

ORDINANCE NO. 2000-6

AN ORDINANCE OF THE HILLTOWN TOWNSHIP BOARD OF SUPERVISORS AMENDING THE SUBDIVISION AND LAND DEVELOPMENT ORDINANCE NO. 95-9, ADOPTED ON DECEMBER 26, 1995, AS AMENDED.

The Hilltown Township Board of Supervisors upon review by the Bucks County Planning Commission and Hilltown Township Planning Commission hereby enacts and ordains the following Ordinance:

I. **Section 202. Watercourse.** is revised to read as follows:

Watercourse – An intermittent or perennial stream of water, river, brook, creek, or swale identified on USGS mapping or SCS mapping; and/or delineated Waters of The Commonwealth.

II. **Section 516. Stormwater Management Requirements.** is revised to read as follows:

Section 516 – Stormwater Management. All subdivisions and land developments shall comply with the Hilltown Township Stormwater Management Ordinance, Ordinance No. _____, adopted on _____, as amended. Requirements of the Stormwater Management Ordinance shall be in addition to, and not in lieu of, requirements set forth within Section 516 of this Ordinance.

1. **General Requirements.**

- A. Lots shall be laid out and graded with a minimum slope of two (2%) percent to provide positive drainage away from buildings. The Township may require a grading and drainage plan for individual lots indicating a buildable area within each lot, complying with the setback requirements, for which positive drainage is assured.
- B. On-lot drainage swales shall be designed to provide positive conveyance of surface water from the individual lot. Each swale lot shall convey stormwater from the lot to a storm sewer system, street, open space area, or stormwater management easement without crossing or combining with stormwater from more than the adjacent lot.
- C. Drainage swales necessary to control surface drainage between lots shall be centered about the common property line.
- D. No person, corporation, or other entity shall block, impede the flow, alter, construct any structure, or deposit any material or thing, or commit any act which will affect normal or flood flow in any stream or watercourse without having obtained prior approval from the Township and/or Department of Environmental Protection, whichever is applicable.

- E. Whenever a watercourse, perennial stream or intermittent stream is located within a development site, it shall remain open in its natural state and location, and shall not be piped (except for road crossings). It is the responsibility of the developer to stabilize existing eroded stream/channel banks.
 - F. Where a subdivision or land development is traversed by a natural watercourse, there shall be provided a drainage easement or right-of-way conforming substantially with the line of such watercourse. The width of the easement shall be adequate to provide for unimpeded flow of stormwater runoff from the 100 year return storm event. Terms of the easement shall prohibit excavation, the placing of fill or structures, and any alterations which may adversely affect the flow of stormwater runoff within any portion of the easement. Periodic maintenance of the easement to ensure proper runoff conveyance shall be required by the landowner.
 - G. Existing points of concentrated drainage discharge onto adjacent property shall not be altered without written approval of the affected property owner(s).
 - H. Areas of existing diffused drainage discharge onto adjacent property shall be managed such that, at a minimum, the peak diffused flow does not increase in the general direction of discharge, except as otherwise provided in this Section. 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 or otherwise prove that no harm will result from the concentrated discharge.
 - I. Any drainage facilities required by this Section that are located on, or discharge to, a State highway rights-of-way shall be subject to approval by the Pennsylvania Department of Transportation.
 - J. Storm drainage facilities and appurtenances shall be so designed and provided as to minimize erosion in swales, watercourse channels and at all points of discharge.
 - K. Minimization of impervious surfaces and infiltration of runoff through seepage beds, infiltration trenches, etc. are encouraged, where soil conditions permit, to reduce the size or eliminate the need for retention/detention facilities.
 - L. Roof drains and sump pumps shall be discharged to a natural watercourse, drainage swale, or stormwater easement. Roof drains and sump pumps shall not be connected to a storm sewer or street unless designed as part of a stormwater management facility within a proposed development. In no case shall roof drains or sump pumps be connected to a sanitary sewer.
2. Storm Drainage System Requirements.
- A. Any proposed storm drainage plans which affect the drainage basin in any stream or watercourse shall be approved by the Division of Dams and Waterway Management of the Pennsylvania Department of Environmental Protection in accordance with the Title 72, Chapter 105, as amended.

