

TOWNSHIP OF MONTGOMERY  
ORDINANCE NO. \_\_\_\_\_

**AN ORDINANCE AMENDING AND SUPPLEMENTING  
CHAPTER XVI, "LAND DEVELOPMENT",  
OF THE CODE OF THE TOWNSHIP OF MONTGOMERY (1984)  
COUNTY OF SOMERSET, STATE OF NEW JERSEY,  
WITH REFERENCE TO SATISFYING THE REQUIREMENTS  
OF THE NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION  
REGARDING STORMWATER MANAGEMENT  
AND SPECIFICALLY SUBSECTION 16-5.2 REGARDING DRAINAGE**

**BE IT ORDAINED BY THE TOWNSHIP COMMITTEE OF THE TOWNSHIP  
OF MONTGOMERY**, in the County of Somerset and the State of New Jersey, that Chapter  
XVI, "Land Development", of the Code of the Township of Montgomery (1984) is hereby  
amended and supplemented as follows:

**SECTION 1.** Amend Section 16-5.2, entitled "Drainage", of the Code of the Township  
of Montgomery (1984) to read in its entirety as follows:

**"16-5.2 STORMWATER MANAGEMENT & GRADING.**

**A. Policy Statement.**

Flood control, groundwater recharge, and pollutant reduction shall be accomplished to the maximum extent practicable through the use of nonstructural Best Management Practices or Low Impact Development (LID) before relying on structural Best Management Practices (BMPs). Nonstructural strategies include both environmentally sensitive site design and source controls that prevent pollutants from being placed on the site or from being exposed to stormwater. Source control plans should be developed based upon physical site conditions and the origin, nature, and the anticipated quantity or amount of potential pollutants. When using structural BMPs, multiple stormwater management measures, smaller in size and distributed spatially throughout the land development site, shall be used wherever possible to achieve the performance standards for water quality, quantity and groundwater recharge established through this ordinance before relying on a single, larger stormwater management measure to achieve these performance standards. Nonstructural and structural management strategies should be used together on site development projects. Maintenance plans must be provided for structural best management practices.

**B. Purpose.**

It is the purpose of this ordinance to establish minimum stormwater management requirements and controls for “major development,” as defined in Section 16-5.2 E. herein below as well as grading requirements for all development.

**C. Applicability.**

1. This ordinance relative to stormwater management shall be applicable to all major and minor site plans and subdivisions for the following “major development,” as defined in Section 16-5.2 E. herein below, that require minor, preliminary or final site plan or subdivision review.
  - a. Non-residential major developments (commercial development); and
  - b. Aspects of residential major developments that are not pre-empted by the Residential Site Improvement Standards at N.J.A.C. 5:21.
2. This ordinance shall also be applicable to all “major developments” undertaken by Montgomery Township.
3. Subsections 16-5.2 G.7., 16-5.2 O.3.(2), and 16-5.2 O.3.(3) of this Ordinance shall be applicable to the following if deemed to be “minor developments”, as defined in Section 16-5.2 E. herein below:
  - a. If an additional 1/4 acre of impervious surface is being proposed on a development site; and/or
  - b. If the applicant is seeking subdivision or minor or major site plan approval or approval for “d” variances pursuant to N.J.S.A. 40:55D-70d or for “c” variances for lot coverage.

**D. Compatibility with Other Permit and Ordinance Requirements.**

Development approvals issued for subdivisions and major and minor site plans pursuant to this ordinance are to be considered an integral part of development approvals under the subdivision and major and minor site plan review process and 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. In their interpretation and application, the provisions of this ordinance shall be held to be the minimum requirements for the promotion of the public health, safety, and general welfare. This ordinance is not intended to interfere with, abrogate, or annul any other ordinances, rule or regulation, statute, or other provision of law except that, where any provision of this ordinance imposes restrictions different from those imposed by any other ordinance, rule or regulation, or other provision of law, the more restrictive provisions or higher standards shall control.

**E. Definitions.**

Unless specifically defined below, words or phrases used in this ordinance shall be interpreted so as to give them the meaning they have in common usage and to give this ordinance its most reasonable application. The definitions below are applicable to this section of the Land Development Ordinance.

“*Compaction*” means the increase in soil bulk density.

“*Core*” means a pedestrian-oriented area of commercial and civic uses serving the surrounding municipality, generally including housing and access to public transportation.

“*County review agency*” means an agency designated by the County Board of Chosen Freeholders to review municipal stormwater management plans and implementing ordinance(s). The county review agency may either be:

A county planning agency; or

A county water resource association created under N.J.S.A 58:16A-55.5, if the ordinance or resolution delegates authority to approve, conditionally approve, or disapprove municipal stormwater management plans and implementing ordinances.

“*Department*” means the New Jersey Department of Environmental Protection.

“*Designated Center*” means a State Development and Redevelopment Plan Center as designated by the State Planning Commission such as urban, regional, town, village, or hamlet.

“*Design engineer*” means a person professionally qualified and duly licensed in New Jersey to perform engineering services that may include, but not necessarily be limited to, development of project requirements, creation and development of project design and preparation of drawings and specifications.

“*Design permeability*” means the tested permeability rate with a factor of safety of two (2) applied to it (for example, if the field tested permeability rate of the soils is 10 inches per hour, the design rate would be 5 inches per hour).

“*Development*” means the division of a parcel of land into two or more parcels, the construction, reconstruction, conversion, structural alteration, relocation or enlargement of any building or structure, any mining excavation or landfill, and any use or change in the use of any building or other structure, or land or extension of use of land, by any person, for which permission is required under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq. In the case of development of agricultural lands, development means: any activity that requires a State permit, any activity reviewed by the County Agricultural Board (CAB)

and the State Agricultural Development Committee (SADC), and municipal review of any activity not exempted by the Right to Farm Act , N.J.S.A 4:1C-1 et seq.

“*Drainage area*” means a geographic area within which stormwater, sediments, or dissolved materials drain to a particular receiving waterbody or to a particular point along a receiving waterbody.

“*Environmentally critical areas*” means an area or feature which is of significant environmental value, including but not limited to: stream corridors; natural heritage priority sites; habitat of endangered or threatened species; large areas of contiguous open space or upland forest; steep slopes; well head protection and groundwater recharge areas; freshwater wetlands; transition areas; 100-year flood plains; and hydric soils as defined in Section 16-6.4 G. of the ordinance. Habitats of endangered or threatened species are identified using the Department’s Landscape Project as approved by the Department’s Endangered and Nongame Species Program.

“*Erosion*” means the detachment and movement of soil or rock fragments by water, wind, ice or gravity.

“*Exception*” means the approval by the approving authority of a variance or other material departure from strict compliance with any section, part, phrase or provision of this ordinance. An exception may be granted only under certain specific narrowly-defined conditions set forth in this ordinance.

“*Groundwater*” means water below the land surface in a zone of saturation.

“*Groundwater mounding analysis*” means an analysis performed to demonstrate that the groundwater below a stormwater infiltration basin will not rise up and encroach upon the unsaturated zone and break the surface of the ground at the infiltration area or downslope, thereby creating an overland flow situation or drainage problem. ModFlow® or any ground water mounding analysis program may be used as long as the input parameters and the method of analysis consider all of the significant hydraulic conditions of the site.

“*Heavy Equipment*” means equipment that exerts pressure on the ground in excess of eight pounds per square inch.

“*Impervious surface*” means a surface that has been covered with a layer of material so that it is highly resistant to infiltration by water and has a CN value equal or greater than 76 for hydrologic soil group A, equal or greater than 85 for hydrologic soil group B, equal or greater than 89 for hydrologic soil group C and equal or greater than 91 for hydrologic group D.

“*Infiltration*” is the process by which water seeps into the soil from precipitation.

“*Low impact development*” means a stormwater management measure, strategy or combination of strategies to reduce the negative stormwater runoff impacts through such practices as minimizing site disturbance, preserving natural site features, reducing impervious cover, disconnecting impervious cover, flattening slopes, utilizing native vegetation, minimizing turf grass lawns, maintaining natural drainage features, maintaining natural drainage characteristics, controlling stormwater runoff closer to the source, and controlling stormwater pollutants closer to the source. The term “nonstructural best management measure” has the same meaning as “low impact development”.

“*Major development*” means any “development” that provides for ultimately disturbing one or more acres of land or increasing impervious coverage by more than one quarter acre or 10,890 square feet. Disturbance for the purpose of this rule is the placement of impervious surface or exposure and/or movement of soil or bedrock or clearing, cutting, or removing of vegetation.

“*Minor development*” means all development other than major development.

“Mitigation” means acts necessary to compensate for conditions that may result from development where the applicant has demonstrated the inability of strict compliance to the stormwater management regulations and an exception from strict compliance is granted by Montgomery Township.

“*Municipality*” means any city, borough, town, township, or village.

“*Node*” means an area designated by the State Planning Commission concentrating facilities and activities which are not organized in a compact form.

“*Nonpoint Source*” or “NPS” means:

1. Any human-created activity, factor, or condition, other than a point source, from which pollutants may be discharged.
2. Any activity, factor or condition, other than point source that may contribute to water pollution.
3. Any human-created activity, factor or condition, other than a point source, that may temporarily or permanently change any chemical, physical, biological, or radiological characteristic of the waters of the State of New Jersey from what was or is the natural, pristine condition of such waters, or may increase the degree of such change.

“*Nonstructural best management measure (BMP)*” means a stormwater management measure, strategy or combination of strategies to reduce the negative stormwater runoff impacts through such practices as minimizing site disturbance, preserving natural site features, reducing impervious cover, disconnecting

impervious cover, flattening slopes, utilizing native vegetation, minimizing turf grass lawns, maintaining natural drainage features, maintaining natural drainage characteristics, controlling stormwater runoff closer to the source, and controlling stormwater pollutants closer to the source. The term “low impact development” has the same meaning as “nonstructural best management measure”.

“*Nutrient*” means a chemical element or compound, such as nitrogen or phosphorus, which is essential to and promotes the development of organisms.

“*Person*” means any individual, corporation, company, partnership, firm, association, Montgomery Township, or political subdivision of this State subject to municipal jurisdiction pursuant to the Municipal Land Use Law , N.J.S.A. 40:55D-1 et seq.

“*Permeability*” means the rate at which water moves through a saturated unit area of soil or rock material at a hydraulic gradient of one, determined as prescribed in N.J.A.C. 7:9A-6.2 (Tube Permeameter Test), N.J.A.C. 6.5 (Pit Bailing Test) or N.J.A.C. 6.6 (Piezometer Test). The Soil Permeability Class Rating Test Alternative per N.J.A.C. 7:9A-6.3 and the Percolation Test per N.J.A.C. 7:9A-6.4 are not acceptable tests for establishing permeability rates for the purposes of complying with this ordinance. See Section 16-5.2.N. of this ordinance.

“*Permeable*” means having a permeability of one (1) inch per hour or faster. The terms “permeable rock” and “permeable soil” shall be construed accordingly.

“*Point source*” means any discernible and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel, floating craft, from which pollutants may be discharged. The term does not include flows from irrigated agriculture.

“*Pollutant*” means any dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, refuse, oil, grease, sewage sludge, munitions, chemical wastes, biological materials, medical wastes, radioactive substance (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.)), thermal waste, wrecked or discarded equipment, rock, sand, cellar dirt, industrial, municipal, agricultural, and construction waste or runoff, or other residue discharged directly or indirectly to the land, ground waters or surface waters of the State, or to a domestic treatment works. “Pollutant” includes both hazardous and nonhazardous pollutants.

“*Recharge*” means the amount of water from precipitation that infiltrates into the ground and is not evapotranspired.

“*Sediment*” means solid material, mineral or organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water or gravity as a product of erosion.

“*Seasonal high water table*” means the upper limit of the shallowest zone of saturation which occurs in the soil, identified as prescribed in N.J.A.C. 7:9A-5.8.

“*Sensitive receptor*” means a specific area or natural feature that will be sensitive to a stormwater impact.

“*Site*” means the lot or lots upon which a major development is to occur or has occurred.

“*Soil*” means all unconsolidated mineral and organic material of any origin.

“*State Development and Redevelopment Plan Metropolitan Planning Area (PA1)*” means an area delineated on the State Plan Policy Map and adopted by the State Planning Commission that is intended to be the focus for much of the state’s future redevelopment and revitalization efforts.

“*State Plan Policy Map*” is defined as the geographic application of the State Development and Redevelopment Plan’s goals and statewide policies, and the official map of these goals and policies.

“*Stormwater*” means water resulting from precipitation (including rain and snow) that runs off the land’s surface, is transmitted to the subsurface, or is captured by separate storm sewers or other sewage or drainage facilities, or conveyed by snow removal equipment.

