
	Over 10	6	4
Buffalograss Kentucky Bluegrass Smooth Brome	0 - 5	7	5
	5 - 10	6	4
	Over 10	5	3
Grass Mixture	0 - 5	5	4
	5 - 10	4	3
Lespedeza Sericea Weeping Lovegrass Yellow Bluestem Alfalfa Crabgrass	0 - 5	3.5	2.5
Common Lespedeza Sudangrass	0 - 5	3.5	2.5

a Original table from Handbook of Channel Design for Soil and Water Conservation, New Jersey State Highway Department, 1960, and modified for this Ordinance.

b Velocities in excess of 5 fps to be used only where good cover and proper maintenance can be obtained.

c Defined as CL, CH, OH, GM, GP, GC and GW (Unified Soil Classification System Designation).

d Defined as ML, SM, SC, MH and OL (Unified Soil Classification System Designation).

e Annuals, used on mild slopes or as temporary protection until permanent cover is established.

Source: Slope Protection for Residential Development, National Academy of Sciences, Washington D.C., 1969.

TABLE 2

RUNOFF COEFFICIENTS (C) BY TYPE OF SURFACE

FOR USE IN THE RATIONAL FORMULA

Type of Surfaces	Runoff Coefficient
Asphalt	0.82
Concrete	0.85
Roof	0.85
Lawns (sandy)	
Flat (0-2% slope)	0.07
Rolling (2-7% slope)	0.12
Steep (greater than 7% slope)	0.17
Lawns (clay)	
Flat	0.16
Rolling	0.21
Steep	0.30
Lawns (loam)	
Flat	0.08
Rolling	0.15
Steep	0.25

TABLE 3

RUNOFF COEFFICIENTS (C) BY LAND USE

FOR USE IN THE RATIONAL FORMULA

Land Use	Runoff Coefficients Flat	Rolling	Steep
Commercial (Town Center)	0.75	0.83	0.91
Commercial (Neighborhood)	0.54	0.60	0.66
Industrial	0.63	0.70	0.77
Garden Apartments	0.54	0.60	0.66
Schools	0.31	0.35	0.34
Churches	0.54	0.60	0.66
Semi-Detached Residential	0.45	0.50	0.55
Detached Residential	0.40	0.45	0.50
Quarter-Acre Lots	0.36	0.40	0.44
Half-Acre Lots	0.31	0.35	0.39
Parkland	0.18	0.20	0.22

NOTE: Flat terrain 0 - 2% slope
Rolling Terrain 2 - 8% slope
Steep Terrain greater than 8% slope
Interpolations, extrapolations and adjustments for local conditions shall be based on engineering experience and judgement and submitted for approval by the Township Engineer.

TABLE 4

INLET CAPACITY REDUCTION FACTORS

ASSUMING PARTIAL CLOGGING

Condition	Inlet Type	Reduction Factor*
Sump	Side Opening	0.80
Sump	Grate	0.50
Sump	Combination	0.65
Continuous Grade	Side Opening	0.80
Continuous Grade	Side Opening with Deflector	0.75
Continuous Grade	Longitudinal Bars	0.60
Continuous Grade	Transverse Bars	0.50
Continuous Grade	Combination	0.60

* Percentage of theoretical capacity

TABLE 5

"n" VALUES FOR MANNING FORMULA

Type of Pipe	"n" Value*
Asbestos Cement	0.013
Concrete Culvert Pipe	0.013
Concrete Sewer Pipe	0.013
Cast Iron	0.013
Corrugated Metal (plain)	0.024
Corrugated Metal (coated)	0.021
Plastic	0.011
Verified Clay	0.013

* Adjustments for specific conditions shall be based on engineering experience and judgement and submitted to the Township Engineer for approval.

TABLE 6

SPACING OF INSPECTION AND CLEANOUT

STRUCTURES FOR STORM SEWERS

Size of Pipe (inches)	Maximum Allowable Spacing (feet)
15	400
18 - 36	500
42 - 60	700
66 or Larger	Unlimited

PART A

ATTACHMENT TO STORM WATER MANAGEMENT ORDINANCE

Storm Water Management and Erosion and Sedimentation Control Publications

1. Chapter 102. Erosion Control. Title 25, Rules and Regulations of the Department of Environmental Resources.

2. Chapter 105. Water Obstructions and Encroachments, Title 25, Rules and Regulations of the Department of Environmental Resources.

3. Engineering Field Manual for Conservation Practices, 1975, U.S. Department of Agriculture, Soil Conservation Service.

4. Erosion and Sedimentation Control Handbook, Franklin County Conservation District.

5. Guidelines for Storm Water Management, Department of Environmental Resources, Bureau of Dams and Waterway Management.

6. Soil Erosion and Sedimentation Control Manual, Department of Environmental Resources, Bureau of Soil and Water Conservation and Bureau of Water Quality Management.

7. Urban Hydrology for Small Watersheds, Technical Release No. 55, Soil Conservation Service, U.S. Department of Agriculture, January, 1975, revised June, 1986.

ENACTED AND ORDAINED this 20th day of April, 1987, in lawful session duly assembled.

TOWNSHIP OF WASHINGTON
FRANKLIN COUNTY

By Richard E. McCue
Chairman, Board of Supervisors

ATTEST:

Juanita L. Huckman
Secretary