- B. Easements shall be dedicated to the Township along all natural or manmade streams and watercourses and/or stormwater management facility areas within a subdivision or land development. These easements shall be of sufficient width to convey a 100-year design storm. Easements shall be provided where storm drainage swales, culverts, or other structures traverse, enter or discharge onto private property. On private property, the entire easement area and fencing and landscaping (if any) shall be maintained by the property owner. The Township shall not maintain and/or repair any improvements within that easement unless stormwater runoff from public roads or public land crosses through the easement. If stormwater runoff from public roads or public lands cross through the easement, the Township shall, upon satisfactory installation of improvements as specified in a Developer's Improvement Agreement and Maintenance Agreement, maintain and repair only the structural stormwater management improvements within the easement such as:

- (1) Piping
- (2) Inlets
- (3) Outlet, Headwalls
- (4) Energy Dissipation Structures or Facilities
- (5) Stormwater Management Facility Control Structures

The landowner shall be responsible for all other maintenance and repairs within this easement. For example, the landowner must:

- (1) Mow the lawn.
- (2) Repair or replace fencing.
- (3) Repair or replace landscaping.
- (4) Control vermin and repair damage from animals.
- (5) Keep the area free of obstructions, structures, vegetation, or accumulated sediment that may block or hinder the function and purpose of the easement.
- (6) Keep the area free of litter or garbage.
- (7) Repair erosion and restore vegetation as necessary to keep the easement in good repair.

- C. Storm sewers, culverts, and related installations shall be provided to permit the flow of natural watercourses, to ensure the drainage of all low points (except in protected "wetlands") on the subdivided lots or developed land areas and along the line of streets, and to intercept stormwater runoff along the streets at intervals related to the extent and grade of the area drained. The system shall also be designed to accommodate or receive and discharge all runoff from adjacent upstream properties. Where adequate existing storm sewers are readily accessible, the developer must connect new stormwater facilities to the existing system.

- D. Flood Protection: No stormwater runoff or natural drainage water shall be 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 proper and approved provisions being made to address these conditions.

- E. Whenever the location of concentrated runoff from a site is changed due to development, the developer must secure written approval from any adjacent downstream property owners. The developer shall indemnify and/or hold harmless the Township against any claim of damage from any downstream property owners that may result from the proposed development.
- F. Scour and Erosion Prevention: In areas in which the street curbs are not required by either this Ordinance or by the Township, drainage may be accomplished by natural or artificial swales and culverts. Special structures such as check dams, drop-outlets, concrete flow channels, or other energy dissipating structures, rip-rap or non-degradable geotextile linings, may be required to prevent scour or erosion in locations with large runoff quantities or steep slopes. Bituminous paved swales will not be permitted.
- G. All proposed streets shall be designed so as to discharge surface water from their rights-of-way. Storm drainage improvements as deemed necessary by the Township shall be required along all existing streets on which a subdivision or land development abuts.
- H. Design Criteria: Unless a more conservative design is required by another Regulation, or is required because of conditions particular to an individual development, the following storm criteria shall be used to design storm collection and conveyance systems:

DESIGN STORM RETURN
(Years)

Fixed Pipe	10
Total Conveyance	100

- I. Design Preparation: Designs of Storm Drainage Systems shall be prepared by a licensed Professional Engineer. Complete detail calculations shall be submitted to the Township for review. Calculations shall cover the entire drainage basin involved, including consideration of areas outside the proposed subdivision or developed land areas.
- J. Setback to Boundaries: No piped storm sewer system outlet, detention basin, or energy dissipation structure shall discharge closer than twenty (20') feet from the boundary of any drainage easement under the control of the developer or which may be utilized by the developer, so as to allow for adequate space for stormwater dissipation in vegetated land areas controlled by or available to the developer and/or to allow adequate space for equipment access for future maintenance.

3. Collection System Design.

A. The collection system shall be designed by the Rational Method of Design in accordance with American Society of Civil Engineers Manual No. 37 except where noted, using the formula $Q=CiA$, unless otherwise approved by the Township.

- (1) Capacity: "Q" is the required capacity in cubic feet per second for the collection system at the point of design.
- (2) Runoff Coefficient: "C" is the runoff coefficient applicable to the entire drainage area. It shall be based on consideration of soil conditions, average slope of the drainage area and the ultimate development of the entire drainage area according to comprehensive plans. For the various types of ultimate development, the runoff coefficient shall be taken from the table in Appendix "C" unless sufficient engineering data has been presented to the Township Engineer by the Developer which information in the judgment of the Township Engineer is sufficient to warrant the use of an alternate runoff coefficient.
- (3) Rainfall Intensity Formula: "i" is the rainfall intensity in inches per hour and shall be determined from rainfall intensity charts for this area, based on time of concentrations, including Overland Flow Time, Manning's Formulae for channelized flow time and pipe flow time. The design rainfall frequency shall be taken from the PennDOT Intensity-Duration-Frequency Field Manual, Region 4 as presented in Appendix "C".
 - (a) A five (5) minute storm duration shall be used if the duration does not result in a maximum expected discharge that exceeds the capacity of a thirty inch pipe.
 - (b) If a five (5) minute storm duration results in a pipe size exceeding thirty (30) inches, the time of concentration approach shall be used in determining storm duration.
 - (c) If a five (5) minute storm duration results in a pipe size exceeding thirty (30) inches, within any run of pipe, the time of concentration approach may be used for sizing of pipes from that point on by adjusting the time of concentration.
- (4) Drainage Area: "A" is the drainage area, in acres, tributary to the point of design, and shall include areas tributary from outside sources as well as from within the subdivision or developed land area itself.