“*Stormwater runoff*” means water flow on the surface of the ground or in storm sewers, resulting from precipitation.

“*Stormwater management basin*” means an excavation or embankment and related areas designed to retain stormwater runoff. A stormwater management basin may either be normally dry (that is, an extended detention basin or an infiltration basin), retain water in a permanent pool (a retention basin or wet pond), or be planted mainly with wetland vegetation (constructed stormwater wetlands).

“*Stormwater management measure*” means any structural or nonstructural strategy, practice, technology, process, program, or other method intended to control or reduce stormwater runoff and associated pollutants, or to induce or control the infiltration or groundwater recharge of stormwater or to eliminate illicit or illegal non-stormwater discharges into stormwater conveyances.

“*Urban Redevelopment Area*” is defined as previously developed portions of areas:

1. Delineated on the State Plan Policy Map (SPPM) as the Metropolitan Planning Area (PA1), Designated Centers, Cores or Nodes;

2. Designated as CAFRA Centers, Cores or Nodes;
3. Designated as Urban Enterprise Zones; and
4. Designated as Urban Coordinating Council Empowerment Neighborhoods.

“*Waters of the State*” means the ocean and its estuaries, all springs, streams, wetlands, and bodies of surface or ground water, whether natural or artificial, within the boundaries of the State of New Jersey or subject to its jurisdiction.

“*Wetlands*” or “*wetland*” means an area that is inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation.

**F. General Design and Performance Standards for Stormwater Management Measures.**

1. Stormwater management measures for major development and redevelopment shall be developed by incorporating nonstructural (low impact design) measures found in Subsection 16-5.2 G.5. in order to meet to meet the erosion control, groundwater recharge, stormwater runoff quantity, and stormwater runoff quality standards in Section 16-5.2 H. of this ordinance. As set forth in Subsection 16-5.2 G.5, the applicant shall provide the Nonstructural Stormwater Management Strategies Point System (NSPS) to demonstrate that sufficient low impact design strategies have been incorporated into the design. If the NSPS fails to demonstrate compliance, the applicant shall demonstrate compliance through additional means such as the Low Impact Development (LID) checklist.
2. The standards in this ordinance apply only to new major development and redevelopment and are intended to minimize the impact of stormwater runoff on water quality and water quantity in receiving water bodies and maintain groundwater recharge. The standards do not apply to new major development and redevelopment to the extent that alternative design and performance standards are applicable under a regional stormwater management plan or Water Quality Management Plan adopted in accordance with Department rules.

**G. Stormwater Management Requirements.**

1. The development shall incorporate a maintenance plan for the stormwater management measures incorporated into the design of a major development in accordance with Section 16-5.2 O. of this ordinance.



2. Stormwater management measures shall avoid adverse impacts of concentrated flow on habitat for threatened and endangered species as documented in the Department' Landscape Project or Natural Heritage Database established under N.J.S.A. 13:1B-15.147 through 15.150, particularly *Helonias bullata* (swamp pink) and/or *Clemmys muhlnebergi* (bog turtle).
3. The following linear development projects are exempt from the groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements of Subsections 16-5.2 G.6. (Recharge & Runoff Quantity) and 16-5.2 G.7.(Runoff Water Quality):
  - a. The construction of an underground utility line provided that the disturbed areas are revegetated upon completion;
  - b. The construction of an aboveground utility line provided that the existing conditions are maintained to the maximum extent practicable; and
  - c. The construction of a public pedestrian access, such as a sidewalk or trail with a maximum width of 14 feet, provided that the access is made of permeable material.
4. A waiver from strict compliance from the groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements of Subsections 16-5.2 G.6. (Recharge & Runoff Quantity) and 16-5.2 G.7 (Runoff Water Quality) may be obtained for the enlargement of an existing public roadway or railroad, or the construction or enlargement of a public pedestrian access, provided that the following conditions are met:
  - a. The applicant demonstrates that there is a public need for the project that cannot be accomplished by any other means;
  - b. The applicant demonstrates through an alternative analysis, that through the use of nonstructural and structural stormwater management strategies and measures, the option selected complies with the requirements of Subsections 16-5.2 G.6. (Recharge & Runoff Quantity) and 16-5.2 G.7 (Runoff Water Quality) to the maximum extent practicable;
  - c. The applicant demonstrates that, in order to meet the requirements of Subsections 16-5.2 G.6. (Recharge & Runoff Quantity) and 16-5.2 G.7 (Runoff Water Quality), existing structures currently in use, such as homes and buildings, would need to be condemned; and

- d. The applicant demonstrates that it does not own or have other rights to areas, including the potential to obtain through condemnation lands not falling under Subsection 16-5.2 G.4.c. above within the upstream drainage area of the receiving stream that would provide additional opportunities to mitigate the requirements of Subsections 16-5.2 G.6. (Recharge & Runoff Quantity) and 16-5.2 G.7 (Runoff Water Quality) that were not achievable on-site.
5. Nonstructural Stormwater Management Strategies (Low Impact Design).
- a. The standards in Subsections 16-5.2 G.6. (Recharge & Runoff Quantity) and 16-5.2 G.7 (Runoff Water Quality) shall be met by incorporating nonstructural stormwater management (low impact design) strategies set forth at Subsection 16-5.2 G.5.b into the design to the maximum extent possible.
    - (1) A total of nine (9) strategies are to be used to meet the groundwater recharge, stormwater quality, and stormwater quantity requirements prior to utilizing structural stormwater management measures.
    - (2) The applicant shall provide the New Jersey Nonstructural Stormwater Management Strategies Point System (NSPS) created by the New Jersey Department of Environmental Protection *as it may be amended from time to time* and currently found on the web site [www.nj.gov/dep/stormwater](http://www.nj.gov/dep/stormwater) to identify the nonstructural measures incorporated into the design of the project and to assist the reviewing board in determining that the strategies have been used to the “maximum extent practicable”.
    - (3) If the Nonstructural Stormwater Management Strategies Point System (NSPS) demonstrates that sufficient nonstructural stormwater management measures have been utilized at a major development, no further proof of compliance with the maximum extent practicable requirement shall be required.
    - (4) However, if the NSPS fails to demonstrate such compliance, such a result shall not be used to disapprove any municipal development application sought by a proposed major development. Instead, the applicant for such approval will be required to demonstrate compliance through other and/or additional means.

- (5) This includes the Low Impact Development (LID) Checklist contained in Appendix A of the New Jersey Stormwater Best Management Practices Manual *as it may be amended from time to time*, which includes a rigorous alternatives analysis for each non structural measure.
  - (6) Finally, it should be noted that the NSPS is not presently intended for use on roadway construction, improvement, and other linear development projects. As a result, other means, including the LID Checklist, should be used for linear development projects.
- b. Nonstructural stormwater management strategies incorporated into site design shall:
- (1) Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss;
  - (2) Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces;
  - (3) Maximize the protection of natural drainage features and vegetation;
  - (4) Minimize the decrease in the “time of concentration” from pre-construction to post construction. “Time of concentration” is defined as the time it takes for runoff to travel from the hydraulically most distant point of the watershed to the point of interest within a watershed;
  - (5) Minimize land disturbance including clearing and grading;
  - (6) Minimize soil compaction;
  - (7) Provide low-maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides;
  - (8) Provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas;

- (9) Provide other source controls to prevent or minimize the use or exposure of pollutants at the site, in order to prevent or minimize the release of those pollutants into stormwater runoff. Such source controls include, but are not limited to:
  - (a) Site design features that help to prevent accumulation of trash and debris in drainage systems, including features that satisfy Subsection 16-5.2 G.5.c. below;
  - (b) Site design features that help to prevent discharge of trash and debris from drainage systems;
  - (c) Site design features that help to prevent and/or contain spills or other harmful accumulations of pollutants at industrial or commercial developments; and
  - (d) When establishing vegetation after land disturbance, applying fertilizer in accordance with the requirements established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq., and implementing rules.

These strategies are implemented through a variety of non-structural stormwater management measures. When properly integrated into the site design, these nonstructural measures can be effective in reducing development-induced increases in runoff volumes, rates, pollutant loads, and concentrations. The New Jersey Stormwater Best Management Practices (BMP) Manual contains guidelines for the design of individual nonstructural measures.

- c. Site design features identified under Subsection 16-5.2 G.5.b.(9)(b) above shall comply with the following standard to control passage of solid and floatable materials through storm drain inlets. For purposes of this paragraph, “solid and floatable materials” means sediment, debris, trash, and other floating, suspended, or settleable solids. For exemptions to this standard, see Subsection 16-5.2 G.5.c.(3) below.
  - (1) Design engineers shall use either of the following grates whenever they use a grate in pavement or another ground surface to collect stormwater from

that surface into a storm drain or surface water body under that grate:

- (a) The New Jersey Department of Transportation (NJDOT) bicycle safe grate, which is described in Chapter 2.4 of the NJDOT Bicycle Compatible Roadways and Bikeways Planning and Design Guidelines (April 1996); or
- (b) A different grate, if each individual clear space in that grate has an area of no more than seven (7.0) square inches, or is no greater than 0.5 inches across the smallest dimension.

Examples of grates subject to this standard include grates in grate inlets, the grate portion (non-curb-opening portion) of combination inlets, grates on storm sewer manholes, ditch grates, trench grates, and grates of spacer bars in slotted drains.

Examples of ground surfaces include surfaces of roads (including bridges), driveways, parking areas, bikeways, plazas, sidewalks, lawns, fields, open channels, and stormwater basin floors.

- (2) Whenever design engineers use a curb-opening inlet, the clear space in that curb opening (or each individual clear space, if the curb opening has two or more clear spaces) shall have an area of no more than seven (7.0) square inches, or be no greater than two (2.0) inches across the smallest dimension.
- (3) This standard does not apply:
  - (a) Where the review agency determines that this standard would cause inadequate hydraulic performance that could not practicably be overcome by using additional or larger storm drain inlets that meet these standards;
  - (b) Where flows from the water quality design storm as specified in Subsection 16-5.2 H.2. are conveyed through any device (e.g., end of pipe netting facility, manufactured treatment device, or a catch basin hood) that

is designed, at a minimum, to prevent delivery of all solid and floatable materials that could not pass through one of the following:

- (i) A rectangular space four and five-eighths inches long and one and one-half inches wide (this option does not apply for outfall netting facilities); or
  - (ii) A bar screen having a bar spacing of 0.5 inches.
- (c) Where flows are conveyed through a trash rack that has parallel bars with one-inch (1”) spacing between the bars, to the elevation of the water quality design storm as specified in Subsection 16-5.2 H.2.; or
- (d) Where the New Jersey Department of Environmental Protection determines, pursuant to the New Jersey Register of Historic Places Rules at N.J.A.C. 7:4-7.2(c), that action to meet this standard is an undertaking that constitutes an encroachment or will damage or destroy the New Jersey Register listed historic property.
- (4) Any land area used as a nonstructural stormwater management measure to meet the performance standards in Subsections 16-5.2 G.6. and 16-5.2 G.7. shall be dedicated to a government agency, subjected to a conservation deed restriction filed with the appropriate County Clerk’s office, or subject to an approved equivalent restriction that ensures that the non structural measure approved by the reviewing agency is maintained in perpetuity. The applicant must provide proof of the filing (receipt) of the conservation deed restriction with the County prior to final approval of the subdivision or site plan by the Township Engineer.
- (5) Guidance for nonstructural stormwater management strategies is available in the New Jersey Stormwater Best Management Practices Manual. The BMP Manual may be obtained from the address identified in Section 16-5.2 K., or found on the Department’s website at [www.njstormwater.org](http://www.njstormwater.org).

6. Erosion Control, Groundwater Recharge and Runoff Quantity Standards.
  - a. This subsection contains minimum design and performance standards to control erosion, encourage and control infiltration and groundwater recharge, and control stormwater runoff quantity impacts of major development.
    - (1) The minimum design and performance standards for erosion control are those established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq. and implementing rules.
    - (2) The minimum design and performance standards for groundwater recharge are as follows:
      - (a) The design engineer shall, using the assumptions and factors for stormwater runoff and groundwater recharge calculations at Section 16-5.2 H., either:
        - (i) Demonstrate through hydrologic and hydraulic analysis that the site and its stormwater management measures maintain 100 percent of the average annual pre-construction groundwater recharge volume for the site; or
        - (ii) Demonstrate through hydrologic and hydraulic analysis that the increase of stormwater runoff volume from pre-construction to post-construction for the 2-year storm is infiltrated.
      - (b) This groundwater recharge requirement does not apply to projects within the “urban redevelopment area,” or to projects subject to Subsection 16-5.2 G.6.a.(2)(c) below.
      - (c) The following types of stormwater shall not be recharged:
        - (i) Stormwater from areas of high pollutant loading:

High pollutant loading areas are areas in industrial and commercial developments where solvents and/or petroleum products are loaded/

unloaded, stored, or applied, areas where pesticides are loaded/unloaded or stored; areas where hazardous materials are expected to be present in greater than “reportable quantities” as defined by the United States Environmental Protection Agency (EPA) at 40 CFR 302.4; areas where recharge would be inconsistent with Department approved remedial action work plan or landfill closure plan and areas with high risks for spills of toxic materials, such as gas stations and vehicle maintenance facilities; and

- (ii) Industrial stormwater exposed to “source material”:

“Source material” means any material(s) or machinery, located at an industrial facility that is directly or indirectly related to process, manufacturing or other industrial activities, which could be a source of pollutants in any industrial stormwater discharge to groundwater. Source materials include, but are not limited to, raw materials; intermediate products; final products; waste materials; by-products; industrial machinery and fuels, and lubricants, solvents, and detergents that are related to process, manufacturing; or other industrial activities that are exposed to stormwater.

- (d) The design engineer shall assess the hydraulic impact on the groundwater table and design the site so as to avoid adverse hydraulic impacts. Potential adverse hydraulic impacts include, but are not limited to, exacerbating a naturally or seasonally high water table so as to cause surficial ponding, flooding of basements, or interference with the proper operation of subsurface sewage disposal systems and other subsurface structures in the



vicinity or downgradient of the groundwater recharge area.

- (3) In order to control stormwater runoff quantity impacts, the design engineer shall, using the assumptions and factors for stormwater runoff calculations at Section 16-5.2 H., complete one of the following:
  - (a) Demonstrate through hydrologic and hydraulic analysis that for stormwater leaving the site, post-construction runoff hydrographs for the 2, 10, and 100-year storm events do not exceed, at any point in time, the pre-construction runoff hydrographs for the same storm events;
  - (b) Demonstrate through hydrologic and hydraulic analysis that there is no increase, as compared to the pre-construction condition, in the peak runoff rates of stormwater leaving the site for the 2, 10, and 100-year storm events and that the increased volume or change in timing of stormwater runoff will not increase flood damage at or downstream of the site. This analysis shall include the analysis of impacts of existing land uses and projected land uses assuming full development under existing zoning and land use ordinances in the drainage area;
  - (c) Design stormwater management measures so that the post-construction peak runoff rates for the 2, 10 and 100 year storm events are 50, 75 and 80 percent, respectively, of the pre-construction peak runoff rates. The percentages apply only to the post-construction stormwater runoff that is attributable to the portion of the site on which the proposed development or project is to be constructed. The percentages shall not be applied to post-construction stormwater runoff into tidal flood hazard areas if the increased volume of stormwater runoff will not increase flood damages below the point of discharge; or

- (d) In tidal flood hazard areas, stormwater runoff quantity analysis in accordance with Subsections 16-5.2 G.6.a.(3)(a), (b) and (c) above shall only be applied if the increased volume of stormwater runoff could increase flood damages below the point of discharge.
  - b. Any application for a new agricultural development that meets the definition of major development at Section 16-5.2 E. shall be submitted to the appropriate Soil Conservation District for review and approval in accordance with the requirements of this section and any applicable Soil Conservation District guidelines for stormwater runoff quantity and erosion control. For the purposes of this section, “agricultural development” means land uses normally associated with the production of food, fiber and livestock for sale. Such uses do not include the development of land for the processing or sale of food and the manufacturing of agriculturally related products.
- 7. Stormwater Runoff Quality Standards.
  - a. Stormwater management measures shall be required for water quality control for the following:
    - (1) If an additional 1/4 acre of impervious surface is being proposed on a development site; and/or
    - (2) If the applicant is seeking subdivision or minor or major site plan approval or approval for “d” variances pursuant to N.J.S.A. 40:55D-70d or for “c” variances for lot coverage.
  - b. Stormwater management runoff quality measures shall be designed to reduce the post-construction load of total suspended solids (TSS) in stormwater runoff by 80 percent of the anticipated load from the developed site, expressed as an annual average. The calculations shall follow Section 16-5.2 H. of this ordinance.
  - c. Runoff quality measures shall also include the calculation of the removal rate of phosphorus and nitrogen expressed as an annual average, from the proposed best management practice. In achieving reduction of nutrients to the maximum extent feasible, the design of the site shall include nonstructural strategies and structural measures that optimize nutrient removal while still achieving the

performance standards in Subsections 16-5.2 G.6. and 16-5.2 G.7. The runoff quality calculations for nutrient removal rates shall follow Table 2 in Subsection 16-5.2 H.2.e. of this ordinance.

- d. The requirement to reduce TSS does not apply to any stormwater runoff in a discharge regulated under a numeric effluent limitation for TSS imposed under the New Jersey Pollution Discharge Elimination System (NJPDES) rules, N.J.A.C. 7:14A, or in a discharge specifically exempt under a NJPDES permit from this requirement.
- e. Additional information and examples are contained in the New Jersey Stormwater Best Management Practices Manual, which may be obtained from the address identified in Section 16-5.2 K.
- f. In accordance with the definition of FW1 at N.J.A.C. 7:9B-1.4, stormwater management measures shall be designed to prevent any increase in stormwater runoff to waters classified as FW1.
- g. Special water resource protection areas shall be established along all waters designated Category One at N.J.A.C. 7:9B, and perennial or intermittent streams that drain into or upstream of the Category One waters, as shown on the USGS Quadrangle Maps or in the County Soil Surveys, within the associated HUC14 drainage area. These areas shall be established for the protection of water quality, aesthetic value, exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, and exceptional fisheries significance of those established Category One waters. These areas shall be designated and protected as follows:
  - (1) The applicant shall preserve and maintain a special water resource protection area in accordance with one of the following:
    - (a) A 300-foot special water resource protection area shall be provided on each side of the waterway, measured perpendicular to the waterway from the top of the bank outwards or from the centerline of the waterway where the bank is not defined, consisting of existing vegetation or vegetation allowed to follow natural succession is provided.

- (b) Encroachment within the designated special water resource protection area under Subsection 16-5.2 G.7.g.(1)(a) above shall only be allowed where previous development or disturbance has occurred (for example, active agricultural use, parking area or maintained lawn area).
  - (c) The encroachment shall only be allowed where the applicant demonstrates that the functional value and overall condition of the special water resource protection area will be maintained to the maximum extent practicable.
  - (d) In no case shall the remaining special water resource protection area be reduced to less than 150 feet as measured perpendicular to the top of bank of the waterway or centerline of the waterway where the bank is undefined.
  - (e) All encroachments proposed under this subparagraph shall be subject to review and approval by the Department.
- (2) All stormwater shall be discharged outside of and flow through the special water resource protection area and shall comply with the Standard for Off-Site Stability in the “Standards For Soil Erosion and Sediment Control in New Jersey,” established under the Soil Erosion and Sediment Control Act , N.J.S.A. 4:24-39 et seq.
- (3) If stormwater discharged outside of and flowing through the special water resource protection area cannot comply with the Standard For Off-Site Stability in the “Standards for Soil Erosion and Sediment Control in New Jersey,” established under the Soil Erosion and Sediment Control Act , N.J.S.A. 4:24-39 et seq., then the stabilization measures in accordance with the requirements of the above standards may be placed within the special water resource protection area, provided that:

- (a) Stabilization measures shall not be placed within 150 feet of the Category One waterway;
  - (b) Stormwater associated with discharges allowed by this section shall achieve a 95 percent TSS post-construction removal rate;
  - (c) Temperature shall be addressed to ensure no impact on the receiving waterway;
  - (d) The encroachment shall only be allowed where the applicant demonstrates that the functional value and overall condition of the special water resource protection area will be maintained to the maximum extent practicable;
  - (e) A conceptual project design meeting shall be held with the appropriate Department staff and Soil Conservation District staff to identify necessary stabilization measures; and
  - (f) All encroachments proposed under this section shall be subject to review and approval by the Department.
- (4) A stream corridor protection plan may be developed by a regional stormwater management planning committee as an element of a regional stormwater management plan, or by a municipality through an adopted municipal stormwater management plan.
- (a) If a stream corridor protection plan for a waterway subject to Subsection 16-5.2 G.7.f. has been approved by the Department of Environmental Protection, then the provisions of the plan shall be the applicable special water resource protection area requirements for that waterway.
  - (b) A stream corridor protection plan for a waterway subject to Subsection 16-5.2 G.7.f. shall maintain or enhance the current functional value and overall condition of the special water resource protection area as

defined in Subsection 16-5.2 G.7.g.(1)(a) above.

- (c) In no case shall a stream corridor protection plan allow the reduction of the Special Water Resource Protection Area to less than 150 feet as measured perpendicular to the waterway subject to this subsection.
- (5) Subsection 16-5.2 G.7.g. (Special Water Resource Protection along Category One Streams) does not apply to the construction of one individual single family dwelling that is not part of a larger development on a lot receiving preliminary or final subdivision approval on or before February 2, 2004, provided that the construction begins on or before February 2, 2009.

**H. Calculation of Stormwater Runoff Rate and Volume, Stormwater Runoff Quality and Groundwater Recharge.**

- 1. Method of Calculating Stormwater Runoff Rate and Volume.
  - a. In complying with the Stormwater Runoff Quantity and Rate Standards in Subsection 16-5.2 G.6., the design engineer shall calculate the stormwater runoff rate and volume using the USDA Natural Resources Conservation Service (NRCS) Runoff Equation, Runoff Curve Numbers, and Dimensionless Unit Hydrograph, as described in the NRCS National Engineering Handbook Part 630 – Hydrology and Technical Release 55 – Urban Hydrology for Small Watersheds as amended and supplemented or the Rational Method for peak flow and the Modified Rational Method for hydrograph computations.
  - b. In calculating stormwater runoff using the NRCS methodology, the design engineer shall separately calculate and then combine the runoff volumes from pervious and directly connected impervious surfaces within each drainage area within the parcel.
  - c. Calculation of stormwater runoff from unconnected impervious surfaces shall be based, as applicable, upon the Two-Step method described in the current New Jersey Stormwater Best Management Practices Manual or the NRCS methodology. In calculating stormwater runoff using the NRCS methodology, the design engineer shall use appropriate 24-hour rainfall depths as developed for the project site by the National Oceanic and Atmospheric Administration, available online, at:  
<http://hdsc.nws.noaa.gov/hdsc/pfds/index.html>.

- d. When calculating stormwater runoff for pre-developed site conditions, the design engineer shall use the following criteria:
  - (1) When selecting or calculating Runoff Curve Numbers (CNs) for pre-developed project site conditions, the project site's land cover shall be assumed to be woods in good condition. However, another land cover may be used to calculate runoff coefficients if:
    - (a) Such land cover has existed at the site or portion thereof without interruption for at least five (5) years immediately prior to the time of application; and
    - (b) The design engineer can document the character and extent of such land cover through the use of photographs, affidavits, and/or other acceptable land use records.
  - (2) If more than one land cover has existed on the site during the five (5) years immediately prior to the time of application, the land cover with the lowest runoff potential shall be used for the computations.
  - (3) All pre-developed land covers shall be assumed to be in good hydrologic condition and, if cultivated, shall be assumed to have conservation treatment.
  - (4) In calculating pre-developed site stormwater runoff, the design engineer shall include the effects of all land features and structures, such as ponds, wetlands, depressions, hedgerows, and culverts, which affect pre-developed site stormwater runoff rates and/or volumes.
  - (5) Where tailwater will affect the hydraulic performance of a stormwater management measure, the design engineer shall include such effects in the measure's design.
2. Method of Calculating Stormwater Runoff Quality.
  - a. In complying with the Stormwater Runoff Quality Standards in Subsection 16-5.2 G.7., the design engineer shall calculate the stormwater runoff rate and volume using the USDA Natural Resources Conservation Service (NRCS) Runoff Equation, Runoff

Curve Numbers, and Dimensionless Unit Hydrograph, as described in the NRCS National Engineering Handbook Part 630 – Hydrology and Technical Release 55 – Urban Hydrology for Small Watersheds, as amended and supplemented or the Rational Method for peak flow and the Modified Rational Method for hydrograph computations.

- b. The design engineer shall also use the NJDEP Water Quality Design Storm, which is one and one-quarter (1.25) inches of rainfall falling in a nonlinear pattern in two (2) hours. Details of the Water Quality Design Storm are shown in Table 1.
- c. Calculation of runoff volumes, peak rates, and hydrographs for the Water Quality Design Storm may take into account the implementation of nonstructural and structural stormwater management measures.