B. Collection System Standards:

- (1) Curb Inlets: Curb inlets shall be located at curb tangents on the uphill side of street intersection, and at intervals along the curb line to control the maximum amount of encroachment of runoff on the roadway pavement so that same does not exceed one half of the traveled lane

width during the design storm event. Design and location of curb inlets shall be approved by the Township.

- (2) State Approvals: Drainage structures that are located on State highway rights-of-way shall be approved by the Pennsylvania Department of Transportation, and a copy of the Highway Occupancy Permit shall be submitted to the Township.
- (3) Pipe Materials: All storm piping shall be Class III reinforced concrete pipe, except when pipe class and strength is required to be increased in accordance with PennDOT Specifications. Piping shall be saw-cut at ends, as needed, and not hammered or broken. All pipe joints and lift holes must be mortared.
- (4) Minimum Pipe Size: Minimum pipe size shall be 18 inches.
- (5) Inlet and Manhole Construction: Inlet and manhole castings and concrete construction shall be equivalent to Pennsylvania Department of Transportation Design Standards.
- (6) Roof Drainage: Stormwater roof drains and pipes shall not discharge water over sidewalks or walkways.
- (7) Open end pipes must be fitted with concrete endwalls or wing walls in accordance with PennDOT Standards.
- (8) Open culvert endwalls or wing walls for pipes larger than eighteen (18) inches in diameter and longer than sixty (60) feet in length shall be fitted with durable protective grates. Design of protective grates is subject to approval by the Township.
- (9) Flow Velocity: Storm drains shall be designed to produce a minimum velocity of 3.0 feet per second when flowing full. The maximum permissible velocity shall be 15.0 feet per second. However, in no case shall the pipe slope be less than 0.5%.
- (10) Inlets and manholes shall be spaced at intervals not exceeding 300 feet, and shall be located wherever branches are connected or sizes are changed, and wherever there is a change in alignment or grade. For drainage lines of at least thirty-six (36) inches diameter, inlets and manholes may be spaced at intervals of four hundred (400) feet. Manholes shall be equipped with open grate lids.
- (11) Storm sewer bedding/backfill requirements shall conform to the construction details included in Appendix "A".
- (12) Inlets shall be located to intercept concentrated runoff prior to discharge over public/private rights-of-way, sidewalks, streets, and driveways.

- (13) The capacity of all inlets shall be based on a maximum surface flow to the inlet of 4.0 cfs, calculated based on the design storm event. The maximum flow to inlets located in low points (such as sag vertical curves) shall include the overland flow directed to the inlet as well as all bypass runoff from upstream inlets. The bypass flow from upstream inlets shall be calculated using inlet efficiency curves included in PennDOT Design Manual Part 2, latest edition. If the surface flow to in inlet exceeds 4.0 cfs, additional inlets shall be provided upstream of the inlet to intercept the excessive surface flow.
- (14) A minimum drop of two (2) inches shall be provided between the inlet and outlet pipe invert elevations within all inlets and manholes. When varying pipe sizes enter an inlet or manhole, the elevation of the crown of all pipes shall be matched.
- (15) Storm sewer pipes shall have a minimum of 12 inches of cover over the bell of the pipe, and in no case shall any part of the pipe project into the road subbase or curb. Where cover is restricted, equivalent pipe arches may be specified in lieu of circular pipe.
- (16) The capacity of all storm sewer pipes shall be calculated utilizing the Manning Equation for open channel flow as applied to closed conduit flow. The Manning's roughness coefficient shall be 0.13 for all concrete pipe. In cases where pressure flow may occur, the hydraulic grade line shall be calculated throughout the storm sewer system to verify that at least 1 foot of freeboard will be provided in all inlets and manholes for the design storm event.
- (17) Culverts shall be designed based on procedures contained in Hydraulic Design of Highway Culverts, HDS #5, U.S. Department of Transportation, Federal Highway Administration.
- (18) Storm sewer structures (i.e. endwalls, inlets, end sections, etc.) may not be located on top of or within ten (10) feet of electric, water, sanitary sewer, and gas services and/or mains, unless approval is received from the Township, and from the Authority or Utility having jurisdiction over same.
- (19) Storm sewer pipes must be oriented at right angles to electric, water, sanitary sewer, and gas utilities when crossing above or beneath same. Crossing angles of less than 90° will only be permitted at discretion of the Township Engineer. When skewed crossings are permitted, interior angles between alignment of the storm sewer pipe and utility may not be less than 45° . Vertical and horizontal design of storm sewer must be linear.
- (20) Where a public storm sewer system is not located within a right-of-way, or dedicated public property, a twenty (20) feet wide easement shall be established to encompass the storm sewer system. For multiple pipes or utilities, the width of the easement shall be a minimum of thirty (30) feet.