<b>Table 1: Water Quality Design Storm Distribution<sup>1</sup></b>			
<b>Time (minutes)</b>	<b>Cumulative Rainfall (inches)</b>	<b>Time (minutes)</b>	<b>Cumulative Rainfall (inches)</b>
<b>0</b>	<b>0.0000</b>	<b>65</b>	<b>0.8917</b>
<b>5</b>	<b>0.0083</b>	<b>70</b>	<b>0.9917</b>
<b>10</b>	<b>0.0166</b>	<b>75</b>	<b>1.0500</b>
<b>15</b>	<b>0.0250</b>	<b>80</b>	<b>1.0840</b>
<b>20</b>	<b>0.0500</b>	<b>85</b>	<b>1.1170</b>
<b>25</b>	<b>0.0750</b>	<b>90</b>	<b>1.1500</b>
<b>30</b>	<b>0.1000</b>	<b>95</b>	<b>1.1750</b>
<b>35</b>	<b>0.1330</b>	<b>100</b>	<b>1.2000</b>
<b>40</b>	<b>0.1660</b>	<b>105</b>	<b>1.2250</b>
<b>45</b>	<b>0.2000</b>	<b>110</b>	<b>1.2334</b>
<b>50</b>	<b>0.2583</b>	<b>115</b>	<b>1.2417</b>
<b>55</b>	<b>0.3583</b>	<b>120</b>	<b>1.2500</b>
<b>60</b>	<b>0.6250</b>		

<sup>1</sup> Source: N.J.A.C. 7:8-5.5(a).



d. Total Suspended Solids (TSS) Reduction Calculations.

- (1) If more than one stormwater BMP in series is necessary to achieve the required eighty percent (80%) TSS reduction for a site, the applicant shall utilize the following formula to calculate TSS reduction:

$$R = A + B - (A \times B) / 100, \text{ where:}$$

R = total TSS percent load removal from application of both BMPs;

A = the TSS percent removal rate applicable to the first BMP; and

B = the TSS percent removal rate applicable to the second BMP.

- (2) If there is more than one onsite drainage area, the eighty percent (80%) TSS removal rate shall apply to each drainage area, unless the runoff from the subareas converge on site, in which case the removal rate can be demonstrated through a calculation using a weighted average.

e. TSS Removal Rates for Stormwater BMPs.

- (1) For purposes of TSS reduction calculations, Table 2 presents the presumed removal rates for certain BMPs designed in accordance with the New Jersey BMP Manual. The BMP Manual may be obtained from the address identified in Section 16-5.2 K. or found on the NJDEP's website at [www.njstormwater.org](http://www.njstormwater.org). TSS reduction shall be calculated based on the removal rates for the BMPs in Table 2 below.
- (2) Alternative stormwater management measures, removal rates and methods of calculating removal rates may be used if the design engineer provides documentation demonstrating the capability of these alternative rates and methods to Montgomery Township. Any alternative stormwater management measure, removal rate or method of calculating the removal rate shall be subject to approval by Montgomery Township and a copy shall be provided to: The Division of Watershed Management, New Jersey Department of

Environmental Protection, PO Box 418, Trenton,  
NJ, 08625-0418.

<b>Table 2: Pollutant Removal Rates for BMPs<sup>2</sup></b>			
<b>Best Management Practice</b>	<b>TSS Percent Removal Rate</b>	<b>Total Phosphorus Percent Removal Rate</b>	<b>Total Nitrogen Percent Removal Rate</b>
<b>Bioretention Systems</b>	<b>90</b>	<b>60</b>	<b>30</b>
<b>Constructed Stormwater Wetland</b>	<b>90</b>	<b>50</b>	<b>30</b>
<b>Extended Detention Basin</b>	<b>40-60 (final rate based upon detention time; see New Jersey BMP Manual, Chap. 9)</b>	<b>20</b>	<b>20</b>
<b>Infiltration basin</b>	<b>80</b>	<b>60</b>	<b>50</b>
<b>Manufactured Treatment Device</b>	<b>Pollutant removal rates as certified by NJDEP; see Section III.</b>	<b>Pollutant removal rates as certified by NJDEP; see Section III.</b>	<b>Pollutant removal rates as certified by NJDEP; see Section III.</b>
<b>Pervious Paving Systems</b>	<b>80 (porous paving)</b>	<b>60</b>	<b>50</b>
	<b>80 (permeable pavers with storage bed)</b>		
	<b>0 - volume reduction only (permeable pavers without storage bed)</b>	<b>0 - volume reduction only (permeable pavers without storage bed)</b>	<b>0 - volume reduction only (permeable pavers without storage bed)</b>
<b>Sand Filter</b>	<b>80</b>	<b>50</b>	<b>35</b>
<b>Vegetative Filter Strip</b> (For filter strips with multiple vegetated covers, the final TSS removal rate should be based upon a weighted average of the adopted rates shown in Table 2, based upon the relative flow lengths through each cover type.)	<b>60 (turf grass)</b>	<b>30</b>	<b>30</b>
	<b>70 (native grasses, meadow and planted woods)</b>		
	<b>80 (indigenous woods)</b>		
<b>Wet Pond / Retention Basin</b>	<b>50-90 (final rate based upon pool volume and detention time; see NJ BMP Manual)</b>	<b>50</b>	<b>30</b>

<sup>2</sup> Source: 7:8-5.5(c) and New Jersey BMP Manual Chapter 4.

## f. Nutrient Removal Rates for Stormwater BMPs.

For purposes of post-development nutrient load reduction calculations, Table 2 presents the presumed removal rates for certain BMPs designed in accordance with the New Jersey BMP Manual. If alternative stormwater BMPs are proposed, the applicant shall demonstrate that the selected BMPs will achieve the nutrient removal standard required in Subsection 16-5.2 G.7. of this ordinance.

3. Methods of Calculating Groundwater Recharge.

- a. In complying with the groundwater recharge standards contained in Subsection 16-5.2 G.6.a., the design engineer may calculate groundwater recharge in accordance with the New Jersey Groundwater Recharge Spreadsheet (NJGRS) computer program incorporated herein by reference as amended and supplemented. Information regarding the methodology is available from the New Jersey BMP Manual. In accordance with the “Evaluation of Groundwater Resources of Sourland Mountain Region of Central New Jersey” dated November 19, 2004 prepared by Matthew J. Mulhall, P.G., of M<sup>2</sup> Associates and Peter M. Demicco, P.G. of Demicco and Associates. The GSR-32 soil recharge rates used by the recharge spreadsheet shall not be used to assess recharge in the Sourland Mountain region located in Montgomery Township as shown in Figure 2 of the referenced report.
- b. Alternative groundwater recharge calculation methods to meet these requirements may be used upon approval by the municipal engineer.
- c. In complying with the groundwater recharge standards contained in Subsection 16-5.2 G.6.a.(2), the design engineer shall:
  - (1) Calculate stormwater runoff volumes in accordance with the USDA Natural Resources Conservation Service (NRCS) methodology, including the NRCS Runoff Equation and Runoff Curve Numbers, as described in the NRCS National Engineering Handbook Part 630 – Hydrology and Technical Release 55 – Urban Hydrology for Small Watersheds as amended and supplemented; and
  - (2) Use appropriate 2-year, 24-hour rainfall depths as developed for the project site by the National Oceanic and Atmospheric Administration, available

online at:

<http://hdsc.nws.noaa.gov/hdsc/pfds/index.html>.

- d. When calculating groundwater recharge or stormwater runoff for pre-developed site conditions, the design engineer shall use the following criteria:
  - (1) When selecting land covers or calculating Runoff Curve Numbers (CNs) for pre-developed project site conditions, the project site's land cover shall be assumed to be woods. However, another land cover may be used to calculate runoff coefficients if:
    - (a) Such land cover has existed at the site or portion thereof without interruption for at least five (5) years immediately prior to the time of application; and
    - (b) The design engineer can document the character and extent of such land cover through the use of photographs, affidavits, and/or other acceptable land use records.
  - (2) If more than one land cover, other than woods, has existed on the site during the five (5) years immediately prior to the time of application, the land cover with the lowest runoff potential (including woods) shall be used for the computations. All pre-developed land covers shall be assumed to be in good hydrologic condition and, if cultivated, shall be assumed to have conservation treatment.

**I. Standards for Structural Stormwater Management Measures.**

1. General Design Standards for structural stormwater management measures are as follows:
  - a. Structural stormwater management measures shall be designed to take into account the existing site conditions, including, for example: environmentally critical areas; wetlands; flood-prone areas; slopes; depth to seasonal high water table; soil type, permeability and texture; drainage area and drainage patterns; and the presence of solution-prone carbonate rocks (limestone).
  - b. Structural stormwater management measures shall be designed to minimize maintenance, facilitate maintenance and repairs, and ensure proper functioning.

- (1) Trash racks shall be installed at the intake to the outlet structure, as appropriate, and shall have parallel bars with one-inch (1") spacing between the bars to the elevation of the water quality design storm.
  - (2) For elevations higher than the water quality design storm, the parallel bars at the outlet structure shall be spaced no greater than one-third (1/3) the width of the diameter of the orifice or one-third (1/3) the width of the weir, with a minimum spacing between bars of one-inch and a maximum spacing between bars of six inches.
  - (3) In addition, the design of trash racks must comply with the requirements of Subsection 16-5.2 L.2.a. of this ordinance.
- c. Structural stormwater management measures shall be designed, constructed, and installed to be strong, durable, and corrosion resistant. Measures that are consistent with the relevant portions of the Residential Site Improvement Standards at N.J.A.C. 5:21-7.3, 7.4, and 7.5 shall be deemed to meet this requirement.
  - d. At the intake to the outlet from the stormwater management basin, the orifice size shall be a minimum of two and one-half (2.5) inches in diameter.
  - e. Stormwater management basins shall be designed to meet the minimum safety standards for stormwater management basins at Section 16-5.2 L. of this ordinance.
  - f. Stormwater management basins shall be designed in a manner that complements and mimics the existing natural landscape, including but not limited to the following design strategies:
    - (1) Use of natural, non-wetland wooded depressions for stormwater runoff storage; and
    - (2) Establishment of attractive landscaping in and around the basin that mimics the existing vegetation and incorporates native plants.
  - g. After all construction activities and required field testing have been completed on the development site, as-built plans depicting design and as-built elevations of all stormwater management measures shall be prepared by a Licensed Land Surveyor and submitted to the municipal engineer. Based upon the municipal engineer's

review of the as-built plans, all corrections or remedial actions deemed by the municipal engineer to be necessary due to the failure to comply with the standards established by this ordinance and/or any reasons of public health or safety, shall be completed by the applicant. In lieu of review by the municipal engineer, Montgomery Township reserves the right to engage a Professional Engineer to review the as-built plans. The applicant shall pay all costs associated with such review.

2. Design and Construction Standards for Stormwater Infiltration BMP's.
  - a. Stormwater infiltration BMP's, such as bioretention systems with infiltration, dry wells, infiltration basins, pervious paving systems with storage beds, and sand filters with infiltration, shall be designed, constructed and maintained to completely drain the total runoff volume generated by the basin's maximum design storm within seventy-two (72) hours after a storm event. Runoff storage for greater times can render the BMP ineffective and may result in anaerobic conditions; odor and both water quality and mosquito breeding problems.
  - b. Stormwater infiltration BMPs shall be designed, constructed and maintained to provide a minimum separation of at least two (2) feet between the elevation of the lowest point of the bottom of the infiltration BMP and the seasonal high water table.
  - c. The minimum design permeability rate for the soil within a BMP that relies on infiltration shall be one-half (0.5) inch per hour. A factor of safety of two (2) shall be applied to the soil's field-tested permeability rate to determine the soil's design permeability rate. For example, if the field-tested permeability rate of the soil is four (4) inches per hour, its design permeability rate would be two (2) inches per hour). The minimum design permeability rate for the soil within a stormwater infiltration basin shall also be sufficient to achieve the minimum seventy-two (72) hour drain time described in Subsection 16-5.2 I.2.a. above. The maximum design permeability shall be ten (10) inches per hour.
  - d. A soil's field tested permeability rate shall be determined in accordance with the following:
    - (1) The pre-development field test permeability rate shall be determined according to the methodologies provided in Section 16-5.2 N. of this ordinance;
    - (2) The results of the required field permeability tests shall demonstrate a minimum tested infiltration rate of one (1) inch per hour;

- (3) After all construction activities have been completed on the site and the finished grade has been established in the infiltration BMP, post-development field permeability tests shall also be conducted according to the methodologies provided in Section 16-5.2 N. of this ordinance;
  - (4) If the results of the post-development field permeability tests fail to achieve the minimum required design permeability rates in 5 above utilizing a factor of safety of two (2), the stormwater infiltration BMP shall be renovated and re-tested until such minimum required design permeability rates are achieved; and
  - (5) The results of all field permeability tests shall be certified by a Professional Engineer and transmitted to the municipal engineer.
- e. To help ensure maintenance of the design permeability rate over time, a layer of infiltration soil shall be placed on the bottom of a stormwater infiltration BMP. This soil layer shall meet the textural and permeability specifications of a K5 soil as provided at N.J.A.C. 7:9A, Appendix A, Figure 6, and be certified to meet these specifications by a Professional Engineer licensed in the State of New Jersey. The depth to the seasonal high water table shall be measured from the bottom of the infiltration layer.
- f. The design engineer shall assess the hydraulic impact on the groundwater table and design the project site and all stormwater infiltration basins so as to avoid adverse hydraulic impacts. Adverse hydraulic impacts include, but are not limited to: raising the groundwater table so as to cause surface ponding; flooding of basements and other subsurface structures and areas; preventing a stormwater infiltration basin from completely draining via infiltration within seventy-two (72) hours of a design storm event; and interference with the proper operation of subsurface sewage disposal systems and other surface and subsurface structures in the vicinity of the stormwater infiltration basin.
- g. The design engineer shall conduct a mounding analysis, as defined in Section 16-5.2 E., of all stormwater infiltration basins. The mounding analysis shall be conducted in accordance with the requirements in Subsection 16-5.2 N.12. of this ordinance. Where the mounding analysis identifies adverse impacts, the stormwater infiltration basin shall be redesigned or relocated, as appropriate.

- h. Stormwater infiltration BMPs shall be constructed in accordance with the following:
  - (1) To avoid sedimentation that may result in clogging and reduce the basin's permeability rate:
    - (a) All other infiltration BMP construction in this section shall be followed when the drainage area is completely stabilized, all accumulated sediment shall be removed from the infiltration BMP, which shall then be excavated to its final design elevation in accordance with the construction requirements of this section and the performance standards in Sections 16-5.2 F. and 16-5.2 G.
    - (b) To avoid compaction of subgrade soils of BMP's that rely on infiltration, no heavy equipment such as backhoes, dump trucks or bulldozers shall be permitted to operate within the footprint of the BMP. All excavation required to construct a stormwater infiltration BMP shall be performed by equipment placed outside the BMP. If this is not possible, the soils within the excavated area shall be renovated and tilled after construction is completed to reverse the effects of compaction. In addition, post-development soil permeability testing shall be performed in accordance with the soil field test permeability rate Section 16-5.2 I.2.d of this ordinance.
    - (c) Earthwork associated with stormwater infiltration BMP construction, including excavation, grading, cutting or filling, shall not be performed when soil moisture content is above the lower plastic limit.
- 3. Stormwater management measure guidelines are available in the New Jersey Stormwater Best Management Practices Manual. Other stormwater management measures may be utilized provided the design engineer demonstrates that the proposed measure and its design will accomplish the required water quantity, groundwater recharge and water quality design and performance standards established by Sections 16-5.2 F. and 16-5.2 G. of this ordinance.



4. Manufactured treatment devices may be used to meet the requirements of Section 16-5.2 G. of this ordinance, provided the pollutant removal rates are verified by the New Jersey Corporation for Advanced Technology and certified by the Department.

5. Storm Pipe Systems Strategy and Design.

a. A system emphasizing a natural as opposed to an engineered drainage strategy shall be encouraged. This shall include, but not be limited to, the use of vegetative swales in lieu of storm sewer inlets and piping.

b. The applicability of a natural approach depends on such factors as site storage capacity, open channel hydraulic capacity, and maintenance needs and resources.

c. Hydraulic capacity for open channel or closed conduit flow shall be determined by the Manning Equation, or charts/nomographs based on the Manning Equation:

$$Q = (1.486 AR^{2/3} S^{1/2})/n, \text{ where:}$$

n = Manning's roughness coefficient;

A = Cross-sectional area of flow in square feet;

R = Hydraulic radius in feet (R = A/P, where P is equal to the Wetted Perimeter); and

S = Slope of conduit in feet per foot.

d. Velocities in open channels at design flow shall not be less than 0.5 foot per second and not greater than that velocity which will begin to cause erosion or scouring of the channel. In no case shall the longitudinal slope of an open channel be less than 1%. The following are the maximum allowable velocities for various soils:

Soil Texture	Allowable Velocity (ft./sec.)
Sand and sandy loam (noncolloidal)	2.5
Silt loam (also high lime clay)	3.0
Sandy clay loam	3.5
Clay loam	4.0
Clay, fine gravel, graded loam to gravel	5.0
Cobbles	5.5
Shale	6.0

- e. Velocities in closed conduits at design flow shall be at least two feet per second but not more than the velocity which will cause erosion damage to the conduit. For reinforced concrete pipe, the maximum velocity shall not exceed 10 ft/sec.
- f. Pipe size shall be dictated by design runoff and hydraulic capacity.
- g. In general, no pipe size in the storm drainage system shall be less than fifteen inch diameter. A twelve-inch diameter pipe will be permitted as a cross-drain to a single inlet.
- h. Materials used in the construction of storm sewers shall be reinforced concrete, ductile iron, or high density polyethylene pipe. In normal circumstances, reinforced concrete pipe is preferred. Use of other types shall be justified by the designer and approved by the Township Engineer. Specifications referred to, such as ASA, ASTM, AWWA, etc., should be the latest revision.
  - (1) Reinforced concrete pipe:
    - (a) Circular reinforced concrete pipe and fittings shall meet the requirements of ASTM C-76.
    - (b) Elliptical reinforced concrete pipe shall meet the requirements of ASTM C-507.
    - (c) Joint design and joint material for circular pipe shall conform to ASTM C-443.
    - (d) Joints for elliptical pipe shall be bell and spigot or tongue and groove sealed with butyl, rubber tape, or external sealing bands conforming to ASTM C-877.
    - (e) All pipe shall be Class III unless a stronger pipe (i.e., higher class) is indicated to be necessary.
    - (f) The minimum depth of cover over the concrete pipe shall be as designated by the American Concrete Pipe Association.
  - (2) Ductile iron pipe shall be centrifugally cast in metal or sand-lined molds to ANSI A21.51-1976 (AWWA C151-76). The joints shall conform to AWWA C111. Pipe shall be furnished with flanges where connections to flange fittings are required.

Pipe should be Class 50 (minimum). The outside of the pipe should be coated with a uniform thickness of hot applied coal tar coating and the inside lined cement in accordance with AWWA C104. Ductile iron pipe shall be installed with Class C, Ordinary Bedding.

- (3) High Density Polyethylene Pipe may used at the discretion of the Township Engineer. Same shall not be used in areas of a shallow seasonal high water table.
- i. Pipe bedding shall be provided as specified in “Design and Construction of Sanitary and Storm Sewers,” ASCE Manuals and Reports on Engineering Practice No. 37, prepared by a Joint Committee of the Society of Civil Engineers and the Water Pollution Control Federation, New York, 1969.
- j. Where storm pipes will be located within the seasonal high water table, they shall be constructed using reinforced concrete piping with watertight “o”-ring gaskets, or approved equal as determined by the Township Engineer.
- k. Inlet spacing shall be designed to limit gutter flow width to six feet but shall not be more than 400 feet.
- l. Manhole spacing shall be increased with pipe size.

Pipe Size Manhole Spacing

(inches) (feet)

15 or less 500

18 to 36 600

42 to 60 700

60+ 700+

- m. All Manholes or Inlets shall be precast concrete or concrete block coated with two coats of portland cement mortar.
- n. If precast manhole barrels and cones are used, they shall conform to ASTM Specification C-473 with round rubber gaskets joints, conforming to ASTM Specification C-923. Maximum absorption shall be 8% in accordance with ASTM Specification C-478, Method A.

- o. If precast manholes are utilized, the top riser section shall terminate less than one foot below the finished grade and the manhole cover shall be flush with the finished grade.
- p. Manhole frames and covers shall be of American made cast iron conforming to ASTM Specification A-48 Class 30 and be suitable for H-20 loading capacity. All manhole covers in rights-of-way or in remote areas shall be provided with a locking device. The letters “Year 20\_\_\_” and the words “MONTGOMERY STORM SEWER” shall be cast integrally in the cover.
- q. All discharge pipes shall terminate with a precast or cast-in-place concrete headwall with or without wingwalls as conditions require. In normal circumstances, a cast-in-place concrete headwall is preferred. Use of other types shall be justified by the designer and approved by the Township Engineer.
- r. Headwalls and endwalls shall extend a minimum of twenty-five (25) feet from all roadways unless there is an existing natural barrier (trees, shrubs, berms) or a guardrail installed. When such conditions exist, the headwall or endwall may be placed at the right-of-way line or at a minimum distance of ten (10) feet from the edge of the roadway, whichever is greater.
- s. The stormwater system strategy and design, for all commercial or residential projects, shall meet the requirements of Residential Site Improvement Standards at N.J.A.C. 5:21-7.2, 7.3, and 7.4, unless otherwise more restrictive requirements are set forth in this section.

**J. Mitigation.**

- 1. Variance or Exemption from Stormwater Design Standards.
  - a. The Planning or Zoning Board having jurisdiction over an application requiring a stormwater management plan shall have the jurisdiction to grant a waiver from strict compliance with the performance requirements of this Ordinance or the Stormwater Management Plan. The waiver may be granted where an applicant has demonstrated the inability or impracticality of strict compliance with the Ordinance, and/or the Stormwater Management Plan upon the following conditions. The applicant must demonstrate one of the following:
    - (1) An inability to apply any of the Best Management Practices and methodologies as defined and approved herein and in the Stormwater Management Plan, due to an extraordinary and

exceptional situation uniquely affecting the subject property or the structures thereon, resulting in a peculiar and exceptional practical difficulty or undue hardship; or

- (2) That the purposes of this Ordinance and Stormwater Management Plan can be advanced by a deviation from the Best Management Practices and methodologies as defined and approved herein and in the Stormwater Management Plan, where the benefits of such deviation substantially outweigh any detriment.
- b. In requesting a waiver as to any application, the applicant may submit as reasons for the waiver the site conditions of the proposed project, including soils types; thin soil cover; low permeability soils, and/or shallow depths to groundwater (high groundwater levels), unique conditions which would create an unsafe design, or conditions which would provide a detrimental impact to public health, welfare or safety.
  - c. The waiver cannot be granted due to conditions created by the applicant. If the applicant can comply with the requirements of the Ordinance and Stormwater Management Plan through reduction of the size of the project, the hardship is self-imposed, and the Montgomery Planning Board or Zoning Board lacks jurisdiction to grant any waiver under this section.
2. Mitigation Projects.
- a. Any waiver is to be granted only upon the condition that the applicant provides a mitigation project within the same sub-watershed as delineated by the HUC 14. The applicant must propose a suitable mitigation method through submission of a mitigation plan as described in the Stormwater Management Plan which will conform as closely as possible to the design and performance standards of this Ordinance, through structural or non-structural stormwater management measures, governing stormwater quality, quantity, and groundwater recharge.
  - b. For purposes of this section, “Mitigation” shall incorporate the definition set forth in Section 16-5.2 E. of this Ordinance and shall include situations where the applicant has demonstrated the inability or impracticality of strict compliance with the stormwater management requirements set forth in N.J.A.C. 7:8 in addition to the requirements set forth in this Ordinance and the Municipality’s Stormwater Management Plan.

- c. The mitigation plan shall include as a minimum the data and analyses, including an alternatives analysis, listed in the Mitigation Plan Section of the Stormwater Management Plan which demonstrate how on-site compliance is to be maximized.
- d. The mitigation plan must provide stormwater management results compatible with the same HUC-14 watershed within which the subject project is proposed. Alternatively, the mitigation plan may:
  - (1) Provide for funding toward an offsite or regional stormwater control project, if available and practicable, or
  - (2) Fund an analysis to determine a more appropriate mitigation method to be presented to the Land Use Board for approval; or
  - (3) Provide for equivalent stormwater treatment at an alternate location, or
  - (4) Provide some other equivalent water quality benefit, if an on-site method is not proposed, provided the results required herein are achieved.
- e. The applicant shall be responsible for locating an appropriate site for mitigation of the performance section for which the waiver is sought. Mitigation may occur on municipal property or on a private property as long as permission is provided in writing from the owner of the property and a temporary construction easement obtained.
- f. General types of mitigation projects permitted and encouraged within the Township of Montgomery are:
  - (1) Repair of Roadside Swales;
  - (2) Stormwater Basin Retrofit;
  - (3) Stream and Stream Bank Stabilization;
  - (4) Stormwater Outfall Restoration; and/or
  - (5) Inlet Retrofit.
- g. The funding option shall be allowed only in situations where there will be no immediate impact upon a sensitive receptor. Contribution to a regional, municipal or offsite mitigation plan

shall be allowed for any application for one individual single-family residence. When approved by the Board, receipt of the financial contribution shall be deemed to satisfy the mitigation requirement for that application.