- C. Open Swales and Gutters: Open swales shall be designed on the basis of Manning's Formula as indicated for collection systems with the following considerations:
- (1) Roughness Coefficient: The roughness coefficient shall be 0.040 for earth swales.
 - (2) Bank Slopes: Slopes for swale banks shall not be steeper than one (1) vertical for three (3) horizontal.
 - (3) Flow Velocity: Design velocity in grass or vegetated swales shall not exceed four (4) feet per second.
 - (4) To minimize sheet flow of stormwater across lots located on the lower side of roads or streets, and to divert flow away from building areas, the cross-section of the street as constructed shall provide for parallel ditches or swales or curbing on the lower side which shall discharge only at drainage easements, unless otherwise approved by the Township.
 - (5) Gutters and swales adjacent to road paving shall be permitted to carry a maximum flow of five (5) cubic feet per second prior to discharge away from the street surface, unless it is proven to the satisfaction of the Township by engineering calculations that the road slopes or other factors would allow higher gutter or swale capacity.
 - (6) Flows larger than those permitted in gutters and roadside swales may be carried in swales outside the required road right-of-way in separate drainage easements, or may be carried in pipes or culverts inside or outside the required road right-of-way.
 - (7) Swales shall be stabilized with vegetation or other materials, approved by the Township, to prevent erosion.
 - (8) Swales shall be provided with underdrains as deemed necessary by the Township should overland seepage result in potential maintenance problems for same. Underdrains must discharge into a natural drainage channel or storm sewer system.
- D. Bridges and Culverts: Bridges and culverts shall be designed in accordance with Pennsylvania Department of Transportation Construction Standards. Separate design plans and specifications shall be required for each bridge and culvert which plans and specifications shall be subject to review and approval of the Township.

III. **Section 517. Excavation and Grading.** is revised to read as follows:

Section 517. - Excavation and Grading. All construction wherein excavation, placement of fill, and/or grading activities are performed shall conform with the following general requirements:

1. No excavation or fill shall be made with a face steeper than three (3) horizontal to one (1) vertical, except under one or both of the following conditions:
 - A. The material is sufficiently stable to sustain a steeper slope. A written statement to that effect from a Professional Engineer licensed in the Commonwealth of Pennsylvania and experienced in erosion control shall be submitted to the Township. The statement shall affirm that the site has been inspected and the deviation from the slope restriction shall not result in injury to persons or damage to property. A detail of the treatment of the slope (proposed grade, seeding, erosion protection, etc., shall be submitted with the application.
 - B. A concrete, masonry, or other approved retaining wall is designed by a Registered Professional Engineer licensed in the Commonwealth of Pennsylvania constructed to support the face of the excavation or fill.
2. If the vertical drop of an excavation or fill slope is greater than five (5) feet, then the maximum slope shall not exceed four (4) horizontal to one (1) vertical.
3. The top or bottom edges of slopes shall be a minimum of five (5) feet from property lines or right-of-way lines of streets in order to permit the normal rounding of the edge without encroachment on abutting property.
4. Adequate provision shall be made to prevent surface water from damaging the cut face of excavation and the sloping surfaces of fills.
5. No person, corporation, or other such entity shall block, impede the flow of, alter, construct any structure, or deposit any material or thing or perform any work that will affect the normal or flood flow in any stream or watercourse without having obtained prior approval from the Township and/or Department of Environmental Protection, whichever is applicable.
6. All lots, tracts, or parcels shall be graded to provide positive drainage away from buildings and dispose of it without ponding, except where ponding (detention/retention facilities, swales, etc.) is part of the stormwater management plan for the site.
7. Concentration of surface water run-off shall be permitted only in swales, watercourses, or stormwater management facilities.
8. In no case shall grading be done in such a manner as to divert water onto the property of another landowner unless part of a stormwater management plan.
9. Earth disturbance/staging shall be in strict accordance with the approved grading and erosion/sedimentation control plan.
10. Areas of the site to remain undisturbed shall be protected from encroachment by construction equipment/vehicles to maintain the existing infiltration characteristics of the soil.