- h. The Board having jurisdiction over the individual application may determine that, due to the size of the project necessary to mitigate for the waiver, it is not practical to require a mitigation project.
- i. In all instances the Board having jurisdiction shall have the power to impose additional conditions as may be appropriate under the circumstances of the application. The Board shall make specific findings of fact and conclusions consistent with this section:
  - (1) Showing the inability or impracticality of strict compliance with the Ordinance and Stormwater Management Plan; and
  - (2) Justifying the approval of the applicant's mitigation plan, in order to satisfy the reporting requirements of the municipality's NJPDES permit and other applicable state law requiring the submission of reports to any state or county review agency.

The Board shall also have the power to require mitigation as to applications which have received waivers from the New Jersey Department of Environmental Protection.

- j. In compliance with the New Jersey Pollutant Discharge Elimination System (NJPDES) Tier A Municipal Stormwater Master General Permit, the Township shall provide the New Jersey Department of Environmental Protection information regarding any variance or exception granted from stormwater requirements and the corresponding mitigation projects in accordance with N.J.A.C. 7:8.

**K. Sources for Technical Guidance.**

- 1. Technical guidance for stormwater management measures can be found in the documents listed at Subsections 16-5.2 K.1.a. and b. below, which are available from Maps and Publications, New Jersey Department of Environmental Protection, 428 East State Street, P.O. Box 420, Trenton, New Jersey, 08625; telephone (609) 777-1038.
  - a. Guidelines for stormwater management measures are contained in the New Jersey Stormwater Best Management Practices Manual, as amended from time to time. Information is provided on stormwater management measures such as: bioretention systems,

constructed stormwater wetlands, dry wells, extended detention basins, infiltration structures, manufactured treatment devices, pervious paving, sand filters, vegetative filter strips, and wet ponds.

- b. The New Jersey Department of Environmental Protection Stormwater Management Facilities Maintenance Manual, as amended.
2. Additional technical guidance for stormwater management measures can be obtained from the following:
    - a. The “Standards for Soil Erosion and Sediment Control in New Jersey” promulgated by the State Soil Conservation Committee and incorporated into N.J.A.C. 2:90. Copies of these standards may be obtained by contacting the State Soil Conservation Committee or any of the Soil Conservation Districts listed in N.J.A.C. 2:90-1.3(a)4. The location, address, and telephone number of each Soil Conservation District may be obtained from the State Soil Conservation Committee, P.O. Box 330, Trenton, New Jersey 08625; (609) 292-5540;
    - b. The Rutgers Cooperative Extension Service, 732-932-9306; and
    - c. The Soil Conservation Districts listed in N.J.A.C. 2:90-1.3(a)4. The location, address, and telephone number of each Soil Conservation District may be obtained from the State Soil Conservation Committee, P.O. Box 330, Trenton, New Jersey, 08625, (609) 292-5540.

**L. Safety Standards for Stormwater Management Basins.**

1. This section sets forth requirements to protect public safety through the proper design and operation of stormwater management basins. This section applies to any new stormwater management basin.
2. Requirements for Trash Racks, Overflow Grates and Escape Provisions.
  - a. A trash rack is a device designed to catch trash and debris and prevent the clogging of outlet structures. Trash racks shall be installed at the intake to the outlet from the stormwater management basin to ensure proper functioning of the basin outlets in accordance with the following:
    - (1) The trash rack shall have parallel bars, with no greater than six (6) inch spacing between the bars.



- (2) The trash rack shall be designed so as not to adversely affect the hydraulic performance of the outlet pipe or structure.
  - (3) The average velocity of flow through a clean trash rack is not to exceed 2.5 feet per second under the full range of stage and discharge. Velocity is to be computed on the basis of the net area of opening through the rack.
  - (4) The trash rack shall be constructed and installed to be rigid, durable, and corrosion resistant, and shall be designed to withstand a perpendicular live loading of 300 lbs/ft sq.
- b. An overflow grate is designed to prevent obstruction of the overflow structure. If an outlet structure has an overflow grate, such grate shall meet the following requirements:
- (1) The overflow grate shall be secured to the outlet structure but removable for emergencies and maintenance.
  - (2) The overflow grate spacing shall be no less than two (2) inches across the smallest dimension.
  - (3) The overflow grate shall be constructed and installed to be rigid, durable, and corrosion resistant, and shall be designed to withstand a perpendicular live loading of 300 lbs./ft sq.
- c. For purposes of this subsection, escape provisions means the permanent installation of ladders, steps, rungs, or other features that provide easily accessible means of egress from stormwater management basins. Stormwater management basins shall include escape provisions as follows:
- (1) If a stormwater management basin has an outlet structure, escape provisions shall be incorporated in or on the structure. With the prior approval of the reviewing agency identified in Subsection 16-5.2 L.3., a free-standing outlet structure may be exempted from this requirement.
  - (2) Safety ledges shall be constructed on the slopes of all new stormwater management basins having a permanent pool of water deeper than two and one-half (2.5) feet. Such safety ledges shall be

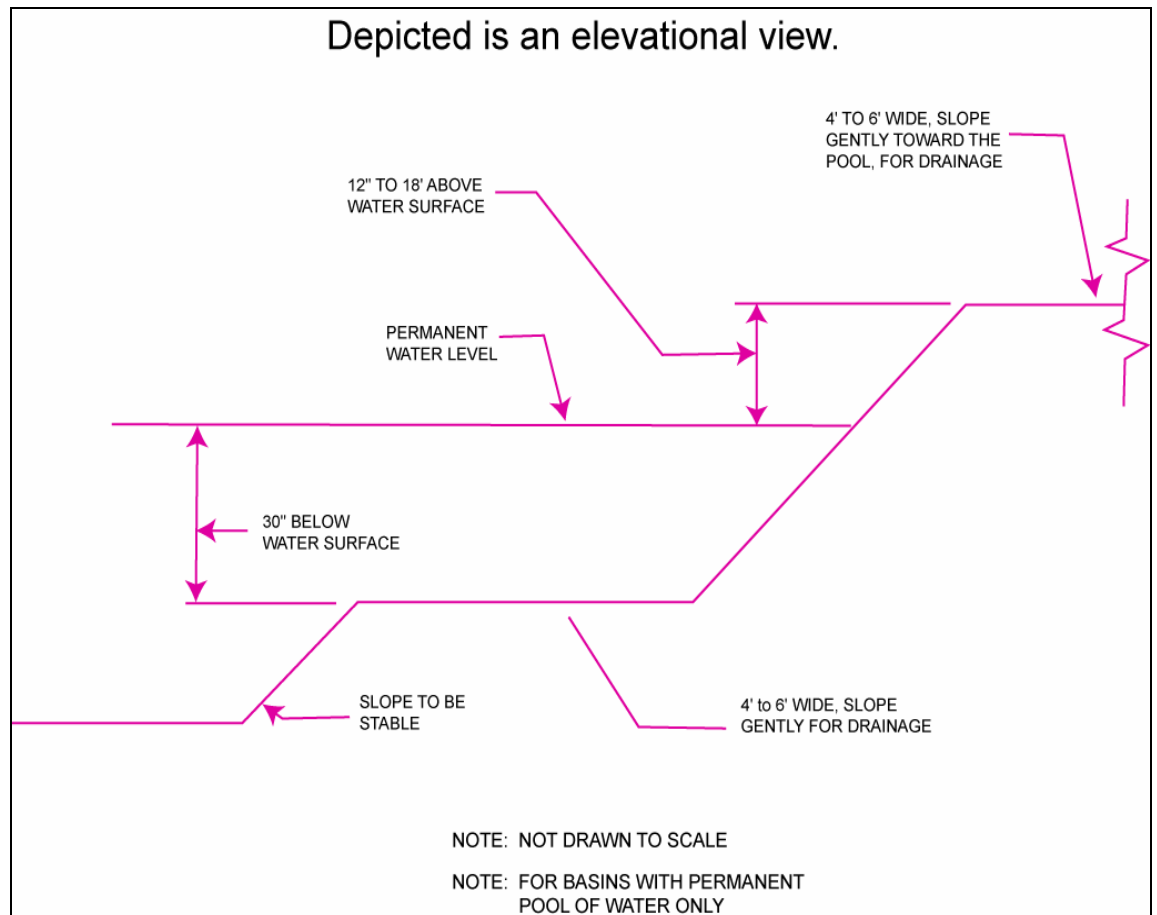
comprised of two (2) steps. Each step shall be four (4) to six (6) feet in width. One step shall be located approximately two and one-half (2.5) feet below the permanent water surface, and the second step shall be located one to one and one-half (1.5) feet above the permanent water surface. See Subsection 16-5.2 L.4. for an illustration of safety ledges in a stormwater management basin.

- (3) In new stormwater management basins, the maximum interior slope for an earthen dam, embankment, or berm shall not be steeper than three (3) horizontal to one (1) vertical.

3. Variance or Exemption from Safety Standards.

A variance or exemption from the safety standards for stormwater management basins may be granted only upon a written finding by the appropriate reviewing agency (municipality, county or Department) that the variance or exemption will not constitute a threat to public safety.

4. Illustration of Safety Ledges in a New Stormwater Management Basin.



**M. Requirements for a Site Development Stormwater Plan.**

1. Submission of Site Development Stormwater Plan.

- a. Whenever an applicant seeks municipal approval of a development subject to this ordinance, the applicant shall submit all of the required components of the Checklist for the Site Development Stormwater Plan at Subsection 16-5.2 M.3. below as part of the submission of the applicant's application for subdivision or site plan approval. These required components are in addition to any other non-stormwater related information required under Montgomery Township's Land Development Ordinance.
- b. The applicant shall demonstrate that the project meets the standards set forth in this ordinance.
- c. The applicant shall submit three (3) copies of the materials listed in the checklist for site development stormwater plans in accordance with Subsection 16-5.2 M.3. of this ordinance.

2. Site Development Stormwater Plan Approval.

The applicant's Site Development project shall be reviewed as a part of the subdivision or site plan review process by the municipal board or official from whom municipal approval is sought. That municipal board or official shall consult the engineer retained by the Planning and/or Zoning Board (as appropriate) to determine if all of the checklist requirements have been satisfied and to determine if the project meets the standards set forth in this ordinance.

3. Checklist Requirements.

The following information shall be required:

- a. Topographic Base Map.

The reviewing engineer may require upstream tributary drainage system information as necessary. It is recommended that the topographic base map of the site be submitted which extends a minimum of 200 feet beyond the limits of the proposed development, at a scale of 1"=200' or greater, showing 2-foot contour intervals. The map as appropriate may indicate the following: existing surface water drainage, shorelines, steep slopes, soils, erodible soils, perennial or intermittent streams that drain into or upstream of the Category One waters, wetlands and 100 year flood plains along with their appropriate buffer strips, marshlands and other wetlands, pervious or vegetative surfaces,

existing man-made structures, roads, bearing and distances of property lines, and significant natural and manmade features not otherwise shown.

b. Environmental Site Analysis.

A written and graphic description of the natural and man-made features of the site and its environs shall include a discussion of soil conditions, slopes, wetlands, waterways and vegetation on the site.

- (1) The geology and hydrogeology information from the National Resource Conservation Service maps and Township soil maps shall be provided, with particular attention to the "Evaluation of Groundwater Resources of Sourland Mountain Region of Central New Jersey" dated November 19, 2004 prepared by Matthew J. Mulhall, P.G., of M<sup>2</sup> Associates and Peter M. Demicco, P.G. of Demicco and Associates.
- (2) A recharge map shall be provided, showing location where recharge is possible on the site.
- (3) Particular attention should be given to unique, unusual, or environmentally critical areas and to those that provide particular opportunities or constraints for development.

c. Project Description and Site Plan(s).

A map (or maps) at the scale of the topographical base map indicating the location of existing and proposed buildings, roads, parking areas, utilities, structural facilities for stormwater management and sediment control, and other permanent structures. The map(s) shall also clearly show areas where alterations occur in the natural terrain and cover, including lawns and other landscaping, and seasonal high ground water elevations. A written description of the site plan and justification of proposed changes in natural conditions may also be provided.

d. Land Use Planning and Source Control Plan.

This plan shall provide a demonstration of how the goals and standards of Sections 16-5.2 G. through J. are being met. The focus of this plan shall be to describe how the site is being developed to meet the objective of controlling groundwater

recharge, stormwater quality and stormwater quantity standards of this ordinance through use of nonstructural or low impact development techniques and source controls to the maximum extent practicable before relying on structural BMPs.

- (1) The Land Use Planning and Source Control Plan shall include the New Jersey NonStructural Stormwater Measures Strategies (NSPS) point system spread sheet, a Low Impact Development Checklist, a detailed narrative and associated illustrative maps and/or plans that specifically address how the nine (9) nonstructural strategies will be implemented on the site to the maximum extent practicable in accordance with Subsections 16-5.2 G.6. and 16-5.2 G.7. of this ordinance.
- (2) A detailed Land Use Planning and Source Control Plan shall provide a description of how the site will be developed to meet the erosion control, groundwater recharge and stormwater runoff quantity and quality standards. If one or more of the nine (9) nonstructural strategies will not be implemented on the site, the applicant shall provide a detailed rationale establishing a basis for the contention that use of the strategy is not practicable on the site.

e. Stormwater Management Facilities Map.

The following information, illustrated on a map of the same scale as the topographic base map, shall be included:

- (1) Total area to be paved or built upon, proposed surface contours at one foot intervals, land area to be occupied by the stormwater management facilities and the type of vegetation thereon, details of the proposed plan to control and dispose of stormwater, soil boring locations, and existing contours; and
- (2) Details of all stormwater management facility designs, during and after construction, including discharge provisions, discharge capacity for each outlet at different levels of detention and emergency spillway provisions with maximum discharge capacity of each spillway.

- (3) Utility Plan showing all stormwater systems proposed, if any.
  - (4) Grading Plan showing existing and proposed contours, storm grate elevations and all storm invert elevations.
- f. Calculations and Soils Report.
- (1) Comprehensive hydrologic and hydraulic design calculations (groundwater recharge and stormwater runoff rate, volume and quality) for the pre-development and post-development conditions for the design storms specified in Section 16-5.2 H. of this ordinance.
  - (2) A soils report shall be submitted in accordance with Section 16-5.2 N. of the ordinance.

g. Maintenance and Repair Plan.

The applicant shall submit a detailed plan describing how the proposed stormwater management measure(s) shall meet the maintenance and repair requirements of Section 16-5.2 O. of this ordinance. Said plan shall include, at a minimum, the following elements:

- (1) The frequency with which inspections will be made;
  - (2) The specific maintenance tasks and requirements for each proposed structural and nonstructural BMP;
  - (3) The name, address and telephone number for the entity responsible for implementation of the maintenance plan;
  - (4) The reporting requirements; and
  - (5) Copies of the inspection and maintenance reporting sheets.
- h. Waiver from Submission Requirements.

The municipal official or board reviewing an application under this ordinance may, in consultation with the municipal engineer, waive submission of any of the requirements in Subsections 16-5.2 M.3.a. through 16-5.2 M.3.f. of this ordinance when it can be

demonstrated that the information requested is impossible to obtain or it would create a hardship on the applicant to obtain and its absence will not materially affect the review process.

**N. Requirements For Soil Testing And Methods For Assessing Soil Suitability For Infiltration Stormwater Management BMPs.**

The results of a subsurface investigation shall serve as the basis for the site selection and design of stormwater infiltration BMPs. The subsurface investigation shall include, but not be limited to, a series of soil test pits and soil permeability tests conducted in accordance with the following:

1. All soil test pits and soil permeability results shall be performed under the direct supervision of a Professional Engineer. All soil logs and permeability test data shall be accompanied by a certification by a Professional Engineer. The results and location (horizontal and vertical) of all soil test pits and soil permeability tests, both passing and failing, shall be reported to Montgomery Township.
2. During all subsurface investigations and soil test procedures, adequate safety measures shall be taken to prohibit unauthorized access to the excavations at all times. It is the responsibility of persons performing or witnessing subsurface investigations and soil permeability tests to comply with all applicable Federal, State and local laws and regulations governing occupational safety.
3. A minimum of two (2) soil test pits shall be excavated within the footprint of any proposed infiltration BMP to determine the suitability and distribution of soil types present at the site.
  - a. Placement of the test pits shall be within twenty (20) feet of the basin perimeter, located along the longest axis bisecting the BMP.
  - b. For BMPs larger than ten thousand (10,000) square feet in area, a minimum of one (1) additional soil test pit shall be conducted within each additional area of ten thousand (10,000) square feet.
  - c. The additional test pit(s) shall be placed approximately equidistant to other test pits, so as to provide adequate characterization of the subsurface material.
  - d. In all cases, where soil and or groundwater properties vary significantly, additional test pits shall be excavated in order to accurately characterize the subsurface conditions below the proposed infiltration BMP.

- e. Soil test pits shall extend to a minimum depth of eight (8) feet below the lowest elevation of the basin bottom or to a depth that is at least two (2) times the maximum potential water depth in the proposed infiltration BMP, whichever is greater.
4. A soil test pit log shall be prepared for each soil test pit.
    - a. The test pit log shall, at a minimum, provide the elevation of the existing ground surface, the depth and thickness (in inches) of each soil horizon or substratum, the dominant matrix or background and mottle colors using the Munsell system of classification for hue, value and chroma, the appropriate textural class as shown on the USDA textural triangle, the volume percentage of coarse fragments (larger than two (2) millimeters in diameter), the abundance, size, and contrast of mottles, the soil structure, soil consistence, and soil moisture condition, using standard USDA classification terminology for each of these soil properties.
    - b. Soil test pit logs shall identify the presence of any soil horizon, substratum or other feature that exhibits an in-place permeability rate less than one (1) inch per hour.
  5. Each soil test pit log shall report the depth to seasonally high water level, either perched or regional, and the static water level based upon the presence of soil mottles or other redoximorphic features, and observed seepage or saturation.
    - a. Where redoxomorphic features including soil mottles resulting from soil saturation are present, they shall be interpreted to represent the depth to the seasonal high water table unless soil saturation or seepage is observed at a higher level.
    - b. When the determination of the seasonally high water table shall be made in ground previously disturbed by excavation, direct observation of the static water table during the months of January through April shall be the only method permitted.
  6. Any soil horizon or substratum which exists immediately below a perched zone of saturation shall be deemed by rule to exhibit unacceptable permeability (less than one (1) inch per hour). The perched zone of saturation may be observed directly, inferred based upon soil morphology, or confirmed by performance of a hydraulic head test as defined at N.J.A.C. 7:9A-5.9.
  7. Stormwater infiltration BMPs shall not be installed in soils that exhibit artesian groundwater conditions. A permeability test shall be conducted in all soils that immediately underlie a perched zone of saturation. Any zone of saturation which is present below a soil horizon which exhibits an in-



place permeability of less than 0.2 inches per hour shall be considered an artesian zone of saturation unless a minimum one (1) foot thick zone of unsaturated soil, free of mottling or other redoximorphic features and possessing a chroma of four (4) or higher, exists immediately below the unsuitable soil.

8. A minimum of one (1) permeability test shall be performed at each soil test pit location.
  - a. The soil permeability rate shall be determined using test methodology as prescribed in N.J.A.C. 7:9A-6.2 (Tube Permeameter Test), 6.5 (Pit Bailing Test) or 6.6 (Piezometer Test).
  - b. When the tube permeameter test is used, a minimum of two (2) replicate samples shall be taken and tested.
  - c. Alternative permeability test procedures may be accepted by the approving authority provided the test procedure attains saturation of surrounding soils, accounts for hydraulic head effects on infiltration rates, provides a permeability rate with units expressed in inches per hour and is accompanied by a published source reference.
  - d. Examples of suitable sources include hydrogeology, geotechnical or engineering text and design manuals, proceedings of American Society for Testing and Materials (ASTM) symposia, or peer-review journals.
  - e. Neither a Soil Permeability Class Rating Test, as described in N.J.A.C. 7:9A-6.3, nor a Percolation Test, as described in N.J.A.C. 7:9A-6.4, are acceptable tests for establishing permeability values for the purpose of complying with this ordinance.
  
9. Soil permeability tests shall be conducted on the most hydraulically restrictive horizon or substratum to be left in place below the basin as follows:
  - a. Where no soil replacement is proposed, the permeability tests shall be conducted on the most hydraulically restrictive horizon or substratum within four (4) feet of the lowest elevation of the basin bottom or to a depth equal to two (2) times the maximum potential water depth within the basin, whichever is greater.
  - b. Where soil replacement is proposed, the permeability tests shall be conducted within the soil immediately below the depth of proposed soil replacement or within the most hydraulically restrictive horizon or substratum to a depth equal to two (2) times the

- maximum potential water depth within the basin, whichever is greater.
- c. Permeability tests may be performed on the most hydraulically restrictive soil horizons or substrata at depths greater than those identified above based upon the discretion of the design or testing engineer.
  - d. The tested infiltration rate should then be divided by two (2) to establish the soil's design permeability rate. Such division will provide a 100% safety factor to the tested rate.
10. The minimum acceptable "tested permeability rate" of any soil horizon or substratum shall be one (1) inch per hour.
- a. Soil materials that exhibit tested permeability rates slower than one (1) inch per hour shall be considered unsuitable for stormwater infiltration.
  - b. The maximum reportable "tested permeability rate" of any soil horizon or substratum shall be no greater than twenty (20) inches per hour regardless of the rate attained in the test procedure.
11. After all construction activities have been completed on the development site and the finished grade has been established in the infiltration BMP, a minimum of one (1) permeability test shall be conducted within the most hydraulically restrictive soil horizon or substratum below the as-built BMP to ensure the performance of the infiltration BMP is as designed.
- a. Hand tools and manual permeability test procedures shall be used for the purpose of confirming BMP performance.
  - b. In addition, the infiltration BMP shall be flooded with water sufficient to demonstrate the performance of the BMP.
  - c. Test results shall be certified to the municipal engineer.
12. A groundwater mounding analysis shall be provided for each stormwater infiltration BMP.
- a. The groundwater mounding analysis shall calculate the maximum height of the groundwater mound based upon the volume of the maximum design storm.
  - b. The Professional Engineer conducting the analysis shall provide the municipal engineer with the methodology and supporting documentation for the mounding analysis used and shall certify to Montgomery Township, based upon the analysis, that the

groundwater mound will not cause stormwater or groundwater to breakout to the land surface or cause adverse impact to adjacent surface water bodies, wetlands or subsurface structures including but not limited to basements and septic systems.

- c. If there is more than one infiltration BMP proposed, the model shall indicate if and how the mounds will interact.
- d. The mounding analysis shall be calculated using the most restrictive soil horizon that will remain in place within the explored aquifer thickness unless alternative analyses are authorized by the municipal engineer.
- e. The mounding analysis shall be accompanied by a cross section of the infiltration BMP and surrounding topography and the mound analysis shall extend out to the point(s) at which the mound intersects with the preexisting maximum water table elevation.

- 13. The applicant shall demonstrate that stormwater infiltration BMPs meet the seventy-two (72) hour drain time requirement established in Subsection 16-5.2 I.2. of this ordinance.

**O. Maintenance and Repair.**

- 1. Projects subject to review as in Section 16-5.2 C. of this ordinance shall comply with the requirements of the following subsections.
- 2. Operation and Maintenance Plan.
  - a. The design engineer shall prepare an Operation and Maintenance Plan for the stormwater management measures incorporated into the design of a major development.
  - b. The maintenance plan shall contain specific information as required in N.J.A.C. 7:8, including but not limited to:
    - (1) Accurate and comprehensive drawings of the site's stormwater management measures;
    - (2) Specific locations of each stormwater management measure identified by means of longitude and latitude as well as block and lot number;
    - (3) Specific preventative and corrective maintenance tasks and schedules for such tasks for each stormwater BMP in easy to understand language;

- (4) Cost estimates, including estimated cost of sediment, debris or trash removal;
  - (5) The name, address and telephone number of the person or persons responsible for regular inspections and preventative and corrective maintenance (including repair and replacement). If the responsible person or persons is a corporation, company, partnership, firm, association, municipality or political subdivision of this State, the name and telephone number of an appropriate contact person shall also be included; and
  - (6) Inspection Logs.
- c. Responsibility for maintenance shall not be assigned or transferred to the owner or tenant of an individual property in a residential development or project, unless such owner or tenant owns or leases the entire residential development or project.
  - d. If the person responsible for maintenance identified under Subsection 16-5.2 O.2.b.(5) above is not a public agency, the maintenance plan and any future revisions, based on Subsection 16-5.2 O.2.f. below, shall be recorded upon the deed of record for each property on which the maintenance described in the maintenance plan must be undertaken.
  - e. Preventative and corrective maintenance shall be performed to maintain the function of the stormwater management measure, including repairs or replacement to the structure; removal of sediment, debris, or trash; restoration of eroded areas; snow and ice removal; fence repair or replacement; restoration of vegetation; and repair or replacement of nonvegetated linings.
  - f. The person responsible for maintenance identified under Subsection 16-5.2 O.2.b.(5) above shall maintain a detailed log of all preventative and corrective maintenance for the structural stormwater management measures incorporated into the design of the development, including a record of all inspections and copies of all maintenance-related work orders.
  - g. The person responsible for maintenance identified under Subsection 16-5.2 O.2.b.(5) above shall evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan and the deed as needed.