11. The minimum depth of topsoil to be replaced shall be eight (8) inches, or the existing depth of topsoil encountered on the site, whichever is greater.
12. Topsoil shall not be removed from the development site. Topsoil shall be stripped, stockpiled, and redistributed on the site. Prior to plan approval, the applicant/designee shall provide the Township with calculations to determine the volume of topsoil anticipated to be stripped, stockpiled, and replaced on the site to verify that excess topsoil will not be generated as a result of construction activity.
13. During grading operations, necessary measures for dust control must be exercised.
14. No grading equipment shall be permitted to be loaded and/or unloaded on a paved public street, and no grading equipment shall be permitted to travel on or across a public street unless licensed for operation on public thoroughfares.
15. Grading equipment shall not be permitted to cross streams. Temporary crossings shall only be permitted where application is made to, and approval received from, PADEP (where applicable), Bucks Conservation District, and the Township.

IV. **APPENDIX "E" – BASIN BERM CONSTRUCTION REQUIREMENTS** is revised to read as follows:

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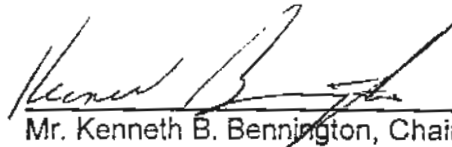
1. Site preparation – Areas under the embankment and any structural works shall be cleared, grubbed, and the topsoil stripped to remove the trees, vegetation, roots or other objectionable material. In order to facilitate clean-out and restoration, the pool area will be cleared of all brush and excess trees.
2. Cut off trench – A cut-off trench will be excavated along the centerline dam on earth fill embankments. The minimum depth shall be two feet. The cut-off trench shall extend up both abutments to the riser crest elevation. The minimum bottom width shall be eight feet but wide enough to permit operation of compaction equipment. The side slopes shall be no steeper than 1:1. Compaction requirements shall be the same as those for the embankment. The trench shall be kept free from standing water during the backfilling operations.
3. Embankment – The fill material shall be taken from selected borrow areas. It shall be free of roots, woody vegetation, oversized stones, rocks or other objectionable material. Areas on which fill is to be placed shall be scarified prior to placement of fill.

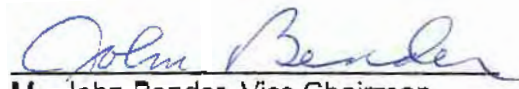
The fill material should contain sufficient moisture so that it can be formed by hand into a ball without crumbling. If water can be squeezed out of the ball, it is too wet for proper compaction.

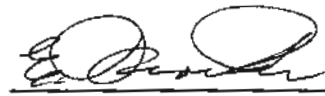
Fill material will be placed in 6 to 8 inch layers and shall be continuous over the entire length of the fill. Fill material must be compacted to a minimum of 95% of Modified Proctor Density as established by ASTM D-1557. Compaction testing by a certified soils engineer/geologist must be completed as directed by the Township Engineer to verify adequate compaction has been achieved.

- V. Should any section or provision of this Ordinance be declared by any court of competent jurisdiction to be invalid, illegal, or unconstitutional, such decision shall have no effect on the validity of this Ordinance as a whole, or any part thereof.
- VI. Any Ordinance or Resolution or part of any Ordinance or Resolution inconsistent with the provisions of this Ordinance shall be repealed to the extent of such inconsistency.
- VII. This Ordinance shall become effective five (5) days after its adoption.

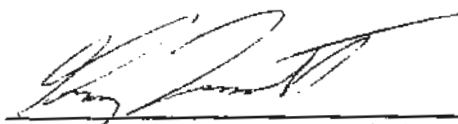
ENACTED AND ORDAINED into an Ordinance this 22 day of May, 2000 by the Board of Supervisors of Hilltown Township in lawful session duly assembled.


Mr. Kenneth B. Bennington, Chairman


Mr. John Bender, Vice Chairman


Ms. E. Diane Parks, Member

ATTEST:


Mr. Greg Lippincott, Township Manager