- h. The person responsible for maintenance identified under Subsection 16-5.2 O.2.b.(5) above shall retain and make available, upon request by any public entity with administrative, health, environmental, or safety authority over the site, the maintenance plan and the documentation required by Subsections 16-5.2 O.2.f. and 16-5.2 O.2.g. above.
- i. The requirements of Subsections 16-5.2 O.2.c. and 16-5.2 O.2.d. do not apply to stormwater management facilities that are dedicated to and accepted by Montgomery Township or another governmental agency.
- j. In the event that the stormwater management facility becomes a danger to public safety or public health, or if it is in need of maintenance or repair, the municipality shall so notify the responsible person in writing.
  - (1) Upon receipt of that notice, the responsible person shall have fourteen (14) days to effectuate maintenance and repair of the facility in a manner that is approved by the municipal engineer or his designee.
  - (2) Montgomery Township, in its discretion, may extend the time allowed for effecting maintenance and repair for good cause.
  - (3) If the responsible person fails or refuses to perform such maintenance and repair, Montgomery Township may immediately proceed to do so with its own forces and equipment and/or through contractors.
  - (4) The costs and expenses of such maintenance and repair by Montgomery Township may be entered on the tax roll as a special charge against the property and collected with any other taxes levied thereon for the year in which the maintenance and repair was performed.
- k. Nothing in this section shall preclude Montgomery Township from requiring the posting of a performance or maintenance guarantee in accordance with N.J.S.A. 40:55D-53.
- l. All paved parking areas, walkways and roads shall be cleaned, as required by State regulations, and the use of deicing agents shall be minimized to the amount necessary to allow safe pedestrian and vehicular access. Trash, debris and sediments shall be removed

from drainage systems as needed. The prevention, containment and clean up of chemical spills or other accumulations of pollutants shall be made in a timely manner pursuant to all local, State and Federal requirements.

3. Stormwater Management Facility Maintenance Responsibilities.

The following shall apply to allocate responsibility for stormwater management facilities:

- a. Stormwater management facility required for any non-residential (commercial) development.

Whenever a detention or retention basin or other stormwater management facility is required for a non-residential development, the basin or stormwater management facility shall be a part of an individual lot owned and maintained by the property owner, or in the case of a business park or other similar complex, part of the common open space owned by a business association. Provisions for long term maintenance of the basin shall be established. No responsibility, maintenance or otherwise, shall be transferred to the Township.

- b. Stormwater management facility required for any multi-family (e.g. apartments or townhouses) development.

Whenever a detention, retention basin or other stormwater management facility is required for a development approval for a multi-family building, the basin or stormwater management facility shall be a part of the individual lot owned and maintained by the property owner of the development consisting of rental units or a part of the common open space owned by a homeowners' association of a development of for-sale units, and provisions for long term maintenance of the basin shall be established. No responsibility, maintenance or otherwise, shall be transferred to the Township.

- c. Stormwater management facility required for any conventional, non-clustered development of single-family detached dwellings.

- (1) Whenever a detention basin, retention basin or other stormwater management facility is required in connection with a development approval for any conventional, non-clustered development of single-family detached dwellings, the detention or retention basin(s) or other large stormwater management facilities shall be owned and

maintained by a homeowners' association unless it is not reasonably feasible to establish a homeowners' association.

When it is not reasonably feasible to establish a homeowners' association, the basin(s) or large stormwater management facilities shall be constructed, under the following conditions:

- (a) A separate lot shall be created for the stormwater basin or management facility and dedicated to the Township.
- (b) If the site plan or subdivision is approved by the Planning or Zoning Board without a separate lot for the stormwater basin or management facility, then a drainage and access easement dedicated to the Township of Montgomery shall be created on the single family residential lot to ensure that the responsibility for maintenance is not transferred to owner of an individual property. The easement shall be recited in metes and bounds in the deed of the property and shall be reviewed and approved by the Township Engineer and Township Attorney prior to recording.
- (c) The developer shall deposit a cash escrow maintenance guarantee with the Township of Montgomery in an amount reasonably determined by the Township Engineer and approved by the Township Committee to be sufficient to complete routine maintenance such as mowing and to maintain the grates and control structures for one hundred (100) years after initial construction and to replace such grates and control structures as required during the one hundred (100) year time period.
- (d) The cash escrow maintenance guarantee shall ensure that all stormwater management measures required under this ordinance will be maintained in accordance with the design specifications required and established under this ordinance. The calculation of the maintenance guarantee shall be based in part

upon the Inspection, Maintenance and Repair Plan (Plan), required to be prepared by the applicant and approved by Montgomery Township. The Plan shall include an estimate of the present value of the cost to inspect, maintain and repair the stormwater management measure(s) in accordance with the Plan for the useful life of those measure(s).

- (e) The calculation of the cash escrow maintenance guarantee also shall consider the costs associated with the reconstruction of stormwater management measures that are reasonably anticipated to be subject to long term failure after an agreed number of years, depending on the type of measure(s) that might need to be reconstructed. The amount shall be based on the future value of the measure(s) being reconstructed.
  - (f) This up-front cash escrow maintenance guarantee shall be placed in a dedicated cash management account and expended by Montgomery Township for the sole purpose of conducting inspection, maintenance and repair activities for all stormwater management measures required under the applicant's major development application approval. Such funds shall not be used for maintenance of any lands or improvements other than stormwater management facilities.
- (2) The maintenance of small stormwater management facilities, as defined below, on individual residential lots are to remain as the lot owners' responsibility.
- (a) A small stormwater management facility is hereby defined as rain gardens, dry wells, water quality basins, vegetated swales which are entirely situated and designed to handle the runoff from a structure on a residential lot.
  - (b) Small stormwater management facilities shall not control runoff from a public street. Stormwater management facilities which are



primarily intended to manage stormwater generated on a residential lot shall be situated and contained on such lot.

- (c) Such facilities shall be designed in accordance with the Best Management Practices Manual from NJDEP as revised from time to time, Ordinances of the Township of Montgomery, the developmental approvals, and accepted engineering standards of design and practice.
- (3) A small stormwater management facility, as defined above, shall not be maintained by the Township of Montgomery, but shall be the responsibility of the owner of the single residential lot upon which the facilities were constructed.
- (a) The aforesaid obligation of maintenance shall be required by the approving board to be memorialized and recorded as a deed restriction.
  - (b) The area of the stormwater facility shall also be recorded on the deed in metes and bounds.
  - (c) No such facility shall be modified or eliminated following issuance of the initial certificate of occupancy unless the Township of Montgomery permits such modification or elimination by adoption of an Ordinance.
- d. Nothing herein shall reduce or eliminate the developer's obligation to adequately construct all stormwater management facilities. Adequate performance guarantees shall be posted to assure the good and workmanlike installation of such stormwater maintenance facilities pursuant to N.J.S.A. 40:55D-53. The Township Engineer shall not accept any stormwater management facilities unless and until the developer's engineers shall have submitted to the Township Engineer as-built drawings certifying that the said facilities were constructed in accordance with the approved plans.

- e. During a period of maintenance immediately following the release of performance guarantees, it shall continue to be the developer's obligation, together with the surety, to adequately maintain the stormwater management facilities. Only after the expiration of maintenance guarantees shall any escrowed funds be utilized for maintenance of stormwater management facilities.
4. Requirements for Inspection, Maintenance and Repair of Stormwater BMP's that Rely on Infiltration.

If a stormwater infiltration BMP is incorporated into the design of a major development, the applicant shall include the following requirements in its Inspection, Maintenance and Repair Plan:

- a. Once per month (if needed): Mow side slopes, remove litter and debris, stabilize eroded banks, and repair erosion at inflow structure(s);
- b. After every storm exceeding one (1) inch of rainfall: Ensure that infiltration BMPs drain completely within seventy-two (72) hours after the storm event. If stored water fails to infiltrate seventy-two (72) hours after the end of the storm, corrective measures shall be taken. Raking or tilling by light equipment can assist in maintaining infiltration capacity and break up clogged surfaces;
- c. Four (4) times per year (quarterly): Inspect stormwater infiltration BMPs for clogging and excessive debris and sediment accumulation within the BMP, and remove sediment (if needed) when completely dry;
- d. Two (2) times per year: Inspect for signs of damage to structures, repair eroded areas, check for signs of petroleum contamination and remediate;
- e. Once per year: Inspect BMPs for unwanted tree growth and remove if necessary, disc or otherwise aerate bottom of infiltration basin to a minimum depth of six (6) inches; and
- f. After every storm exceeding one (1) inch of rainfall, inspect and, if necessary, remove and replace basin infiltration layer and accumulated sediment, to restore original infiltration rate.
- g. Additional guidance for the inspection, maintenance and repair of stormwater infiltration BMPs can be found in the New Jersey BMP Manual.

**P. Grading.**

1. Lots shall be graded to secure proper drainage away from the buildings. Additionally, drainage shall be provided in a manner which will prevent the collection of stormwater in pools or other unauthorized concentrations of flow and, to the greatest extent possible, water shall not flow across adjacent property lines. No areas of concentrated flow via gutters, channels, swales and/or pipe discharge shall be directed across driveways or sidewalks.
2. A final drainage plan shall accompany the final subdivision or site plan. Such drainage plan shall show the same information as required on the preliminary plan with the addition that the individual lot grading shall be shown as follows:
  - a. Final grades shall be shown for each lot corner, all high and low points and breaks in grade, finished floor elevation of structures, finished grade of septic systems, if applicable, and at the corners of tentative structure locations. If the use of drainage swales is intended, the elevation of these swales shall be shown. The minimum grade of disturbed areas shall be one and one-half (1 1/2%) percent.
  - b. Prior to construction of foundation walls, an as-built plan of the horizontal and vertical location of the foundation footing shall be submitted to the Zoning Officer for review and approval. As a condition precedent to the issuance of certificates of occupancy, the developer shall submit an as-built lot grading plan to the Township bearing an engineer's certification that the lot grading complies with the approved final lot grading and soil erosion control plans.
3. Grading and finished floor elevations shall be adjusted for the house model selected, located within the building envelope and final architectural plans conforming to applicable codes. Final information shall be submitted to the Township as part of the building permit application for each lot.
4. Each individual lot's grading plan, which is submitted as part of a building permit application for footings and foundations shall identify the International Building Code grading requirements. In all cases, the grade shall pitch away from the buildings at not less than one (1) inch in twelve (12) inches for a distance of eight (8) feet. Where cross lot drainage is reasonably unavoidable and contradicts Subsections 16-5.2 P.1. and 2. above, the footing and foundation permit application shall include a grading plan which defines the proposed final grading of all abutting lots affecting the lot for which the foundation permit is being made.

**Q. Dedication of Easements.**

The approving board may require easements along drainage ways, natural water courses, steep slopes and other unique botanical, historical, geological and paleontological areas located therein or adjacent to a proposed development. The easement shall be indicated on the plan and shall be marked on the land by iron pipes at angle points and or property corners at sufficient locations to enable the easements to be surveyed. In such cases, the approving board shall consult with the Township Planner, Township Engineer, and the Environmental Commission in determining the required shape and size of the easement. The easement shall be in a form approved by the approving board's attorney and shall include provisions assuring the following:

1. Preservation of the channel and flood plain of the water course, including the right to clean, de-snag and all such work necessary to maintain the shape, slope and water flow of the water course.
2. Prohibition of any removal of trees and other cleaning and grading not directly related to the preservation of the channel of a water course.
3. Grant of a right to the Township to install and maintain any drainage facilities necessary for the health and safety of the public.
4. Right-of-entry to the Township to install and maintain any drainage facilities therein.

**R. Penalties.**

Any person who erects, constructs, alters, repairs, converts, maintains, or uses any building, structure or land in violation of this ordinance shall be subject to the penalties stipulated in Section 16-10.6 of this chapter.

**SECTION 2.** Add a new subsection to Subsection 16-5.14a., entitled “Streets”, of the Code of the Township of Montgomery (1984) to read in its entirety as follows:

- “11. No privately owned above ground or below ground improvement, including but not limited to landscaping and lawn sprinkler systems, may be installed within the street right-of-way, except mailboxes in accordance with Post Office regulations, without the expressed written approval of the Montgomery Township Engineer.”

**SECTION 3.** If any section, paragraph, subsection, clause or provision of this Ordinance shall be adjudged by the Courts to be invalid, such adjudication shall apply only to the subsection, clause or provision so adjudged and the remainder of this Ordinance shall be deemed valid and effective.

**SECTION 4.** This Ordinance shall take effect upon final adoption, publication and the filing of a copy of said Ordinance with the Somerset County Planning Board, all in accordance with the law.